News and Notes

The Influence of Hormones on Enzymes: A Symposium

THE New York Academy of Sciences, Section on Biology, sponsored a conference on Influence of Hormones on Enzymes on June 5 and 6. The meetings, which were held in the auditorium of the New York Genealogical and Biographical Society in New York City, attracted more than 350 scientists. The program, arranged by R. I. Dorfman and E. D. Goldsmith, was planned primarily to bring together endocrinologists and enzymologists to review the present status of the work on the mechanism of hormone action. As a working hypothesis it has been assumed by many that hormones act by influencing enzyme systems. This influence may be exerted (1) by means of changes in tissue enzyme concentrations, (2) by the hormone functioning as a component of an enzyme system, or (3) by direct or indirect effects on accelerators and/or inhibitors of enzyme systems. A group of stimulating papers dealing with such hypotheses was presented.

The meeting was opened by C. D. Kochakian, who discussed the influence of steroid hormones on arginase concentrations in the organism. Testosterone increases rat kidney arginase concentration without influencing this enzyme in the liver tissue, and the increase continues even after the generalized protein anabolic effect of the hormone is no longer evident. Cortisone produced an increase in kidney arginase, as well as an increase in liver arginase, in contrast to the influence of testosterone on this enzyme system. Of further interest is the fact that cortisone stimulation of liver arginase concentration is increased only after the usual protein catabolic effect of cortisone is no longer in evidence.

W. H. Fishman and S. L. Cohen discussed the influence of hormones on β-glucuronidase concentrations in the tissues of various animals. Dr. Fishman pointed out that there is a definite relationship between estrogen and uterine β-glucuronidase concentrations. Following ovariectomy in female mice, the concentration of this enzyme in the uterus decreases and, when such animals were given estrogen, the enzyme concentration increased. This is also true for vaginal and mammary tissues (Dr. Cohen). In pregnancy one also sees an increased β-glucuronidase concentration in the serum. In C_3H mice estrogen stimulation produces an increased concentration of the enzyme in the liver without influencing kidney concentration. On the other hand, treatment of C_3H mice with androgens such as testosterone or Δ 5-methylandrostenediol-3(β),17(β) results in a very great increase in kidney glucuronidase, whereas liver enzyme concentrations are unaltered. The influence of androgens on kidney glucuronidase may be prolonged by continued administration of hormone for as long as 70 days, at which time, with high doses of androgens, the kidney β-glucuronidase concentration may be increased as much as fifty-fold. Dr. Cohen emphasized the fact that β-glucuronidase concentrations in tissues of animals vary greatly —by a factor as large as 30 in mammary tissues. He also called attention to the inverse relationship that exists between the glucuronidase and esterase concentrations of tissues; namely, that a low concentration of β-glucuronidase is associated with a high concentration of esterase, and vice versa. He confirmed the findings of Dr. Fishman concerning the interrelationship of estrogens and β-glucuronidase concentrations in sex-specific tissues. Progesterone was studied by Dr. Cohen and found to cause a reduction in the β-glucuronidase activity of both sexual and nonsexual tissues in mice. Cortisone and stress conditions were shown to be associated with an increase in serum glucuronidase and a decreased serum esterase. Preliminary observations indicated a direct relationship between the levels of serum β-glucuronidase and the proportion of urinary ketosteroids excreted as glucuronide conjugates.

The influence of steroid hormones of various oxidases was reported by several investigators using both *in vitro* and *in vivo* techniques. W. W. Umbreit presented evidence indicating that concentrations of D-amino acid oxidase, as well as proline oxidase, in tissues are under the control of adrenal cortical hormones. Specifically in studies of adrenalectomy and treatment with cortisone, he was able to show that the two oxidases are decreased in specific tissues in adrenalectomized animals and their concentrations restored to normal after treatment with cortisone. Whereas cortisone appears to control the concentration of liver D-amino acid oxidase, the hormone was without effect on the kidney enzyme concentration. On the other hand, proline oxidase of kidney was controlled by cortisone, whereas the liver enzyme was independent of adrenalectomy and cortisone treatment. Of further interest was the finding of an increased requirement for adenylic acid and ATP in the tissues of adrenalectomized animals. This alteration can be restored to normal by cortisone treatment.

