News and Notes

Genetic Recombination

The Seventh Annual Symposium of the Biology Division of the Oak Ridge National Laboratory, held 19–21 Apr., with the Atomic Energy Commission as cosponsor, was devoted to the subject of genetic recombination. This was a most timely subject, because the recent work on genetic recombination in viruses and bacteria and the recent developments in the knowledge of the chemical composition and structure of the genetic material clearly need to be integrated with the older knowledge of crossing over obtained from the genetic analysis of recombination in *Drosophila*, maize, *Neurospora*, and other organisms. Six sessions were devoted to a thorough reconsideration of the perplexing nature of genetic recombination, in the light of the latest findings in such relevant areas as bacterial transformation and transduction, genetic recombination in bacteriophage and bacteria, chromosome replication and behavior, the structure of the desoxyribose nucleic acid molecule, and recombination in natural populations.

The first session was opened with a masterly review by Rollin Hotchkiss of recent work on the *Pneumococcus* transformations, a review that served as a setting for all the discussions that followed. The most interesting recent observation in this field is probably that of the separability of genetically determined characteristics in the transfer process. Thus, if an encapsulated, drug-resistant strain is used as a source of desoxyribose nucleic acid (DNA) for the transformation process, separate encapsulated and drug-resistant types are induced in the recipient strain. A penicillin-resistant strain that had acquired its resistance by steps yielded DNA that also induced resistance in the recipient in a stepwise transformation, the individual steps being in the same sequence in the original acquisition of resistance and in the transformation process.

Experiments with the adaptive enzyme mannitol dehydrogenase showed that DNA from the *M*-strain transformed cells of the *m*-strain irrespective of whether the enzyme was actually present in the cells of the *M*-strain. In other words, it is not the enzyme itself, but the genetic material that is transferred from strain to strain. DNA from a strain with the mannitol-fermenting enzyme and also with streptomycin resistance produces transformed strains with the former character or the latter singly, or with both together; and the reciprocal type of recombination, which yields the double type from a recombination between two donors of the single types, is also obtainable. Desoxyribonuclease completely blocks the transforming process; and DNA from calf thymus also inhibits the transformation by means of pneumococcus DNA. From these and other results, including the inability to detect any other substance in the purified DNA used for the transformations, Hotchkiss concluded that the genetic material is DNA itself, rather than protein or nucleoprotein. The recombination of different genetic characters in the DNA-transformations implies that the DNA is diversified—that is, it exists in the form of different "genes." Vigorous discussion and debate were aroused by the presentation of these concepts.

Norton Zinder followed with a similar story, that of bacterial transduction in *Salmonella*. In this phenomenon, phage is the transducing agent in the transfer of a genetic trait from one strain of the bacterium to a different strain. Linked transductions have been discovered. Since the active part of the bacteriophage is DNA, the interpretation of this phenomenon reinforces the conclusions reached by Hotchkiss. A. H. Doermann described the genetic recombination process in the bacteriophage itself. In the T2 and T4 coliphages, three distinct linkage groups have been identified. When the phage particle infects the host cell, its protein membrane is left outside and only the DNA (genetic material) enters the host cell. Here, after multiple infections, recombination may occur even between genetic units supplied by three different phage types. There is not as much interference to recombination in both of two linked regions as there is in the higher organisms; in fact, there is more recombination than is to be expected on the simple basis of an independent coincidence of recombination in the two regions. X-rays can inactivate some genes in a phage particle without damaging others. This fact, like the recombination process, indicates the independence and integrity of individual genetic units.

Joshua Lederberg, following the preceding speakers, discussed recombination in bacteria. The recent development in this field that has clarified considerable doubt and confusion, resulting from the inability to find sexual recombination in any bacteria other than *Escherichia coli* K-12, has been the discovery of the dependence of mating and recombination on differences in mating type. The situation somewhat resembles that which is now so well known in *Paramecium* and other protozoans. Thus, crosses between F− and F− are sterile, and crosses between F− and F+ are uniformly fertile, yielding only F+ progeny; but, on the other hand, crosses between F+ and F+ are also somewhat fertile. Another significant finding is the discovery that certain strains will cross when they are treated with streptomycin, whereas they will not cross if untreated.

On the second day, discussion began with a very interesting paper by J. D. Watson on the relationship between the structure of the DNA molecule, as worked out by Crick and Watson, and the processes of chromosome replication and recombination. DNA fibers 20 A in diameter and many thousands of angstrom units in length give x-ray diffraction patterns that imply the presence of double, rather than single, chains. Crick and Watson have postulated a model consisting of two intertwined chains with 10 nucleotides per coil, and with the phosphate-sugar groups

outside and the base groups inside. The latter are united between strands by H bonds that link adenine to thymine and guanine to cytosine, this structure being the only one that allows the coiled chains to fit properly and that is consonant with the observed ratios of 1 purine : 1 pyrimidine, 1 adenine : 1 thymine, and 1 guanine : 1 cytosine. Replication might occur if each fiber separated from the other and then served as a template. Secondary phosphoryl liberations indicate that there are breaks in the chains at intervals of 50 A. Genetic continuity might be assured if the breaks in the sister strands alternate in position; and crossing over may be related to replication.

David D. Perkins discussed methods for extending the analysis of crossing over, particularly in such forms as *Neurospora,* by relating chiasma interference, chromatid interference, and possibly sister-strand crossing over to the observed frequencies of various types of tetrads and multiple exchanges and to recombination frequencies. Edward Novitski and Drew Schwartz presented some recent work on chromosome behavior and crossing over in *D. melanogaster.* Novitski described the six possible types of compound X-chromosomes, which synapse either spirally or by a simple foldback of the two components. Crossing over between the two components of these compound X's throws some new light on the crossing-over process. Thus, in a tandem compound-X carrying an inversion in one component X, crossing over is reduced within the inversion to about one-fourth of what would be expected in the absence of an inversion. Yet there was no striking interference between a crossover outside the inversion and one inside it. The conclusion may be drawn that pairing between the chromosomes is initiated by the heterochromatin, and that a weaker euchromatic pairing commences when homologous euchromatic regions are brought into proximity. Schwartz, from analyses of crossing over in maize as well as in *Drosophila,* has come to the conclusion that sister-strand crossing over, long thought to be ruled out by classic observations, must be postulated in order to explain his data on anaphase configurations resulting from crossing over in ring-rod heterozygotes in maize, and on twin spots produced by somatic crossing over in *Drosophila.*

In the final session, Maurice B. Whittinghill summarized the effects of ionizing and ultraviolet radiations on crossing over, and dwelt particularly on the induced crossing over in gonial—oögonial as well as spermatogonial—cells. Hampton L. Carson discussed the relationship of genetic recombination to the amount of genetic variation in natural populations, particularly those of *D. robusta.* Populations at the center of the distribution of a species seem to show more blocked recombination because of the presence of heterozygous chromosome rearrangements. Populations toward the borders of the distribution of a species are more homozygous as to chromosome arrangement; hence, they have freer recombination and, consequently, manifest more genetic variation.

