

Galvanometric Studies: Professor A. T. Poffenberger, professor of psychology, Columbia University.

Instructional Films: Dr. Franklin Fearing, associate professor of psychology, Northwestern University.

TUESDAY, SEPTEMBER 12

Social Psychology: Professor Walter B. Pillsbury, professor of psychology, University of Michigan.

Animal Psychology: Dr. Karl S. Lashley, professor of psychology, University of Chicago.

Clinical Psychology: Dr. Edgar A. Doll, director of research, The Training School, Vineland, New Jersey.

WEDNESDAY, SEPTEMBER 13

Industrial Psychology: President Walter Dill Scott, Northwestern University.

Animal Psychology: Professor John F. Dashiell, professor of psychology, University of North Carolina.

Abnormal Psychology: Professor Edward S. Robinson, professor of psychology, Yale University.

SCIENTIFIC NOTES AND NEWS

PROFESSOR ALBERT EINSTEIN has been elected a foreign associate of the Paris Academy of Sciences to fill the place vacant by the death of Professor Albert A. Michelson.

THE Conné Medal has been presented by the Chemists' Club of New York to Dr. Henry D. Dakin, editor of the *Journal of Biological Chemistry*, in recognition of his work on antiseptic solutions. The first award was made last year to Dr. John J. Abel, professor emeritus of pharmacology, the Johns Hopkins University School of Medicine.

AMONG those on whom the doctorate of laws will be conferred on the occasion of the celebration of the three hundred and fiftieth anniversary of the University of Edinburgh on October 28 will be Lord Rayleigh, emeritus professor of physics at the Imperial College of Science and foreign secretary of the Royal Society; Sir Edward Albert Sharpey-Schafer, retiring professor of physiology at the University of Edinburgh, and Sir James Colquhoun Irvine, principal of the University of St. Andrews, formerly professor of chemistry at the University of Glasgow.

DR. GEORGE BARGER, professor of medical chemistry at the University of Edinburgh, will receive the honorary degree of LL.D. from the University of Michigan on September 25.

THE Royal Numismatic Society, London, has awarded its medal to Professor Kurt Regling, director of the cabinet of coins at the Berlin State Museum.

DR. ALBERT PETER, professor of botany at the University at Göttingen, celebrated his eightieth birthday on August 21.

DR. BERNARD V. CHRISTENSEN, Ph.D., head of the department of pharmacognosy and pharmacology, University of Florida, has been appointed director of the school of pharmacy. The college of pharmacy was recently classified as a school and placed under the College of Arts and Sciences.

DR. HARRY B. WEISER, since 1919 professor of chemistry at Rice Institute, has been appointed dean.

DR. EBEN J. CAREY, director of the department of anatomy, Marquette University School of Medicine, Milwaukee, has been appointed dean to succeed Dr. Bernard F. McGrath, who resigned recently because of ill health.

PROFESSOR S. C. OGBURN, JR., formerly head of the department of chemical engineering at Bucknell University, Lewisburg, Pennsylvania, has been appointed chairman of the division of engineering at that institution. Dr. Robert C. Kintner, formerly of the department of chemical engineering of the Ohio State University, has become assistant professor of chemical engineering.

DR. J. L. McELROY, superintendent of the hospital division of the Medical College of Virginia since 1929, has resigned to become director of the American Hospital, Paris, France; Dr. Lewis E. Jarrett, senior assistant superintendent of the hospital division, has been promoted to succeed Dr. McElroy. Promotions for the session 1933-34 include: Dr. W. R. Bond, from associate professor to professor of physiology; Dr. H. B. Haag, from associate professor to professor of pharmacology; Dr. R. H. Courtney, from assistant professor to associate professor of ophthalmology; Dr. Wyndham B. Blanton, from associate professor to professor of the history of medicine.

It is announced in *Nature* that the following awards, among others, for the year 1933-1934 have been made by the Salters' Institute of Industrial Chemistry. Fellowships renewed to: S. C. Britton, Pembroke College, Cambridge, E. H. T. Hoblyn, Imperial College of Science and Technology, G. Pearce, University of Birmingham, and P. Chisholm Young, Trinity College, Cambridge. Fellowships awarded to: N. S. Kelland, St. John's College, Oxford, J. D. Rose, Jesus College, Oxford, F. C. Storrs, Chelsea Polytechnic and University College, London, C. W. Woolgar, King's College, London. The Salters' Institute has also awarded one hundred and ten grants-in-aid to young men and women employed in chemical works, to facilitate their further studies.

RAFAEL MENENDEZ RAMOS, an authority on sugar cane technology, has been appointed commissioner of agriculture and commerce for the island of Puerto Rico.