M. Hayano and R. I. Dorfman described *in vitro* effects of steroids on the partially purified D-amino acid oxidase system, showing that many steroids, particularly desoxycorticosterone, at low concentrations are capable of inhibiting the enzyme. The inhibition has been found to be reversible and noncompetitive. The action of the steroid appears to be on the surface of the apoenzyme and does not influence the prosthetic group.

H. Jensen described *in vitro* and *in vivo* effects of the amino acid oxidase system. Like Dr. Umbreit, he found that adrenalectomy or thyroidectomy reduces the concentration of the amino acid oxidase in the liver. Dr. Jensen's finding that adrenalectomy decreased the amino acid oxidase of kidney, however, is at variance with the observations of Dr. Umbreit. Dr. Jensen pointed out that the activity of amino acid oxidase in kidney, but not in liver, may be influenced by amino acid concentrations in the blood.

J. H. Quastel discussed the influence of steroid hor-

mones on the α-glycerophosphate dehydrogenase system prepared from yeast. Using a new manometric technique involving MNO_2 as terminal acceptor, he and Dr. Hochester found an inhibition in an *in vitro* system with various ketosteroids, the most active being those possessing a 3-ketone group. The inhibition could be demonstrated anaerobically or aerobically. Of particular interest is the fact that brain homogenates added to the reaction mixture reversed the steroid inhibition.

The work on the effects of castration on brain metabolism or brain respiration was reviewed by G. S. Gordan, who pointed out that androgens tend to suppress brain respiration. Castration in the rat increases respiration of brain tissues, probably by the mechanism of release of some inhibitory substances. This increase can be reversed by either the *in vivo* administration of testosterone or by the *in vitro* addition of this compound to the test system. This investigator also studied the influence of desoxycorticosterone glucoside on cerebral blood flow, respiration, and carbohydrate metabolism. As a result of desoxycorticosterone glucoside stimulation *in vivo* in man, he found an increased carbohydrate concentration in the venous blood from the brain, which is believed to be due to galactose originating in the cerebrosides. The release of the galactose from the cerebrosides was evident within 7 minutes of the intravenous hormone administration. This finding is particularly significant with respect to the high rate of metabolism of cerebrosides, heretofore thought to be components of a sluggish metabolic system.

H. A. Lardy and Gladys Feldott studied the *in vitro* metabolism of glutamic acid and β-hydroxybutyric acid, both of which appear to be at least in part controlled metabolically by thyroxin. Glutamic acid metabolism by rat kidney homogenate in the presence of Krebs' cycle intermediates was inhibited by thyroxin in concentrations as low as 10^{-6} molar. A partial reversal of this inhibition could be produced by the addition of coenzyme I, ATP, and cytochrome *c*. Compounds biologically related to thyroxin also inhibited this system in direct proportion to their biological activity in the intact animal. The oxidation of fatty acids and β-hydroxybutyric acid by washed residues from rat kidney was stimulated by thyroxin.

The effects of the hyperglycemic factor of the pancreas, as well as epinephrine, on synthesis and breakdown of glycogen was discussed by E. Sutherland. He presented evidence that both these hormonal factors influence the breakdown of glycogen to glucose phosphate by their influence on the phosphorylase system in liver. He found that the hyperglycemic factor and epinephrine increased the concentration of active phosphorylase in liver slices, and that epinephrine also increased the amount of active phosphorylase in isolated rat diaphragms. He further pointed out that neither of these two hormones altered the phosphate permeability.

M. E. Krahl discussed the influence of hormones on the metabolism of carbohydrates by the diaphragm muscle. He showed that hypophysectomy or hypophysectomy and adrenalectomy increased the glucose uptake in the tissues, suggesting an increase in the rate of the hexokinase reaction. He further demonstrated that glucose uptake by muscle could be inhibited by a pituitary factor, and that this pituitary factor appears to be similar to, though probably not identical with, the growth hormone. Insulin stimulates the uptake of glucose in the diaphragm muscle experiments, indicating a stimulatory action on the hexokinase system. Dr. Krahl's experiments show that the hexokinase system in muscle is controlled by at least three hormones: an anterior pituitary hormone, the adrenocortical hormone, which appears to be inhibitory, and insulin, which is stimulatory.