Alexander Weinstein, A. H. Sturtevant, and Karl Sax undertook to summarize and evaluate the various contributions made to the symposium, including the points of view developed in the vigorous and often entertaining free discussions that followed the formal papers. These evaluations by veteran students of the recombination process were particularly welcome.

On the first evening of the meeting, an extra session was scheduled for those persons particularly interested in a field in which the Oak Ridge workers themselves have been leaders, namely, the study of the effect of oxygen concentration on the induction of chromosome aberrations by x-rays. Work with *Tradescantia* and *Drosophila* was presented by Norman H. Giles, Jr., C. P. Swanson (paper read *in absentia*), and W. K. Baker. Others who were present added data that throw light on the relative merits of the hypotheses that oxygen exerts its effect by either affecting recombination or affecting the initial frequency of breakage.

An opportunity was given the approximately 150 participants in the symposium to visit the Biology Division of the Oak Ridge National Laboratory. There was opportunity for informal discussion between visitors and hosts alike on problems of mutual interest. The symposium was declared to be one of the most successful ever held at Oak Ridge. Like the previous Oak Ridge symposia, it is planned to have the proceedings published as a supplement to the *Journal of Cellular and Comparative Physiology.*

BENTLEY GLASS

Department of Biology,
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AAAS Southwestern Meeting

The 30th annual meeting of the Southwestern Division of the AAAS was held 25–29 Apr. in Lubbock, Tex., at the Texas Technological College. This was the third time that the Association has enjoyed the hospitality of Lubbock and the College, the earlier occasions having been in 1934 and 1941, and the growth of both the city and the school during this 20-yr period is phenomenal. Joining in making the meeting a success was the Southwestern Association of Naturalists (SWAN). Although organized only a little more than a year ago, it has already become an important factor in fostering scientific progress in the region. Other cooperating societies were the Texas and Oklahoma academies of science, the Texas Archaeological Society, and the Panhandle Plains Section of the American Chemical Society. Under the auspices of the society of the Sigma Xi, Henry Eyring, dean of the graduate school of the University of Utah, delivered an after-dinner speech on "The physical chemistry of enzymes in luminescent bacteria and nerves."

Ever since the Southwestern Division was organized in 1920, a great deal of its interest has centered around problems peculiar to arid lands. In the early days, this interest took the form of archeological studies of the prehistoric peoples who once lived in the area, and several years ago the Division set up a special committee on desert and arid zone research. Through its

efforts, the UNESCO committee on arid lands has become so interested in the Division's work that it has agreed to give some support in organizing an international symposium to be held in Albuquerque, N.M., following the Southwestern Division's meeting in Santa Fe in Apr. 1955. After the symposium there will be a conference at Socorro with the New Mexico Institute of Mining and Technology as host. Plans for these arid lands meetings have been discussed at length [*Science* **119**, 869 (18 June 1954)].

The annual John Wesley Powell lecture was given this year by Roger J. Williams, biochemist of the University of Texas. The title he chose for his address was "A new era in human understanding." Four symposia dealt with "Instrumentation," "Ground water of the south plains of Texas," "Natural history of the Lubbock area," and "Geology and oil technology." Some idea of the wealth of material presented can be gleaned by noting such titles as "Radiological instrumentation," "Application of transducers in the measurement of physical quantities," "Underground water flow," "The use of fish embryos in biological assay tests," "Differentiation in call among southwestern anuran amphibians," "The interpretation of seismic data obtained in geophysical prospecting," "The internal plastic coating of pipelines in place," "The use of emulsions to stimulate petroleum production," and "Radiotracer survey as a gas and oil well service."

Eight papers in the social-sciences section included such titles as "Some repeated pictograph forms in the Big Bend of Texas," "Acculturation of the Navajo Indians," and "Human sterilization laws and psychiatric thinking." Some of the 23 botany papers treated "Successional relations of plant communities of the Elk Mountain Range," "The effect of certain soil correctives on nutrition of seedlings," "Evolution of college botany teaching," "Ladies botany," "The absorption of 2,4-D through the root systems of 60 woody plants," and "A study of some factors affecting the quality of cottage cheese." Some of the topics for the 11 papers in the field of zoology were "Birds of the south plains," "The nasal mites of finches," "The effect of certain chemicals on the eggs and larvae of the dog hookworm," and "Inhibition of antidiuretic activity of blood serum with adrenal medullary hormones."

There were 31 papers in the physical sciences and among them were "Parallax in mathematics," "Influence of planetary alignment cycles on climatic variation," "Ion exchange in clays," "A spectrographic study of the venoms of some poisonous desert animals," "The effects of ionizing radiations on the chemical composition and carcinogenicity of organic and biochemical compounds," "A polarographic study of the zirconium-alizarin lake," "The motion of a conducting sphere in a uniform magnetic field," "Elastic scattering of fast neutrons," and "The fluorescence of alpha naphthylphenyl oxazole in various solvents."

About 300 persons registered at the meeting, many of them coming from states well beyond the limits of the Division. At the closing business session, it was voted to recommend to the national office that the Division's name be changed to Southwestern and Rocky Mountain Division, in view of the fact that Wyoming and a part of Montana had recently joined. Joe Dennis of the Texas Technological College and E. F. Castetter of the University of New Mexico were elected president and vice president, respectively. Frank E. E. Germann of the University of Colorado was continued as secretary-treasurer.