DR. MORTIMER E. COOLEY, dean emeritus of the College of Engineering in the University of Michigan, has been appointed state engineer under the Public Works Administration of the National Recovery program. Dr. James B. Edmonson, dean of the school of education, is director of the local NRA efforts.

MADemoiselle Thérèse Frémont, investigator in plant pathology in the Institut Pasteur, Lille, France, is spending the year at Riverside, California, in the laboratory of plant physiology of the Citrus Experiment Station of the University of California, where she will investigate certain problems of the mycorrhiza of citrus roots in cooperation with Professor H. S. Reed. Mlle. Frémont holds a traveling fellowship awarded by l'Institut Agronomique and a grant from la Caisse National des Sciences.

FATHER BERNARD F. DOUCETTE, S.J., of Manila Observatory, Manila, P. I., recently spent two weeks at the Scripps Institution of Oceanography of the University of California with Dr. G. F. McEwen, professor of physical oceanography.

DR. C. H. EDMONDSON, professor of zoology at the University of Hawaii, Honolulu, is visiting the United States.

DR. ALBERT W. C. T. HERRE, curator of the Zoological Museum, Stanford University, sails on September 11 for Yap, in pursuance of his studies of the geographical distribution of fishes in the tropical Pacific. The Pelews will next be visited, and further explorations made in the Philippines. Two or three months will be spent at Ling Nan University, Canton, in continuation of his investigations of the fishes of southeastern China. The return trip will be made *via* Singapore, Colombo, Mombasa, Zanzibar, Durban, Cape Town, Buenos Ayres, Rio de Janeiro and the Panama Canal.

DR. RICHARD THURNWALD, professor of ethnology at Berlin, has accepted an invitation from the Australian National Research Council, Sydney, to undertake a scientific expedition to New Guinea and the Solomon Islands.

DR. G. VAN ITERSON, professor of technical botany in the Technical University of Delft, gave on July 18 an illustrated demonstration lecture on liquid crystals before the newly formed California-at-Los-Angeles chapter of the Society of the Sigma Xi.

THE first American Congress of Radiology, organized in connection with the radiological exhibit at

the Century of Progress Exposition, will be held in Chicago on September 25. Dr. George E. Pfahler, of Philadelphia, is chairman of the scientific program committee. Four organizations will take part, the American Roentgen Ray Society, the Radiological Society of North America, the American Radium Society and the American College of Radiology. One section of the congress will be devoted to roentgenological studies of tuberculosis, another to the study of bone tumors, a third to cancer of the mouth and skin and a fourth to urology and gynecology. Dr. Byrl R. Kirklin, of the Mayo Clinic, is chairman of a committee which is arranging an extensive scientific exhibit, and the leading manufacturers of x-ray equipment in America and Europe will show their appliances.

A SERIES of lectures on industrial chemistry and chemical engineering will be presented by specialists of the Mellon Institute of Industrial Research during 1933-34, on alternate Thursdays, at 11:30 A. M., throughout both semesters in the fellows' room of the institute. These discourses will be open to all students of industrial chemistry and chemical engineering in the University of Pittsburgh, as well as to the institute's members. The speakers are: October 5, Dr. E. R. Weidlein, "Chemical Engineering To-day and To-morrow"; October 19, Dr. H. J. Rose, "Solid Fuels"; November 2, Dr. A. P. Thompson, "Electric Furnace Products"; November 16, Dr. A. W. Coffman, "Corrosion-Resistant Materials"; December 7, Dr. W. W. Duecker, "Sulfur"; January 4, Dr. E. W. Reid, "Solvents"; January 18, Dr. P. B. Davidson, "Paper"; February 15, Mr. C. F. Goldthwait, "Textiles"; March 1, Dr. A. W. Harvey, "Cottonseed Products"; March 15, Dr. H. K. Salzberg, "Dairy Products"; March 29, Dr. J. J. Enright, "Bacteriology, Chemistry, and Public Health"; April 12, Dr. G. D. Beal, "Pharmaceuticals"; April 26, Dr. L. H. Cretcher, "Synthetic Medicinals."

THE Council of the Biological Society of Washington has reissued all the various parts of its *Proceedings* formerly out of print, and can now supply complete sets of volumes 1 to 46, 1881 to 1933, and can also supply whatever parts may be needed to complete partial sets now in the libraries of individuals or institutions. Among the items again available is the formerly very rare Volume 3, July 1, 1884, to February 6, 1886, now lacking from a considerable number of otherwise complete sets. This volume contains (pages 35 to 105, inclusive) the well-known work by Dr. G. Brown Goode entitled "The Beginnings of Natural History in America," the continuous demand for which contributed to the speedy exhaustion of the original edition. Lists of desiderata or requests

for information should be sent to the society's corresponding secretary, J. S. Wade, U. S. Bureau of Entomology, Washington, D. C.