W. C. Stadie has also studied certain aspects of the influence of insulin on *in vitro* systems. Three basic points seem to be indicated from Dr. Stadie's experiments: first, that the hormone needs the intact cell for its action; second, that the insulin adheres to the cell wall, probably involving a binding; and, third, that the insulin cell combination is influenced by various factors such as pituitary hormones and the nutritional state of the animal. The combination of insulin is not restricted to any specific tissues, since combinations can be demonstrated with muscle, adipose, and mammary tissue. A specific factor affecting the action of insulin appears to be a pituitary factor other than the growth hormone or ACTH, which inhibits the action of insulin.

E. M. MacKay reported that insulin causes a marked increase in the rate of oxidation to carbon dioxide in the eviscerated rabbit. When this is measured with a C^{14}-labeled sugar, the glucose passes through a large metabolic pool, for the most part a water-soluble fraction. Fasting diminishes the effect of insulin measured by C^{14}-compounds. The glucose and sorbitol spaces in the body are essentially the same as those of the extracellular fluid. Insulin is without influence upon the volume occupied by either.

Studies on the influence of hormones on ketogenesis were carried out and reported by J. and H. M. Tepperman. Hypophysectomy in the rat results in a decreased rate of formation of ketone bodies by liver slices. Operated animals treated within the first 15 days with growth hormone show a restoration of the liver slices to produce ketone bodies. After about 30 days, treatment of the hypophysectomized animals with growth hormone is without effect—that is, the ketone body formation by liver slices is definitely decreased. Thirty days after the hypophysectomy, administration of cortisone results in a slight restoration of ketone body production. However, treatment of hypophysectomized animals with both cortisone and growth hormone even 50 days or more postoperatively produces normal ketone body production by liver slices. *In vitro* studies were reported indicating that growth hormone preparations can stimulate the ketone body production by liver slices.

The three sessions were ably presided over by G. Pincus, W. C. Stadie, and A. White.

R. I. DORFMAN
The Worcester Foundation for Experimental Biology
E. D. GOLDSMITH
The College of Dentistry, New York University

Scientists in the News

Raymond DeLacy Adams has been appointed associate clinical professor of neurology at the Harvard Medical School and chief of the Neurological Service at Massachusetts General Hospital. He succeeds **Charles Soucek Kubik,** who will continue his neurological research and practice at the Hospital as lecturer on neuropathology.

Mount Sinai Hospital has promoted **Morris B. Bender** from associate neurologist to chief of the neurologic service. He has been at Mount Sinai since 1933, except for a research assignment at Yale in 1936–37 and service as a commander in the Navy Medical Corps in World War II. Dr. Bender is professor of clinical neurology at the New York University College of Medicine, head of its Laboratory of Experimental Neurology, and director of the New York University–Bellevue Medical Center's neurologic service.

Manson Benedict has been appointed technical assistant to the general manager to organize an operations analysis staff for the U. S. Atomic Energy Commission. Dr. Benedict is on leave from his position as professor of nuclear engineering at MIT for the period necessary to complete his assignment with the AEC.

Arthur H. Brayfield has been named head of the Department of Psychology at Kansas State College. Dr. Brayfield is now in Germany on a joint assignment for the U. S. Army and Columbia University.

C. Fraser Brockington, county medical officer of health, West Riding, Yorkshire, and lecturer in preventative medicine in the University of Leeds, has been appointed professor of social and preventative medicine, Manchester, to succeed **Andrew Topping.**

James Allan Campbell, assistant professor of medicine at the Illinois University College of Medicine since 1948, has been appointed dean of Albany Medical College. **R. S. Cunningham,** who has served as dean since 1937, will be given new responsibilities as executive director of the Albany Medical Center Council, a post to which he was appointed in May 1950.

Harold J. Coolidge, executive secretary of the Pacific Science Board of NRC, is representing the Pacific Science Association at the Filariasis and Elephantiasis Conference in Tahiti this month.

Aureal T. Cross, of the West Virginia Geological and Economic Survey, has made a comparative study of the remaining or available type material of Paleozoic plant microfossils in Europe. Fifteen museums, coal laboratories, and universities in England, Scotland, Wales, France, Belgium, Netherlands, and West Germany were included in his itinerary. Clarification of problems in identification and taxonomy of fossil spores and pollen and exchange of representative specimens were among the objectives of the trip, which was supported by a grant from the Penrose Fund by the Geological Society of America.

