viruses. The second group, open only to graduates in medicine who have completed one or more years of hospital experience in clinical surgery and are planning a career in orthopedic surgery, is designed to provide opportunities for training and research in those basic medical sciences which will be of particular value in furthering progress in the field of orthopedic surgery.

Fellows will be appointed at a meeting of the board late in February. Applications to receive consideration at this meeting must be filed on or before January 1. Appointments may begin on any date determined by the board.

For further particulars concerning these fellowships, application should be made to the Secretary of the Medical Fellowship Board, National Research Council, 2101 Constitution Avenue, Washington, D. C.

SCIENTIFIC NOTES AND NEWS

THE *Times*, London, reports that the King of England has approved the recommendations of the Council of the Royal Society awarding royal medals for 1942 to Professor W. N. Haworth, F.R.S., for his fundamental contributions to organic chemistry, particularly to the constitution of the sugars and the structure of complex polysaccharides, and to Dr. W. W. C. Topley, F.R.S., for his outstanding work on experimental epidemiology and immunology. Awards of medals by the president and council of the society are: the *Copley Medal* to Sir Robert Robinson, F.R.S., for research work of outstanding originality and brilliance which has influenced the whole field of organic chemistry; the *Rumford Medal* to Dr. G. M. B. Dobson, F.R.S., for his outstanding work on the physics of the upper air and its application to meteorology; the *Davy Medal* to Professor C. N. Hinshelwood, F.R.S., for his distinguished work on the mechanism of chemical reactions; the *Darwin Medal* to Professor D. M. S. Watson, F.R.S., for his researches on primitive fishes and amphibians which have much advanced the knowledge of the evolution of these groups of animals; the *Buchanan Medal* to Sir Wilson Jameson, for his distinguished administrative service to hygienic science and practice; the *Hughes Medal* to Professor Enrico Fermi, for his outstanding contributions to the knowledge of the electrical structure of matter, his work in quantum theory and his experimental studies of the neutron.

JOSIAH K. LILLY, chairman of the board of Eli Lilly and Company, was presented with the Remington Honor Medal for 1942 "for his many accomplishments in the interests of pharmacy" at a dinner given on December 2 by the local branch of the American Pharmaceutical Association in New York City.

DR. HARRY N. HOLMES, professor of chemistry and head of the department at Oberlin College, president of the American Chemical Society, has been elected an honorary member of the Chemical, Metallurgical and Mining Society of South Africa.

IT is reported in *Nature* that the Emil von Behring Prize, which is awarded by the University of Marburg every two years for outstanding achievements in immunology, serum therapy and chemotherapy, has been presented to Professor Paul Uhlenhuth, professor of hygiene and bacteriology at the University of Freiburg-im-Breisgau.

AT the seventh annual meeting of the Florida Academy of Science held at the University of Florida, Gainesville, on November 20 and 21, the following officers were elected for 1943: *President,* Robert B. Campbell, Tampa; *Vice-president,* T. H. Hubbell, University of Florida; *Secretary-Treasurer,* R. F. Bellamy, Florida State College for Women.

DR. JOHN BOSWELL WHITEHEAD, director of the School of Engineering of the Johns Hopkins University, has become professor emeritus.

DR. WILLIAM M. SMALLWOOD, head of the department of zoology at Syracuse University, will have leave of absence during the second semester prior to his official retirement in June. He has been a member of the faculty for forty-six years.

DR. RHEINART PARKER COWLES, professor of zoology at the Johns Hopkins University and for the past twelve years investigator in charge of the biological and hydrographical survey of the Chesapeake Bay, retired in September.

DR. LEE BONAR has been appointed chairman of the department of botany of the University of California at Berkeley. He succeeds Alva R. Davis, who is now a major in the Coast Artillery at Camp Callan, San Diego. Dr. Bonar has been associated with the university for the past twenty years.

THE chair of oil engineering and refining in the University of Birmingham, vacant by the death of Professor A. W. Nash, has been filled by the appointment of Dr. F. H. Garner, a graduate of the university. Dr. Garner was for many years chief chemist of the Anglo-American Oil Company.

DR. HAROLD P. BROWN, chairman of the department of chemistry of the University of Kansas City, has joined the staff of the Synthetic Rubber Division

of the Research Laboratories of the B. F. Goodrich Rubber Company, Akron, Ohio.