FRANK E. E. GERMANN
University of Colorado, Boulder

Science News

The Soviet Council of Ministers has announced that a 5000-kw electric **power station using atomic energy** is in operation somewhere in Russia. The station, which may be regarded as only a pilot model, was described in the announcement as "the first industrial electric station utilizing atomic energy."

An extensive **analysis of the American Medical Association** by the student editors of the *Yale Law Journal* criticizes the A.M.A.'s excessive authority over medical practice and its failure to use this power as an "instrument of progress." The 84-page report, published in the current issue of the *Journal* contains both criticism and praise for the A.M.A., but the criticisms predominate; it is based on a 2-yr study of the A.M.A.'s published records, interviews with both its critics and proponents, and a questionnaire directed to state medical societies.

In Chicago, George F. Lull, secretary and general manager of the American Medical Association, who received an advance copy of the report shortly before it went to press, issued a strong statement in rebuttal. "It took the students two years to make the study, but they took neither the time nor the trouble to interview A.M.A. officers or staff people at the Chicago headquarters to get their facts correct. It is most unfortunate that the article was submitted to us so late that insufficient time remained before publication for correction of basic and glaring errors of fact and omissions of vital facts. In many important sections the text is based on completely false and erroneous information."

The report states that "no other voluntary association commands such power within its area of interests as does the A.M.A. It holds a position of authority over the individual doctor, wields a determining voice in medical education, controls the conditions of practice, and occupies a unique position of influence in shaping government health policies." For example, the authors charge that the A.M.A.'s power has been used to block virtually all plans for providing low-cost health and medical care unless subjected to Medical Association control; at present, the article continues, the A.M.A. is opposing President Eisenhower's proposal for Federal Government reinsurance of voluntary health plans on the thesis that this might lead to socialized medicine. In rebuttal, Dr. Lull said that the "Association opposed the federal

reinsurance plan because it was unnecessary and represents the intrusion of the Federal Government into a phenomenally successful area of private enterprise. Evidently the House of Representatives felt the same way because it recently 'killed' the bill by an overwhelming majority—238 to 134."

The *Yale Law Journal* pointed out that although many physicians are critical of A.M.A. policies, the A.M.A., with its total national income of $9,000,000 a year, is not truly representative of the nation's doctors and does not tolerate conflicting opinions within its membership. The article claims further that the *Journal* of the A.M.A. "rarely prints opinions in disagreement with positions taken by the organization's governing boards." Dr. Lull branded this statement as false. "On the contrary, the A.M.A. is so representative of its membership that many other organizations, including the American Bar Association, have modeled their organizational structure after the A.M.A."

Physicians who defy A.M.A. authority, the law students argue, may be subjected to professional ostracism, which could cut them off from patient referrals and consultations, deny them advancement in hospitals, or bar them from professional appointments. Dr. Lull also branded this statement as false. "The American Medical Association has almost no authority over individual physicians. It is the county medical society that disciplines members who are guilty of unethical practices."

"Despite the dangers inherent in such a concentration of power," the Yale report continues, "no interest group enjoys more freedom from federal control than organized medicine."

Several steps are recommended by the student authors to curb these powers. First, to protect the individual doctor from unreasonable exercise of organized medicine's authority, the importance of society membership should be de-emphasized in order to mitigate the severe consequences of its disciplinary powers. As one step, the writers suggest that this could be done by insuring availability of hospital privileges to nonmembers. Commenting on this statement, Dr. Lull said, "the American Medical Association has no control whatsoever over hospital staff appointments which are made by the local hospital Board of Trustees."

The second recommendation urged that organized medicine should be divested of its control over the nation's supply of doctors. This step could be accomplished by federal aid to medical schools without impairing A.M.A. powers to set educational requirements and to inspect these schools. Dr. Lull termed this accusation "false and malicious." The A.M.A. he said, "has no control over the nation's supply of doctors. The Yale Medical School Admission Committee and all similar committees throughout the United States determine the number to be admitted. The A.M.A. has nothing to do with control over the supply of doctors."

The student authors also recommend that legislatures should divest state medical societies of their control over the formation of new methods of providing low-cost prepaid care. At present state statutes requiring approval or participation by the medical society or a majority of the doctors have foreclosed experimentation in solving pressing medico-economic problems. "Independent groups of doctors, cooperatives, unions and employers—as well as the medical societies —should be free to work out their own solutions. Government assistance to plans for low-income subscribers may also be required."

Finally, the authors say, the A.M.A. should provide a forum for dissenting opinions and conflicting viewpoints. "New ideas which the A.M.A. has accepted have been forced upon it; by assuming leadership in experimentation with unproved systems of practice and payment, the A.M.A. could become an instrument of progress."

Dr. Lull in his concluding statement of rebuttal to the student report said: "The real danger in this article is that nearly all of the facts are given a negative slant whereas they just as well could have been presented in a positive light. It is very apparent that the authors built up a straw man and then proceeded to knock him down. It is an obvious attempt to neutralize the conservative influence of one of America's great voluntary health organizations."

An **artificial heart** of Swedish design was used for the first time to save a human being on 16 July when Clarence Crafoord operated upon a 42-yr-old woman suffering from a growing tumor of the heart. The operation is reported to have been successful. The artificial heart, designed by Åke Senning and Anton Åstradsson, is based on a method of producing controlled "ventricular flutter" by means of weak electric shocks.

The **U.S. Naval Engineering Experiment Station,** Annapolis, Md., marked its 50th anniversary in July. Located across the river from the Naval Academy, it covers 50 acres and maintains a staff of 1000.

Discovery of a **6000-yr-old canal system** that ran parallel to the Euphrates River in ancient Mesopotamia has been announced by Albrecht Goetze, professor of Assyriology and Babylonian Literature at Yale, and director of the Baghdad School of the American Schools of Oriental Research. While archeologists had long known of sections of this canal, they were unaware of the complexity and extent of the system until it was traced by a recent expedition to Iraq sponsored by the American section of the Baghdad School of Oriental Research.