THE first number of the newly named quarterly, *California Journal of Mines and Geology*, hitherto known as *Mining in California*, continues the increased attention to geology that has characterized its issues for two years past. The geology and the gold deposits of the mountainous Redding-Weaverville district, adjoining the northern end of the Great Valley Plain, are treated by N. E. A. Hinds, of the University of California at Berkeley, and C. A. Averill, mining engineer; the economic geology of Del Norte County, in the extreme northwestern corner of the state, is discussed by J. H. Maxson, of the California Institute of Technology at Pasadena; and a general description of the lakes of California is contributed by W. M. Davis, now associated with the same institute. All the articles are well illustrated. Geological visitors to California should know that, when they ferry across the bay and land at the Ferry Building on the San Francisco water-front, the State Division of Mines, by which the above-named journal is published, maintains on the third floor of that building a large collection of California minerals and a good library on geology and mining, open to the public.

ASSOCIATED with a deposit of mammoth bones found near Dent, Weld County, Colorado, two artifacts of the spear-head Folsom type have been discovered, the first by Father Bilgery, of Regis College, Denver, the second by Mr. B. F. Howarter, of the Colorado Museum of Natural History. The association is such as to indicate that the artifacts belong to the same period as the mammoths. An account of these finds, with illustrations, has been published by the Colorado Museum of Natural History; it is written by the director, J. D. Figgins.

WILD-LIFE management, as worked out by the School of Forestry and Conservation, University of Michigan, at Williamston, Michigan, in cooperation with other state and federal organizations, is illustrated at the Century of Progress Exposition as a part of the exhibit of the Izaak Walton League, of which S. B. Loeke is conservation director. It consists of a diorama which illustrates farm land being managed for wild life. Several pheasants, including a family of young, are shown in the foreground, as are song birds and bobwhite quail. These are built up in wax and painted in natural colors. Food and cover patches and evergreen and shrub plantings are shown along the banks of a stream, while in the background are pictured the farm buildings, growing crops and the woods.

Nature writes: "Dungeness Promontory, famous amongst bird-lovers as the last refuge of the Kentish

plover and the home of the stone-curlew and many other interesting shore-birds, is the only remaining natural and undisturbed area of any size on the south-east coast of Great Britain. A year or two ago, the key position of the area was threatened by the building contractor, and it was saved by the sacrifice of Mr. R. B. Burrowes, a retired teacher, formerly in the Electrical Department of Liverpool Technical College. Mr. Burrowes obtained an option upon the site at a cost of £5,585, which meant the selling or mortgaging of the whole of his possessions. The Committee of the Dungeness Preservation Fund is anxious to refund at least £1,740 of this amount, so that the donor may regain possession of certain bonds and securities lodged by him at his bank as security for a loan, without which he could not have made the original advance. He will still be out of pocket to the extent of £3,845, but he lives on a slender pension of £138 a year, gratified that his sacrifice has saved a valuable corner of England for the future. Any contribution towards the special sum now being raised will be gratefully received by the Manager, Lloyds Bank, Canterbury."

A CORRESPONDENT of the *London Times* reports from Rome that a first experiment in the establishment of sanctuaries for birds which are useful to agriculture is to be made in the National Park of Stra, near Padua. The scheme originated with the National Council of Research and its execution has been entrusted to the Zoological Institute of the University of Bologna, which has specialized in ornithological studies. The object of the scheme is twofold—to carry out a number of researches which are expected to yield biological results, and to preserve from destruction birds useful for agriculture. The Park at Stra, where the first sanctuary is to be established, has an area of about 50 acres and is well wooded. In order to encourage breeding 250 artificial nests, 30 feeding-boxes and 50 special nests are, it is said, to be placed in the grounds.

WHAT is believed to be the most complete recreation map of the United States ever prepared has been issued by the Office of National Parks, Buildings and Reservations of the Department of the Interior, and is available for free distribution. Arno B. Cammerer, director of the bureau, under whose supervision the map was prepared, states that it shows more than a thousand federal and state reservations of interest to the traveling public, and the main traveled highways of the United States. In addition to the super-scenic regions that constitute the twenty-three national parks of the nation, the new map shows the location of all the state parks in the country, practically all the national forests, the most important Indian reservations, the national military parks, the national monuments, and state forests, monuments and

picnic grounds. On the back of the map are brief descriptions of all the places shown except the national forests and the Indian reservations. The Fed-

eral Reservations are listed under the executive departments having jurisdiction over them, and the other reservations are grouped according to states.