DR. CHARLES A. COOK, formerly senior biochemist at the Experimental Research Laboratories of Burroughs Wellcome and Company (U.S.A.), Inc., is now in charge of the department of medical and biological chemistry at the Research Laboratories of the Lambert Pharmacal Company in St. Louis.

Chemical and Engineering News states that Wilmer T. Rinehart, who was recently associated with the United States Gypsum Co. and formerly with the Roessler and Hasslacher Chemical Co. at Niagara Falls, N. Y., has joined the chemical engineering staff of the Armour Research Foundation.

THE three hundred and fifteenth meeting of the Washington Academy of Sciences was held jointly with the Anthropological Society of Washington on December 17. Matthew W. Stirling, chief of the Bureau of American Ethnology of the Smithsonian Institution, delivered an address entitled "Anthropological Explorations in Netherlands New Guinea."

DR. HARLAN TRUE STETSON, of the Massachusetts Institute of Technology, addressed the Worcester Polytechnic Institute Chapter of the Society of Sigma Xi on the occasion of the initiation of new members on December 4. He spoke on "Solar Radiation and the Upper Atmosphere."

PETER E. KRAGHT, senior meteorologist of the American Airlines, Inc., gave on December 1 a public lecture on "Meteorology and Our Daily Work" before the Kappa Chapter of Sigma Xi of Columbia University.

DR. ERNEST SACHS, professor of neurological surgery at Washington University Medical School, St. Louis, delivered the William Haggard Memorial lecture at Vanderbilt University on November 27. The subject was "The Essential Qualifications of a Great Surgeon."

JOHN LOVELL LOUGHBOROUGH, a member of the Industrial Relations Research Department of Lockheed and Vega Aircraft Corporations, has been appointed consulting anthropologist to the Advisory Council of the California State Bureau of Industrial Health. The council will advise on problems dealing with war and post-war industrial health problems.

THE American Mathematical Society and the Mathematical Association of America have voted to cancel the New York meeting, in line with the postponement of the annual meeting of the American Association for the Advancement of Science. The meetings were to have been held during Christmas week in conjunction with the association.

THE meeting and symposium which had been arranged by the American Association of Physical Anthropologists to be held jointly with Section H of the American Association for the Advancement of Science have been cancelled.

THE annual meeting of the Society of American Bacteriologists has been cancelled. It was planned to be held in Columbus, Ohio, on December 28, 29 and 30.

BY vote of the executive committee of the American Association of Anatomists, the meeting scheduled for Montreal in April, 1943, has been postponed.

THE American Statistical Association has cancelled its annual meeting, which it was planned to hold in Cleveland from December 29 to 31, because of the greatly increased need for curtailment of civilian travel resulting from the acceleration of war activities and the probability that government employees planning to participate in the program would not be granted leave for this purpose. The other societies composing the group of Allied Social Science Associations have also cancelled their Cleveland meetings. Arrangements are now being made for the presentation of a number of the papers scheduled for the annual meeting at special meetings of the Washington and New York Chapters of the association.

IT is reported in the daily press that a national committee to aid the war effort, none of whose members will go to Washington, is being organized. Members will consult individually with War Production Board representatives by telephone and letter only, and will not be asked to meet in Washington. The referee board of the chemicals division, through its chairman, Professor Donald B. Keyes, of the University of Illinois, stated that the group will be made up of leaders in research and development in the chemical and allied industries. They will serve as liaison men between their companies or industries and the referee board.

WHEN Dr. J. Shelton Horsley was president of the Virgnia Academy of Science in 1926, he raised an endowment fund amounting to $12,000, interest from which has been used since to aid and encourage younger men and women in Virginia with aptitudes for scientific investigative work. This year's research committee of the academy consists of Dr. Harvey B. Haag, *chairman,* Dr. Allen T. Gwathmey, J. H. Johnson, Dr. Gillie A. Larew, Dr. Ivey F. Lewis, Dr. Rolland J. Main and Dr. Frank C. Vilbrandt. Dr. E. C. L. Miller, secretary, and Dr. Sidney S. Negus are ex-officio members. At a recent meeting of this committee research grants were awarded to the following: Dr. Lynn D. F. Abbott, Medical College of Virginia; Professor J. A. Addlestone and Herman Hackerman,

Virginia Polytechnic Institute; W. L. Gooch, of the Chesapeake Corporation; James McD. Grayson, Virginia Polytechnic Institute; Dr. Ladley Husted, University of Virginia; Claiborne S. Jones, University of Virginia, and Dr. C. R. Spealman, Medical College of Virginia.