Loyal Davis, professor of surgery and chairman of the department at Northwestern University's Medical School, has been selected to give the Earl of Litchfield lecture at Oxford University next Oct. 10. He will speak on "The Physiological Principles Underlying the Treatment of High Diastolic Hypertension by Thiocyanates and Sympathectomy."

Margaret Denham, Helen Roberts and **Helen Bakhtiar,** nurse officers of the Public Health Service, have left for Indo-China and Iran, assigned to Economic Cooperation and Point IV health missions. Miss Denham and Miss Roberts are detailed to the ECA health mission headquarters in Saigon, and Mrs. Bakhtiar to Point IV mission headquarters in Tehran.

Columbia University has granted **Irwin Edman,** Johnsonian professor of philosophy, a leave of absence to permit his appointment as a Fulbright lecturer at the Sorbonne, the University of Aix-Marseille, and other institutions of higher learning in France.

Three medical research men have been appointed to the permanent staff of the Harvard Medical School: **Jordi Folch-Pi,** who becomes associate professor of biological chemistry at the McLean Hospital, will continue as chief of the biochemical laboratory there; **Nathan Bill Talbot,** who has been named associate professor of pediatrics at the Massachusetts General Hospital; and **Clinton Van Zandt Hawn,** of Cooperstown, N. Y., who has been appointed associate professor of pathology in the Harvard Medical School and pathologist-in-chief of Peter Bent Brigham Hospital. Dr. Hawn has been serving as assistant professor of pathology in the College of Physicians and Surgeons, Columbia University, as pathologist to the Mary Imogene Bassett Hospital, Cooperstown, N. Y., and as director of the Otsego County Laboratories. **Otto Krayer** is now professor of pharmacology and head of the Department of Pharmacology.

Gilbert J. Haeussler has been named leader of the Division of Truck Crop and Garden Insect Investigations, Bureau of Entomology and Plant Quarantine, USDA. **William H. White,** former leader of this Division, died March 14, 1951. Mr. Haeussler entered the Bureau of Entomology in 1925.

The retirement at 65 of **Frederick S. Hammen,** scientific director of the Lankenau Hospital Research Institute of Philadelphia, from active participation in the work of the Institute has been commemorated in *Growth* by statements of his part in the founding and development of the Institute, the journal *Growth,* the Growth Symposia, and the Society for the Study of Development and Growth, by Irene C. Diller, Stanley P. Reimann, Philip R. White, and Leigh Hoadley.

Five officials of the International Health Division of USPHS are making a study of the public health programs of the Special Technical and Economic

Missions in Southeast Asia established by ECA. They are **Howard M. Kline,** chief, Technical Missions Branch; **Virginia Arnold,** chief nurse; **R. W. McComas,** chief, Health Service Branch; **Donald J. Pletsch,** chief of SEA Technical Missions; and **Paul S. Heneshaw,** chief, Program Development Branch, who has been in India.

President Truman has accepted the resignation of **Katherine F. Lenroot** as chief of the Children's Bureau of the Federal Security Agency. As her successor, he nominated **Martha M. Eliot,** of Massachusetts, a former bureau official for twenty-five years. For the past two years Dr. Eliot has been an assistant director general of WHO at Geneva.

The Association for Jewish Children in Philadelphia has appointed as its executive director **Norman V. Lourie.** Since February 1947, Mr. Lourie has been director of the Hawthorne Cedar-Knolls School in Pleasantville, N. Y., maintained by the Jewish Board of Guardians for the care and treatment of emotionally disturbed children.

Marian MacAulay, formerly head nurse of the Research Ward at the Massachusetts General Hospital, Boston, has been appointed a member of the staff of the Oklahoma Medical Research Institute and director of nursing for the Oklahoma Medical Research Hospital. Miss MacAulay, who will also have an appointment in the University of Oklahoma Medical School, has been in charge of nursing on the Metabolic Research Ward at Massachusetts General for the past nine years. **Shirley L. Wells,** formerly research dietician at Massachusetts General Hospital, has also been appointed a member of the staff of the new Oklahoma institutions.