DISCUSSION

THE CHEMICAL NATURE OF ENZYMES

ENZYMES are regarded as specific catalysts of biological origin and of high molecular weight. Willstätter¹ pronounced the view that they consist of a carrier, colloidal in nature, and of one or several chemically active groups. This hypothesis has been widely accepted, as it accounts both for the physico-chemical and the chemical behavior of the enzymes. The colloidal carrier determines the stability and the magnitude of catalytic activity of the active groups, while the nature of the active groups is responsible for the specificity of the enzymes.

This view is supported by observations on enzyme-like substances of known structure. Pure oxy-hemoglobin is known to possess a marked peroxidase action² and a very insignificant catalase action³ at the same time. Hemin, on the other hand, has only a slight peroxidase effect, but a very pronounced catalase activity. Mesohemin, formed by introduction of two hydrogen atoms into hemin, displays no catalase action at all, but is a strong peroxidase. Thus, a small change in the nature of the active group, such as the introduction of two hydrogen atoms, produces great qualitative changes in enzymatic specificity.

On the other hand, a change in the nature of the colloidal carrier produces a quantitative rather than a qualitative change in activity. In the case of purest oxy-hemoglobin crystals from different species,⁴ demonstrated quantitative differences in the peroxidase action of these substances, which are composed of identical hemin, but different globins.

The chemical character of the active groups in natural catalase and peroxidase has been cleared up in recent years. Zeile and Hellström⁵ have shown by photospectrometric measurements on highly purified enzyme preparations that an iron-porphyrin complex has to be regarded as the active group of liver catalase and of pumpkin catalase. Similarly, Kuhn, Hand and Florkin⁶ demonstrated the proportionalism between the content of porphyrin-bound iron and peroxidase activity in horse-radish preparations. Even the most highly purified preparations of peroxidase (20,000

times from raw horse-radish), contain only 0.1 per cent. of porphyrin. One can see from this that enzymes occur in Nature in very great dilution only, but are extremely active as catalysts. Thus it appears that the chemical nature of the colloidal carrier is mainly responsible for the great quantitative differences in activity of the porphyrin-iron group which obtain between hemoglobin and its derivatives on one hand and the naturally occurring catalases and peroxidases on the other.

The colloidal carrier of an enzyme can be altered in its composition, according to Willstätter, Graser and Kuhn's observations on yeast saccharase,⁷ either by choosing a different variety of yeast or by changing the procedure of purification, sometimes with and sometimes without significant change in enzyme activity. The same principle applies to some of the highly purified preparations obtained in the form of crystallized proteins, namely, the crystalline urease of Sumner⁸ and the crystalline pepsin of Northrop.⁹ Trypsin digestion of the crystalline protein of urease takes place without significant change in urease activity.¹⁰ In the case of crystalline pepsin, it has been shown by Dyckerhoff and Tewes¹¹ and in our laboratory¹² that the protein which carries the peptic activity can be changed arbitrarily by the adsorption of the active component on crystalline plant proteins, leaving the original protein carrier without activity.

These crystalline enzyme preparations should be regarded, then, as adsorption compounds of the true enzymatic component plus crystalline protein to which they have a special affinity. The finding of crystalline protein-enzyme compounds may lead to the concept that enzymes are merely proteins, and thus cause investigators to disregard enzyme specificity which can only be explained by the existence of highly specialized active groups.

The researches on catalase and peroxidase have shown that their active groups are non-protein in character. The way is thus cleared to investigate the nature of the enzymatically active groups of other

⁷ R. Willstätter, J. Graser and R. Kuhn, *Z. physiol. Chem.*, 123: 1, 1922.

⁸ J. B. Sumner, *Jour. Biol. Chem.*, 69: 435; 70: 97, 1926; J. B. Sumner and D. B. Hand, *Naturwiss.*, 16: 145, 1928.

⁹ J. H. Northrop, *Jour. Gen. Phys.*, 13: 739, 1930.

¹⁰ E. Waldschmidt-Leitz and F. Steigerwaldt, *Z. physiol. Chem.*, 195: 260, 1931; 206: 133, 1932.

¹¹ H. Dyckerhoff and G. Tewes, *Z. physiol. Chem.*, 215: 93, 1933.

¹² E. Waldschmidt-Leitz and E. Kofranyi, *Naturwiss.*, 21: 206, 1933.

¹ R. Willstätter, *Ber.*, 55: 3601, 1922.

² R. Kuhn and L. Brann, *Ber.*, 59: 2370, 1926.

³ F. Haurowitz, *Z. physiol. Chem.*, 198: 9, 1931.

⁴ R. Willstätter and A. Pollinger, *Z. physiol. Chem.*, 130: 281, 1923.

⁵ K. Zeile and H. Hellström, *Z. physiol. Chem.*, 192: 171, 1930; 195: 39, 1930-31.

⁶ R. Kuhn, D. B. Hand and M. Florkin, *Z. physiol. Chem.*, 201: 255, 1931.