BECAUSE of the demand for women in certain kinds of engineering work, the Drexel Institute of Technology, Philadelphia, will accept in February women students in all departments of the School of Engineering. The Drexel Evening Diploma School opened new engineering classes on the evening of December 14 for women as well as men. The subjects offered are mathematics, algebra, geometry, trigonometry, analytical geometry and calculus, physics, inorganic chemistry, mechanical and engineering drawing, the foundations of English and advanced English. Students may enroll for one, two or three evenings a week.

A PRE-METEOROLOGICAL training course covering six months of intensive instruction in physics, mathematics and electrical engineering will be opened on March 1 at the University of Michigan. Four hundred privates from the Army are expected to be in attendance.

APPLICATIONS must be received by March 1 for the Mary Putnam Jacobi Fellowship for Medical Research of $1,000 of the Women's Medical Association. Blanks may be obtained from the secretary of the committee, Dr. Phebe L. Du Bois, 150 East 73rd Street, New York.

THE board of the second Sigma Delta Epsilon Fellowship has announced that applications and reference statements, both in triplicate, for the 1943–1944 award of $1,000 should be submitted to it before March 1. Women with the equivalent of a master's degree, conducting research in the mathematical, physical or biological sciences, who need financial assistance to complete their work for the doctorate, and give evidence of high ability and promise, are eligible. The appointee must devote the major part of her time to an approved research project, and not engage in other work for remuneration unless such work shall have received the written approval of the board before the awarding of the fellowship or in any later emergency. Application blanks may be secured from Dr. Eloise Gerry, care of the U. S. Forest Products Laboratory, Madison, Wisc. Announcement of the award will be made early in April.

PRINCETON UNIVERSITY has received a legacy by the will of Louise R. Pierson, of Orange, N. J., of $25,000 for the endowment of a sixth scholarship in memory of the late Dr. John Grier Hibben, the fourteenth president of the university. The fund will provide annually a scholarship "for a New Jersey man of outstanding scholarship, character and promise . . . who intends to make the practice of medicine his life profession."

THE James F. Lincoln Arc Welding Foundation, Cleveland, Ohio, offers $5,000 in student awards and $1,750 in scholarships for the departments of the institutions in which the students are registered. There are seventy-seven student awards—a first award of $1,000, a second of $500, a third of $250, four awards of $150, eight of $100, twelve of $50 and fifty of $25. There are seven scholarships of $250 each. The school of the winner of the first award will receive four scholarships; of the second two, and of the third one. Any resident engineering undergraduate student registered in any school, college or university in the United States, giving a course in any branch of engineering or architecture, leading to a degree, or any cadet registered in the U. S. Military Academy, U. S. Naval Academy and the Coast Guard Academy is eligible to submit a paper. The awards will be made for papers describing the conversion from other methods to arc-welded construction of parts of machines, complete machines, trusses, girders or structural parts.

THE Museum of Vertebrate Zoology of the University of California at Berkeley has recently completed the identification of birds obtained in El Salvador, Central America, in the early part of 1942. The collection, numbering 1,145 items, was made by Joe T. Marshall, Jr., assisted principally by John Davis, while they were members of the University of California's expedition to El Salvador under the direction of Dr. R. A. Stirton. The material comprises 301 separate species and subspecies. Of these 217 are new to the collection and 47 genera are for the first time represented there. One of the most valuable aspects of this collection is its inclusion of 345 complete bird skeletons of 192 species. These afford material for extensive study of the phyletic relationships of groups of Neotropical birds; skeletons of many of these species are either rare or lacking in North American and European institutions.

BIRDS, small mammal specimens, pressed plants, insects, rocks and minerals, seeds, soils, American Indian handicraft objects and other natural history and ethnological material may now be drawn from Field Museum of Natural History as are books from a public library. This is a new service inaugurated by the N. W. Harris Public School Extension Department. The new materials have been made available to provide teachers with visual aids that can be used at times when instruction in a particular subject is

being given in classrooms as part of the regular curriculum. Most of the specimens are of natural history subjects local to the Chicago area. Teachers may obtain loans of this material upon written or telephoned request, to the extent that previous loans make compliance with their requests possible.