The work was headed by Thorkild Jacobsen of the Oriental Institute of the University of Chicago. Vaughn Crawford, research fellow in the department of near eastern languages and literature at Yale, was a member of the expedition. The system was used mainly for irrigation, although it served also as one of the main lines of communication between towns. The ancient towns of Bad Tibira and Zabalam were located, and findings have led to the correction of earlier archeological views on the location of Lagash, one of

the first Sumerian towns ever excavated. The canals were abandoned probably in the era of Hammurabi about 1800 B.C.

At the Seattle meeting of the American Physical Society in July, Marcel Schein of the University of Chicago reported that a very unusual new event consisting of a **large number of individual electron pairs** has been found in a stack consisting of 18 Ilford G-5 600-μ pellicles flown in a Skyhook balloon from Goodfellow Air Force Base, Tex. (41° N. geomagnetic latitude). The pellicles were placed in an aluminum exposure box with 0.7 gm/cm^2-walls and free of other matter. The emulsions were exposed for 6 hr at an altitude exceeding 100,000 ft. The event entered the side of the stack at a zenith angle of 66° and passed through 14 of the 18 pellicles with a total length of more than 50,000 μ and at an angle of 7.5° to the emulsion surface. This made it possible to carry out accurate measurements on individual tracks. An explanation of this event by conventional mechanisms has not been possible. Hence the tentative suggestion was offered that it may be due to annihilation of an antiparticle, a negative proton. Production of antiparticles at these energies by cosmic ray particles outside the atmosphere is predicted by Fermi's theory.

The national birth total in the first four months of 1954 topped the same period of 1953 by about 30,000, according to **vital statistics** estimates released recently by the Public Health Service of the U.S. Department of Health, Education, and Welfare. However, marriages this year have continued to fall, after sinking in 1953 to 9.7 marriages per thousand population, the lowest annual rate since 1933. Compared with the first four months of 1953, marriages in the same period this year dropped by 25,000, a drop of 7.2 percent.

In connection with the **visa problem,** it is interesting to note that the Secretary of State has recommended that 11 churchmen from Czechoslovakia and Hungary be admitted to the United States as official deleates to the second assembly of the World Council of Churches at Evanston, Ill. Among the other Protestant church meetings of international significance taking place in the U.S. this summer are the Presbyterian Alliance Conference at Princeton University and the World Lutheran Conference in Chicago.

Hexamethonium chloride, given with alseroxylon, a derivative of *Rauwolfia serpentina,* benefited 36 of 39 hypertensive patients and brought **blood pressure** down to normal levels in 18, according to a report in the 17 July issue of the *Journal of the American Medical Association* by W. R. Livesay, J. H. Moyer, and S. I. Miller, Baylor University College of Medicine.

When the *Rauwolfia* derivative was given alone to 43 additional patients with high blood pressure, 20 responded favorably, and 10 returned to normal blood pressure levels. Alseroxylon given with hydralazine to a third group of 21 patients lowered blood pressure in 12 and brought a return to normal levels in one. Fewer side effects were observed when the drugs were used in combination than with hexamethonium alone.

In cases of mild or fluctuating high blood pressure, the less potent *Rauwolfia* derivatives such as alseroxylon should be given alone as the initial treatment. When severe high blood pressure is complicated by kidney failure, alseroxylon should be used with hydralazine rather than with hexamethonium, because of the lower potency of the former. Severe malignant hypertension or hypertensive emergencies call for hexamethonium given by injection or infusion.

On 28 July L. Kresak and M. Vozarova, both of the Skalnate Pleso Observatory in Czechoslovakia, discovered a **new comet,** their second such discovery in July. Now known only as 1954 F, it is of magnitude 9 and is in the constellation of Camelopardalis. It is the sixth new comet to be spotted this year. With a small telescope and good visibility, it can be seen most of the night.

Herman A. Spoehr, retired chairman of the Carnegie Institution of Washington's division of plant biology, Stanford, Calif., and professor (honorary) in the department of chemistry at Stanford University, died on 21 June. Born in Chicago in 1885, he received his B.S. degree from the University of Chicago in 1906 and his Ph.D. in 1909. The following year he was appointed a staff member of the Carnegie Institution's Desert Laboratory at Tucson, Ariz., where he remained until 1920 when he moved to the Institution's Coastal Laboratory at Carmel, Calif. In 1928 he became chairman of the newly-created division (now department) of plant biology, which was established on the Stanford University campus in 1929. For a year he was director of the natural sciences division of the Rockefeller Foundation in New York, but in 1931 resumed his previous post.

Dr. Spoehr's scientific interests centered on the formation of organic matter by photosynthesis in plants, and he was one of the first scientists in the United States to investigate seriously the process of photosynthesis. His book, *Photosynthesis* (1926) is used by biologists and biochemists throughout the world. He made numerous investigations in pure carbohydrate chemistry, and in the occurrence and interconversion of carbohydrates in plants during respiration and photosynthesis. He was deeply concerned with the eventual application of basic research in photosynthesis to increasing the world's food supply, and this concern led him to seek modification of the plant's composition by changing its environment—specifically to increase the protein and fat content of algae at the expense of the carbohydrates. This undertaking contributed greatly to the recent rapid development of large-scale cultures of algae for use as food.

Dr. Spoehr's scientific eminence was recognized by election to membership in the American Philosophical Society, the American Academy of Arts and Sciences, and honorary membership in the Linnean Society of London and the Deutsche Botanische Gesellschaft of Berlin. The University of Chicago conferred on him

an honorary doctor of science degree in 1929 and gave him one of its Distinguished Alumni Awards in 1943. He was active in a number of learned societies and served as vice president of the American Society of Naturalists in 1946; president of the American Society of Plant Physiologists, 1944–45; and president of the Pacific Division of the AAAS, 1951–52.

Scientists in the News

Harvey S. Allen, associate professor of surgery in the Northwestern University medical school has received a Fulbright grant to lecture on hand surgery for 3 mo next year at the Society and Home (for cripples), Copenhagen, Denmark.

Wade Thomas Batson, assistant professor of biology of the University of South Carolina, is on leave of absence to serve as assistant in the university relations division of the Oak Ridge Institute of Nuclear Studies. He will assist **W. W. Grigorieff,** chairman of the division, in carrying out Institute programs of particular interest to universities.