Malcolm A. Mason has been appointed to the new position of health educator in the preventive medicine division of the Air Force surgeon general's office. He will assist in planning, directing, and coordinating all USAF health education activities. Mr. Mason has been director of health education for the agriculture extension service at Purdue University.

F. Lloyd Mussells has been appointed deputy executive director of the Committee on Medical Sciences, Research and Development Board, succeeding **Thomas B. Spencer,** who became executive director of the committee on June 15. Dr. Mussells is on a two-year leave of absence from Strong Memorial Hospital, University of Rochester, where he has been assistant director for the past two years.

Maurice A. Schooley has been appointed head of the veterinary medical research department of the Research Division of Armour and Company. He has been in general veterinary practice at St. Joseph, Mo., and in the diagnostic laboratory of the North Carolina State Department of Agriculture. He also spent four years in the Army veterinary corps.

Allan Charles Scott, of Schenectady, N. Y., has been appointed head of the Biology Department at Colby College. Dr. Scott succeeds **Gordon Enoch Gates,** who resigned last month. He goes to Colby from Union College in Schenectady, where he has been a member of the biological staff for 15 years.

Sol Sherry has been appointed director of the May Institute for Medical Research of the Jewish Hospital Association and assistant professor in the Department of Internal Medicine of the University of Cincinnati Medical School. Dr. Sherry succeeds **I. Arthur Mirsky** (*Science,* **113,** 303 [1951]).

D. R. Shoults, director of engineering for Aro, Inc., of St. Louis, Mo., has been appointed director of the General Electric Company's aircraft nuclear propulsion project for the Air Force and Atomic Energy Commission. Headquarters of the project will be at the company's Lockland, Ohio, turbojet research, engineering, and manufacturing center.

Warren A. Sinsheimer, vice president of Petroleum Advisers, Inc., a Cities Service affiliate, has been appointed to the new office of petroleum economics coordinator. Under Mr. Sinsheimer's direction, broad economic studies within the petroleum industry will be made. Mr. Sinsheimer joined Cities Service in 1917 in the production and engineering department in Oklahoma.

I. Melville Stein has been elected to the newly created post of executive vice president of the Leeds & Northrup Company, Philadelphia. Mr. Stein has been a vice president, and is director of research. He joined Leeds & Northrup in January 1919. Mr. Stein is a fellow and former vice president of both the AAAS and the American Institute of Electrical Engineers.

Paul C. Tompkins has been appointed scientific director of the U. S. Naval Radiological Defense Laboratory, San Francisco, succeeding **William H. Sullivan** (*Science,* **114,** 140 [1951]). Dr. Tompkins went to USNRDL in 1949, first as scientific staff adviser, later becoming associate scientific director.

James Claude Thomson, recipient of a Fulbright lectureship in food and nutrition, will be at the Medical College of the University of Tehran and in the Ministry of Health of Iran for a nine-month period. He is on leave of absence from the University of Nanking, where he is professor of biochemistry and nutrition and head of the Department of Chemistry.

Education

Executive headquarters of the **Association for the Advancement of Instruction About Alcohol and Narcitics** will be at Yale, where the organization was formed during the 1951 Summer School of Alcohol Studies. Vashti Ishee, of the State Department of Education, Jackson, Miss., is the first president; J. Kenneth Ferrier, of Oregon, vice president; John L. Miller, of Wisconsin, secretary-treasurer; and Raymond G. McCarthy, of Yale, executive secretary. The

new association will serve as a clearinghouse for information and materials about the problems of alcoholism and drug addiction.

Robert H. Denison, curator of fossil fishes at **Chicago Natural History Museum,** is in charge of an expedition in New York, New Jersey, and Pennsylvania, which is seeking specimens of the fishlike vertebrate ostracoderm, one of the oldest known. Dr. Denison will also investigate the late Devonian rocks in western New York.

A new Center for Research and Training in Family Life will be opened at the **University of Chicago,** under the direction of Nelson N. Foote. Established with a fund of $80,000 from the Grant Foundation of New York City, the center will be open to students qualified to work for advanced degrees in the fields of family life education, parent-child relations, family and marriage counseling, family research, and teaching in these fields. Ernest W. Burgess, professor emeritus of sociology, will head a nine-member advisory committee, drawn from related fields, that will assist in the operation of the center.