ACCORDING to *The Experiment Station Record,* an Agricultural Machinery Development Board set up early in 1942 has established a National Institute of Agricultural Engineering at Askham Bryan, near York. The nucleus of the institute is the Institute of Research in Agricultural Engineering, transferred from Oxford by the university with its director, S. J. Wright, continuing in charge. Temporary housing in the new location will be provided in buildings belonging to the Yorkshire Council for Agricultural Education, but eventually it is intended to build permanently on a near-by site. The main functions of the new institute will be to act as a general clearing house for information about agricultural machinery and its use, to carry out tests or demonstrations of new or improved implements and to undertake experimental and demonstration work on the better utilization of existing equipment.

DISCUSSION

PREDETERMINATION OF SEX[1]

IN the past the sex of the offspring from any mating has been a matter of chance. Despite the fact that thousands of techniques have been suggested no method of sex control has stood the scrutiny of unbiased investigation.

The advent of this century contributed a major advance in understanding the mechanism behind this chance distribution of the sexes. The unbalanced condition of one or more chromosome pairs in one sex furnished the mechanism whereby the distribution of sex in a population was random with a mean approximating equality for the two sexes. The extension of the gene balance concept to our knowledge of sex determination did not alter the random nature of the sex distribution, it refined our understanding of how the randomness came about. No man-controlled environmental circumstance was found to affect the ratios of the gametes or the sex after their fusion.

Sex-linked lethals gave students of inheritance the first positive means of controlling the sex of specified progeny. The control was directional in that it reduced the numbers of males. But it was positive and could be duplicated to any interested person's satisfaction. At first this genetic control changed the sex ratio from the 50:50 distribution to 33⅓ males to 66⅔ females. But the introduction of one or more lethal genes in each of the sex chromosomes with prevention of crossing over soon showed that the sex control could be made practically perfect, no males to 100 per cent. adult females. This directional genetic control of the adult sex ratio had become an accomplished fact.

Gowen and Gowen[2] demonstrated another genetic control of sex. The presence of a homozygous gene pair in the third chromosome of *Drosophila melanogaster* controlled the embryological development of the sex-differentiating organs. Besides normal males and females, individuals with a mixture of male and female organs appeared in the progeny. Inheritance control of sex even to the organ arrangement was evidently a function of this gene. But the path over which the gene worked was also learned. The gene controlled the maturation division of the parent female in such a manner that diploid and fractionally diploid eggs, instead of the haploid eggs, were produced.

Gershenson[3] in *Drosophila obscura* analyzed another case in which the genotype affects the maturation division. In this case the male instead of the female is the responsible agent. Male genotypes carrying this inheritance in their sex chromosomes have nearly 100 per cent. female progeny (96 per cent. females to 4 per cent. males) without regard to the females to which they are bred. The possible mechanism through which this inheritance may work has been further clarified by Sturtevant's and Dobzhansky's[4] observation that at maturation of this genotype the sex chromosome undergoes equational division at each meiotic division, the Y degenerates and the autosomes behave normally.

These cases furnish understandable mechanisms for shifting a normal sex ratio of 1 male to 1 female to that of all females. The other end of the sex control question, the production of all male progeny, has not been possible as yet. It is the purpose of this paper to present such a case where genotypic control leads to a progeny of 100 per cent. males.

In crosses intended for homozygosis studies, Mr. Nelson observed a pair mating of *Drosophila melanogaster* which produced 136 males and no females. The male progeny of this cross were able to transmit

[1] Journal Paper No. J-1054 of the Iowa Agricultural Experiment Station, Ames, Iowa. Project No. 714.

[2] Marie S. Gowen and John W. Gowen, *Am. Nat.,* 56: 286–288, 1922; John W. Gowen, SCIENCE, 68: 211–212, 1928; John W. Gowen, *Am. Nat.,* 65: 193–213, 1931.

[3] S. Gershenson, *Genetics,* 13: 488–507, 1928.

[4] A. H. Sturtevant and Th. Dobzhansky, *Genetics,* 21: 473–490, 1936; A. H. Sturtevant, *Proc. Nat. Acad. Sci.,* 23: 360–362, 1937.