For his work on photographic emulsions, **Burt H. Carroll** of Kodak Research Laboratories has been granted the Henderson award of the Royal Photographic Society of Great Britain. The award, a bronze medal and a small sum in cash from an endowment, is made "for the most useful discovery in or essay on photographic chemistry."

Edmund Claxton of the Armstrong Cork Co., Lancaster, Pa., was chosen vice president and the following were appointed to the board: for 3 yr, F. Stuart Fitzpatrick, H. N. Huntzicker, Thomas D. Jolly, J. W. Kreuttner, Harry C. Plummer, R. A. Smith, and P. J. Walker; for 2-yr terms to fill vacancies, Robert W. Cutler, and Mr. Claxton; for 1-yr terms to fill vacancies, H. A. Leedy and Clarence A. Thompson.

The Triennial research award of Iota Sigma Pi, national chemical honorary society for women, has been presented to **Donna B. Cosulich,** senior research scientist at Bound Brook Laboratories of the American Cyanamid Co.

Bjorksten Research Laboratories, Inc., has announced the appointment of **George D. Creelman** as technical service director. Formerly with M. A. Hanna Co., Cleveland, he will act as liaison between the technical staff at Madison and clients sponsoring research programs with the organization.

Jacob P. Den Hartog has been appointed head of the department of mechanical engineering at the Massachusetts Institute of Technology, where since 1945 he has been in charge of the division of applied mechanics. He is an authority in the field of mechanical vibrations, and during World War II served with the U.S. Navy Bureau of Ships. Born in Ambarawa, Java (Indonesia), he became a naturalized U.S. citizen in 1930.

Charles L. Dunham, chief of the medical branch in the U.S. Atomic Energy Commission's division of biology and medicine since 1949, has been appointed deputy director of the division. He will assist John C. Bugher in the administration of the commission's biomedical program, which includes activities in the fields of medicine, biology, agriculture, genetics, biophysics, radiation instrumentation, and technical aspects of civil defense.

Cornell University has announced the appointment of **John L. Finan** as a visiting professor of psychology for the fall term. Since 1951 he has been assistant director of the Army's Human Resources Research Office at George Washington University. He will offer two courses at Cornell, on the psychological basis of social behavior and on physiological psychology.

Fred M. Hauserman, of E. F. Hauserman Co., Cleveland, has been elected president for 1954–55 of the Building Research Institute, a branch of the Division of Engineering and Industrial Research, National Academy of Sciences–National Research Council, Washington, D.C.

Thomas Hindle has been appointed assistant dean of the Temple University Medical School. A graduate of the school, he recently completed his internship at the university hospital.

The University of Maryland has appointed **S. B. Jackson** professor of mathematics and head of the department of mathematics.

Robert Jastrow, formerly assistant professor of physics at Yale University, has been appointed to the staff of the nucleonics division of the Naval Research Laboratory, Washington, D.C.

The applied physics division at the Midwest Research Institute has named **Sheldon L. Levy** manager. Dr. Levy, formerly mathematics professor at Brown University, succeeds **R. R. Hancox,** who is now with the Great Lakes Pipeline Co.

Robert M. McAmmond has been appointed chief of the New York Department of Mental Hygiene's newly created office of planning and procedure.

Ernest E. McCollough, Cumberland, Md., will go to Judson College, Marion, Ala., this fall as chairman of the division of sciences and professor of chemistry and physics. Previously associated with the Celanese Corp. of America as a research chemist, he is replacing **H. C. Steele** who is retiring from his duties as head of the science division.

George A. Miller has been appointed associate professor of psychology at Harvard University effective 1 Feb. 1955. Dr. Miller, who is now on the faculty of Massachusetts Institute of Technology, was one of the group that worked, during and after World War II, to perfect methods of assuring communication by voice against a background of noise and mechanical distortion such as occurs often in military and naval action.

V. Lawrence Parsegian is resigning as director of the research division, New York operation office, U.S. Atomic Energy Commission, effective 1 Sept., to accept appointment as chairman of the engineering group and professor of nuclear engineering at Rensselaer Polytechnic Institute. The engineering group comprises seven degree-granting engineering departments with an enrollment of more than 2000 students.

Henry B. Sargent, president and general manager of the Arizona Public Service Co., Phoenix, has joined Stanford Research Institute's Board of Directors.

Six authors of outstanding technical papers published by the American Society for Testing Materials have been honored.

Clyde E. Work and **Thomas J. Dolan,** University of Illinois, "The influence of strain-rate and temperature on the strength and ductility of mild steel in torsion," Charles B. Dudley medal.

A. A. Wagner, Bureau of Reclamation, Denver, "Lateral load tests on piles for design information," C. A. Hogentogler award.

E. T. Wessel and **R. D. Olleman,** Westinghouse Electric Corp., "Apparatus for tension testing at subatmospheric temperatures," Richard L. Templin award.

John T. Richards, Penn Precision Products, Inc., "The corrosion of beryllium copper strip in sea water and marine atmospheres," Sam Tour award.

In addition, two ASTM awards established this year to honor Max Hecht and Frank E. Richart were given, respectively, to **Max Hecht,** Power Stations Chemistry, Drexel Hill, Pa., for the study of water as an engineering material, and to **Albert T. Goldbeck,** National Crushed Stone Association, Inc., Washington, D.C., for contributions in the field of concrete and concrete aggregates.

Meetings

The program of the 62nd annual meeting of the **American Psychological Association,** which will be held in New York, 3–8 Sept., appeared in the July issue of *The American Psychologist.* At the various sessions some 6000 members of APA will meet to hear discussions of approximately 50 subjects ranging from child psychology to desegregation, problems of old age, industrial relations, psychological warfare, and related topics. For further information write to APA headquarters, 1333 16th St. NW, Washington 6, D.C.

The National Association of Biology Teachers has received a grant of $15,000 from the National Science Foundation to conduct a work **conference on the improvement of biology teaching** in colleges and high schools at the University of Florida, 28 Aug.–6 Sept. Richard L. Weaver of the University of Michigan and Samuel Meyer of Florida State University are serving as codirectors of the conference and are selecting the 90 delegates, largely from the 10 southeastern states.

The conference is being held in conjunction with the annual meeting of the American Institute of Biological Sciences and one summary session will he held the evening of 6 Sept. so that those attending AIBS meetings may hear the recommendations of the conference.