Cosmic ray experts at **Cornell's Laboratory of Nuclear Studies** are making studies in a salt mine 2,000 feet below the surface for the Geophysics Research Division of the Air Force Research Center, Cambridge, Mass. The Cayuga Rock Salt Company mine near Ithaca is the subject of investigations of the relation between upper atmospheric conditions and cosmic ray intensity. The project is directed by Kenneth I. Greisen and Guiseppe Cocconi.

The **Department of State** has announced the appointment of five U. S. scientists to serve as scientific attachés in overseas posts: Hans T. Clarke, of Columbia University; William L. Doyle, of the University of Chicago; L. H. Farinholt, of Columbia University; Robert L. Loftness, a physical chemist from industry; and Louis Lek, formerly of the Scripps Institution. Dr. Clarke and Dr. Farinholt will assume responsibilities as science attachés in the embassy in London; Dr. Doyle and Dr. Loftness in the embassy in Stockholm; and Dr. Lek in the legation in Bern.

The Ministry of Agriculture of Venezuela has raised to the category of **Instituto Botánico** the former División de Botánica and has named Tobías Lasser director. The Biological Station of Rancho Grande, located in a subtropical forest, is part of the institute and is open to visiting scientists who may wish to do research in tropical biology. Information may be obtained from Dr. Lasser, P. O. Box 2156, Caracas.

In cooperation with the USDA, the **University of Minnesota** will try to find a way to improve exchange of agricultural publications by making a survey of agricultural research institutions in Latin America, followed by recommendations as to the most suitable depositories for the publications of various state experiment stations and of the department. Responsibility for initiating the new Point IV project rested with a committee composed of Harold Macy, chairman, R. D. Lewis, George F. Dow, and S. B. Freeborn. Ralph R. Shaw, USDA librarian, Glen T. Taggart, OFAR, and E. C. Elting, Office of Experiment Stations, cooperated with the committee.

Meetings and Elections

Taking advantage of the presence of scientists from all over the world at the Diamond Jubilee of the American Chemical Society, the Pulp and Paper Research Institute of Canada is organizing an **International Symposium on the Fundamental Chemistry of Cellulose and Lignin,** to be held in Montreal Sept. 24–26. A similar (but not duplicate) conference is being held at the Institute of Paper Chemistry in Appleton, Wis., during the preceding week.

Between 80 and 90 U. S. scientists are attending the ninth general assembly of the **International Union of Geodesy and Geophysics** at Brussels Aug. 21–Sept. 1. Heading the official U. S. delegation is Walter H. Bucher, of Columbia University, president of the American Geophysical Union. Other official delegates are K. Hilding Beij, National Bureau of Standards; Francis Birch, Harvard; Perry Byerly, University of California (Berkeley); Horace R. Byers, University of Chicago; L. P. Disney, U. S. Coast and Geodetic Survey; Waldo E. Smith, American Geophysical Union; F. J. Veihmeyer, University of California. Twenty-two other members of the group will officially represent the National Research Council.

J. Cloyd Miller, superintendent of schools in Deming, N. M., has been elected president of the **National Education Association.** F. L. Schlagle, superintendent of Kansas City, Kan., schools, was re-elected to the Board of Trustees, and Harvey E. Gayman, executive secretary, Pennsylvania State Education Association, was elected to the Executive Committee.

The semicentennial of the **Pacific Coast Entomological Society** will be celebrated at the California Academy of Sciences, Golden Gate Park, San Francisco, on Sept. 29. The program will include a lecture and motion picture by Elwood C. Zimmerman of the Hawaiian Sugar Planters Association Experiment Station on "The Origin, Development and Decay of Oceanic Islands." The anniversary will also serve as the occasion for introducing the society's new "Memoirs Series," the first volume of which, *The Sucking Lice,* is by G. F. Ferris and constitutes a comprehensive monograph of the Anoplura of the world.

In reporting out the Supplemental Appropriation Bill, 1952, on Aug. 17, the House Appropriations Committee cut the budget request of the **National Science Foundation** from $14,000,000 to $300,000—a sum barely sufficient for the simple needs of personnel and business operation. Obviously, without funds for the support of basic research and the training of scientific manpower, the foundation can merely go through meaningless motions of functioning.