"Gravity day" will be held at New Boston, N.H., on 28 Aug. In the morning Roger W. Babson, founder of Gravity Research Foundation, will speak on "Why does our world revolve?" In the afternoon there will be discussion of problems concerning gravitation, and the 1953 winning essays on gravity will be considered.

At the 35th summer meeting of the **Mathematical Association of America** at the University of Wyoming, 30–31 Aug., L. H. Loomis of Harvard University will deliver the third series of Earle Raymond Hedrick lectures on the topic "Convex sets." These lectures, named in honor of the first president of the association and delivered annually at its summer meeting, are a series of three expository lectures on a subject of current interest in mathematics.

On 7 Sept., during the annual meeting of the American Institute of Biological Sciences, Gainesville, Fla., the Institute's Publications Committee is sponsoring a special **symposium on the communication of research results.** John A. Behnke, associate administrative secretary of AAAS, assisted in organizing the following program, which will be under the chairmanship of James Bonner of the California Institute of Technology: "Introduction: a blueprint for streamlining biological journal publication," William Duryee, National Cancer Institute, and chairman, Publications Committee, AIBS; "Better preparation of material," Richard M. Hewitt, senior consultant, Division of Publications, Mayo Clinic, and assistant professor of medical literature, Mayo Foundation; "Modern reproduction of material," Robert Bray, deputy chief, Technical Information Division, Library of Congress; "Indexing and rapid differential selecting of material," Ralph Shaw, director of the library, U.S. Dept. of Agriculture; "The use of material," Ralph Cleland, professor of botany, Indiana University.

Society Elections

American Association of University Professors: pres., William E. Britton, University of Illinois; 1st v. pres., Robert L. Calhoun, Yale University; 2nd v. pres., Harold Newton Lee, Tulane University; general sec., Ralph E. Himtead; treas., Florence P. Lewis, Goucher College.

American Board of Clinical Chemistry: pres., Otto A. Bessey, University of Texas School of Medicine; v. pres., A. E. Osterberg, Abbott Laboratories, N. Chicago; sec.-treas., O. H. Gaebler, Henry Ford Hospital, Detroit.

American Society for Experimental Pathology: pres., Russell L. Holman, Louisiana State University Medical School; v. pres., Harold L. Stewart, National Cancer Institute; sec.-treas., Cyrus C. Erickson, University of Tennessee College of Medicine.

Medical Library Association: pres., Wilma Troxel, University of Illinois Medical School; v. pres. and pres.-elect, Wesley Draper, Medical Society of the County of Kings and Academy of Medicine of Brooklyn; honorary v. pres., E. H. Cushing, Washington, D.C.; sec., Esther Judkins, Rockefeller Institute for Medical Research; treas., Pauline Duffield, State Medical Association of Texas.

Education

On 23 Sept. from 6:00 to 7:00 P.M., E.D.S.T., the American College of Physicians will utilize television through a national closed circuit over the Columbia Broadcasting System to carry to its members and their colleagues a "Symposium on the management of hypertension." This telecast is made possible through the cooperation and support of Wyeth Inc. of Philadelphia, and will be the **first nationwide telecast for postgraduate medical education.**

The panel of physicians who will participate includes Cyrus C. Sturgis of the University of Michigan; F. H. Smirk of the University of Otago (New Zealand); Garfield G. Duncan of Pennsylvania Hospital, Philadelphia; R. W. Wilkins of Massachusetts Memorial Hospital, Boston; and Edward D. Freis of Georgetown University.

Harvard University this fall will start to train graduate students in the field of **data processing.** A specialized group will be selected as candidates for the new M.S. degree, the first such to be offered in the United States. Data processing involves the use of automatic computing machinery for problems where storage and handling of large amounts of information are required.

In business, its aim is the automatic office, with customer billing and inventory control done entirely without human aid. Life insurance companies, large retail stores, and public utilities are believed to be among those that could use digital computers to great advantage. In industry, data processing looks toward the day of the automatic control of factory operations. Chemical and oil industries have already made a start toward automation in this field.

The following is the schedule for the **Northwestern University lecture series,** "New methods of physical chemistry," to be given on the downtown Chicago campus on Tuesday evenings. For further information write to Dr. R. G. Pearson, Chemistry Department, Northwestern University, Evanston, Ill.

28 Sept., "Ionic properties of polyelectrolytes," F. T. Wall, University of Illinois; 5 Oct., "Isotope fractionation studies applied to chemical and geochemical problems", J. G. Thode, McMaster University, Canada; 12 Oct., "Kinetic methods for rapid chemical reactions", R. P. Bell, Oxford University, England; 19 Oct., "Structural and kinetic applications of infrared spectroscopy", Bryce Crawford, Jr., University of Minnesota; 26 Oct., "Shock and detonation waves as a research tool", G. B. Kistiakowsky, Harvard University; 2 Nov., "Applications of physical chemical methods to the semiconductor field", C. S. Fuller, Bell Telephone Laboratories; 9 Nov., "Chemical applications of nuclear magnetic resonance", R. A. Ogg, Jr., Stanford University; 16 Nov., "Recent developments in the application of magnetochemistry to the study of catalysts", P. W. Celwood, Northwestern University; 23 Nov., "Paramagnetic resonance studies of free radicals produced by radiation", R. Livingston, Oak Ridge National Laboratory; 30 Nov., "X-ray structure determinations by means of the x-rac", R. Pepinsky, Pennsylvania State University; and 7 Dec., "Some physical methods of studying aerosols", F. T. Gucker, Jr., University of Indiana.

Fellowships and Awards Available

Nominations are solicited for the **1955 Borden award in nutrition** made available by the Borden Company Foundation, Inc. The American Institute of Nutrition will make this award in recognition of distinctive research in the United States and Canada that has emphasized the nutritive significance of the components of milk or of dairy products. The award will be made primarily for the publication of specific papers during the previous calendar year, but the jury of award may recommend that it be given for important contributions made during the past several years. Membership in the American Institute of Nutrition is not a requisite of eligibility for the award. Employees of the Borden Company are not eligible.

Nominations, accompanied by supporting data, *must be submitted by 1 Jan.* to W. D. Salmon, Animal Husbandry and Nutrition, Alabama Polytechnic Institute, Auburn, Ala.

The **Committee on Disaster Studies** of the National Research Council in its last meeting emphasized the need to encourage research by competent representatives of the social sciences and related disciplines who wish to advance knowledge in their own fields and contribute to the solution of disaster problems. The Committee is interested in the effects of disaster upon individuals, groups, communities, and societies; human response to the threat and impact of disaster, ranging from the individual to the national level; the human aspects of such problems as communications, warning, organization, rescue, welfare, medical care, evacuation, and logistics; and the long-term effects and recovery problems of disaster.

The Committee can support this development to a limited extent by providing financial assistance for investigations and analyses. Assistance will be similar to grants-in-aid and ordinarily will range from $200 to $2000. Projects requiring larger sums will be considered if they are especially meritorious and pertinent. Proposals from graduate students and other qualified investigators will be entertained. These should reach the Committee's offices at 2101 Constitution Ave., Washington 25, D.C., *by 1 Sept.*

A new annual **scholarship in American studies** valued at $600 has been established at New York University's

Graduate School of Arts and Science, beginning with the 1954–55 academic year. A gift of Daniel Lerner, professor of sociology at the Massachusetts Institute of Technology, and his wife, the study grant honors Dr. Lerner's father, the late Louis Lerner.

Applications for **U.S. Government awards under the Fulbright Act** for the academic year 1955–56 *must be postmarked no later than 15 Oct.* The awards offered are for university lecturing and for research at the postdoctoral level in Europe and Asia. For detailed information, address the Conference Board of Associated Research Councils, Committee on International Exchange of Persons, 2101 Constitution Ave., Washington 25, D.C.

Grants and Fellowships Awarded

The first three fellowship awards of $2000 each for teaching and study at the Columbia University Institute of **Air Flight Structures** have been announced jointly by John A. Krout, vice president and provost of Columbia, and Harry F. Guggenheim, president of the Daniel and Florence Guggenheim Foundation. Winners of fellowships are Jerome L. Sackman, Oscar W. Dillon, Jr., and Richard P. Shaw. Purpose of the Institute, formed in January on a grant from the Daniel and Florence Guggenheim Foundation, is to train exceptionally qualified graduate students in the comparatively new field of air flight structures and to conduct research in aircraft design and structure.

A research grant from the **American Philosophical Society** is enabling A. E. Porsild, chief botanist of the National Museum of Canada, Ottawa, to carry out extended studies of the taxonomy and distribution of arctic plants. He has sailed for Europe where he will visit some of the leading herbaria and libraries.

The **Atlantic Refining Co.**, Philadelphia, has announced the names of the winners of the 2 fellowships and 12 scholarships granted to colleges and universities for the 1954–55 academic year. The awards are made for the purpose of encouraging and assisting outstanding undergraduate and graduate students who show the greatest promise of success in the fields of science, engineering, and research directly related to petroleum industry operations.

Fellowships

H. A. Deans, Rice Institute. Chemical engineering.
R. C. Reynolds, Washington University. Geology.

Scholarships

R. A. Moses, Alabama Polytechnic Institute. Chemical engineering.
R. O. Barnes, Colorado School of Mines. Geophysics.
R. S. Johnson, Georgia Institute of Technology. Electrical engineering.
B. A. Dalton, University of Kansas. Petroleum engineering.
K. H. Ault and J. R. Crocker, Louisiana State University. Petroleum engineering.
W. H. Thompson, University of Oklahoma. Petroleum engineering.
T. V. McEvilley, St. Louis University. Geophysics.
J. B. Ashby, Southern Methodist University. Geology.
G. W. Millsap, Texas A. & M. College. Chemical engineering.
J. Medford, Texas Technological College. Mechanical engineering.
L. P. White, University of Texas, Geology.
M. J. Hagan, Jr., University of Tulsa. Petroleum engineering.

Two fellowship awards given annually by the **Educational Testing Service,** a national nonprofit testing agency, for graduate study in psychology at Princeton University have been announced. The recipients are Robert F. Boldt, Fremont, Nebr., and Donald P. Estavan, Redwood City, Calif. The award is $2500 annually for each fellow.

The Carnegie Corp. of New York, through a grant to ETS, has made it possible to extend for a second year the visiting psychometric fellowship to John A. Keats, a graduate of the University of Melbourne and a member of the staff of the Australian Council for Educational Research in Melbourne. Announcement also is made by ETS of the reappointment as psychometric fellows of Norman Cliff, Bertram Karon, Anton Morton, and Robert Sadacca.

The American Heart Association's second annual **Howard W. Blakeslee awards** for outstanding reporting in the field of heart and blood vessel diseases will be presented on 14 Sept. to Cathy Covert, medical writer, and Arthur Cornelius, chief photographer, of the Syracuse *Herald-Journal,* for their series of ten articles on heart diseases that appeared in Dec. 1953; Clive Howard of Ridgewood, N.J., for his article, "Can heart disease wreck your marriage?", in the Feb. 1953 issue of *Woman's Home Companion*; "American inventory," for "The mechanical heart," a documentary television program, telecast on NBC-TV from Harper Hospital, Detroit, 15 Feb. 1953; and William A. Brams, of Chicago, Ill., for his book, *Managing Your Coronary* (Lippincott, Philadelphia, 1953). Each award involves an honorarium of $500.

Vladimir Nikolaevich Ipatieff, the chemist responsible for many significant developments in chemistry, including an inexpensive method for making the raw material leading to mass production of synthetic rubber, has been honored by the formation of an **Ipatieff Gift Fund** for the John Crerar Library of Chicago. The fund of $5000 is a joint bequest from Dr. Ipatieff's estate and an anonymous donor. It will be used to purchase books on chemistry for the library, a nonprofit institution, open to the public, whose collection is devoted entirely to science and technology.

M. Truman Fossum, agricultural economist in the U.S. Department of Agriculture, has received the **Norman Jay Colman award** for 1954 from the American Association of Nurserymen in recognition of his efforts directed toward the development of a sound program of economic research for florists and nurserymen, and for his *Trade in Horticultural Specialties, a Statistical Compendium,* published by the USDA in 1953. It is the first award to be given by the association in recognition of economic research in ornamental horticulture. Last year, Mr. Fossum received an award from the Foundation for Floriculture of the Society of American Florists.

Miscellaneous

The American Southwest is featured in the August issue of the *American Anthropologist,* journal of the American Anthropological Association. This marks the first time in the history of the 66-yr-old publication that an entire issue has been devoted to a single area. Sol Tax of the University of Chicago is editor of the journal, but Emil W. Haury, American Indian specialist of the University of Arizona, was guest editor for the special issue. Single copies may be obtained for $2.25 from the Executive Secretary, American Anthropological Association, Box 71, Andover, Mass.

The following **chemicals** are wanted by the Registry of Rare Chemicals, Armour Research Foundation of Illinois Institute of Technology, 35 W. 33 St., Chicago, Ill.: potassium thioplatinate; dilauryl selenide; tetraphenylgermanium; zinc hydride; potassium monoxide; truxillic acid; 3,3,3-trichloropropene; 1,2,3-butanetriol; tri(p-nitrophenyl)carbinol; 2,3,5,6-tetramethylbenzoic acid; succindialdehyde; piperidine-4-acetic acid; 4-nitrohydrindene; 2,4-dichlorobenzyl alcohol; n-laurylpiperidine; chroman-5,6-quinone; phthalazone; scyllitol; cymarin; gamma-tocopherol.

The Bavarian State's **Museum of Ethnology** in Munich was reopened early in July. Some 12 yr ago its collections were evacuated to safeguard them from war damage. Since the reopening, ethnological treasures from all parts of the world are being shown in alternating exhibits in 12 halls of the museum's east wing. The original "Ethnographical Collection" dates from 1817; it was established as an independent museum in 1868.

Abstracts of 29 papers presented at a symposium on **neurosecretion,** held in Naples last year were recently printed in Italy in *Pubblicazioni della Stazione Zoologica,* Vol. 24, Supplemento, Convegno Sulla Neurosecrezione. Participants in the symposium came from the United States, Denmark, England, France, Germany, Italy, Japan, and Sweden.

A preliminary hearing was held recently to explore the possibility or advisability of developing a uniform system for use in coding biological taxonomic entities, since it is known that several laboratories have already established their own punch-card records. Participants at this exploratory meeting were from the Library of Congress, the U.S. Department of Agriculture, the Smithsonian Institution, and the Chemical-Biological Coordination Center of the National Research Council. To facilitate the exchange of information between various laboratories, it would seem to be highly desirable for research groups to use a uniform **taxonomy coding system.** If the need for uniformity is confirmed by a significant number of biologists, a start on the formation of a standardized code should be made as soon as possible.

The immediate problem is to determine what areas of biology could be usefully served by such a code. It is requested that those who have devised or adopted a system for coding taxonomic entities, or who may be conducting work which might benefit from such codification, submit their opinions concerning a standardized biological taxonomy code to Dr. G. Congdon Wood, Chemical-Biological Coordination Center, National Research Council, 2101 Constitution Ave. NW, Washington, D.C.

New Periodicals

Eugenics Quarterly, vol. 1, No. 2, June 1954. Helen G. Hammons, Ed. American Eugenics Society, 230 Park Ave., New York 17. Quarterly. $3 per year. Successor to *Eugenical News.* . . . *Composite Wood.* vol. 1, No. 3, Apr. 1954. D. Narayanamurti, Ed. 15 Beeson Rd., New Forest P.O., Dehra Dun, U.P., India. Rs. 14 per year; Rs. 2/8 per issue. . . . *Acta Medica et Biologica.* vol. 1, No. 1, Mar. 1953. Niigata University School of Medicine, Niigata, Japan. . . . *Opera Botanica.* (In English, German, and French.) vol. 1, No. 1, H. Hjelmqvist, Ed. Botanical Society of Lund. Distributed by Almqvist and Wiksell, Stockholm. Irregular. Kr. 30 per vol. Continuation of *Botaniska Notiser, Supplement.* . . . *Acta Cuyana de Ingeniería.* (In Spanish.) vol. 1, No. 1, Jan. 1953. Facultad de Ingeniería y Ciencias Exactas Físicas y Naturales, San Juan, Argentina. . . . *Bulletin of the Central Electrochemical Research Institute Karaikudi.* vol. 1, No. 2, Apr. 1954. A. Narayanaswami, Ed. Central Electrochemical Research Institute, Karaikudi, India. Rs. 12/- per year (foreign, incl. postage); Rs. 2/- per issue. . . . *Eye to Eye.* Bull. of the Graphic History Society of America. No. 3, Dec. 1953. Paul Vanderbilt, Ed. Graphic History Society of America, P.O. Box 4402, Washington, D.C. Quarterly. $10 per year. . . . *The Prescriber.* vol. 1, No. 2, June 1954. Russel V. Lee, Ed. The Prescriber and Prescriptionist, P.O. Box 9189, San Diego 9, Calif. Monthly. $5 per year; 50¢ per issue. . . . *The Prescriptionist.* vol. 1, No. 2, June 1954. Edward P. Fleming, Ed. The Prescriber and Prescriptionist, P.O. Box 9189, San Diego 9, Calif. Monthly. $5 per year; 50¢ per issue. . . . *Industrial Science and Engineering.* vol. 1, No. 1, Jan. 1954. Advanced-student edition of *Industrial Laboratories.* George A. Whittington, Ed. Industrial Laboratories Pub. Co., 201 N. Wells St., Chicago 6, Ill. Monthly. Gratis to senior and graduate students working toward degrees in the engineering sciences. Available to others at $25 per year. . . . *Current Chemical Papers.* No. 1, 1954. Classified world list of new papers in pure chemistry. Cyril Hinshelwood, Ed. The Chemical Society, Burlington House, London, W.1., England. Monthly. $7.50 (post free) or $12.75 (air mail) per year. . . . *Boletín del Instituto de Antropología* (in Spanish). vol. 1, No. 1, Nov. 1953. Universidad de Antioquia, Medellin, Colombia. . . . *Nuclear Notes for Industry.* No. 1. U.S. Atomic Energy Commission, Technical Information Service, Oak Ridge, Tenn. Formerly listed in *Nuclear Science Abstracts* as "Selected Subjects of Interest to Industry."