tutions at dates and places to be announced later. The Sigma Xi lectures are annual events in the dissemination of the newest, important advances in the selected fields of science. The lecturers are:

Dr. G. D. Birkhoff, Perkins professor of mathematics at Harvard University, who will lecture on the "Mathematical Nature of Modern Physical Theories." He will endeavor to establish, in elementary terms, the fact that, since 1900, mathematical ideas have been responsible for theoretical advances of modern physical theories.

Dr. D. W. Bronk, professor of neurology at the University of Pennsylvania, will speak on the "Physical Structure and Biological Action of Nerve Cells." He will discuss this subject not only from the standpoint of research now in progress, but also with attention to the biological consequences of the demands of modern warfare and aviation.

Dr. Peter Debye, professor of chemistry at Cornell University, whose topic is "The Magnetic Approach to Absolute Zero," will tell what prevents science from reaching the absolute zero, and discuss whether magnetic cooling can be applied to the nucleus of the atom.

Dr. C. A. Elvehjem, professor of agricultural chemistry at the University of Wisconsin, will discuss "The Present Status of the Vitamin B Complex." He will explain that the vitamin B complex consists of at least a dozen separate factors, each of which can be obtained in pure form. He will report recent work on the use of sulfaguanidine and the evidence for the synthesis of several B vitamins in the intestinal tract.

Dr. H. Mark, professor of chemistry at the Brooklyn Polytechnic Institute. The title of his lecture is "Fundamental Aspects of the Elasticity of High Polymers." He will explain that the high polymers are chemical compounds that provide us with rubber, plastics and fibers. Dr. Mark will discuss the structure of these complex chemicals which mean so much to our war effort.

SCIENTIFIC NOTES AND NEWS

JOSIAH K. LILLY, since 1882 chairman of Eli Lilly and Company, has been awarded the twenty-first Remington Medal by the Philadelphia College of Pharmacy in recognition of his distinguished services to pharmacy. The committee of selection was composed of past presidents of the American Pharmaceutical Association. The presentation of the medal is expected to be made in the autumn at a meeting of the New York branch of the association.

MAJOR GENERAL ROBERT U. PATTERSON, U. S. Army, retired, dean of the Medical School of the University of Oklahoma at Oklahoma City, having reached the retirement age of sixty-five years, has submitted his resignation.

DR. HARRY NOBLE WRIGHT, formerly professor of mathematics at the College of the City of New York, who has for eight months served as acting president, was installed as sixth president of the college on September 30. The principal address was made by Dr. Felix Frankfurter, justice of the Supreme Court. Among other speakers were Mayor LaGuardia and Dr. Nelson P. Mead, chairman of the department of history and for three years acting president of the college.

THE Michigan College of Mining and Technology has made the following appointments to replace men who have leave of absence in order to serve with the armed forces: Professor O. Gaylord Marsh, a former consul general of the United States with service in Canada, Europe, Latin America and Korea, special lecturer in world affairs and a member of the Spanish division of the languages department; Drs. George Machwart, A. R. Kendall and Ernest Epperson, department of chemical engineering; and Jesse C. Butler, Earl Roberts and Thomas R. Richards, instructors in mathematics. Dr. Machwart has the rank of associate professor and Dr. Kendall that of assistant professor.

APPOINTMENTS of those who received in August doctorates of philosophy in agricultural and biological chemistry at the Pennsylvania State College are: James Russell Oyler, Nutrition Foundation research fellow at Columbia University; Isadore Zipkin, First Lieutenant, Sanitary Corps, U. S. Army; Laurence L. Layton, research department, Distillation Products, Inc., Rochester, N. Y.; Gertrude H. Spremulli, Ranger Aircraft Engines, Farmingdale, L. I.; Seymour S. Block, Seagram's, Lawrenceburg, Ind.

DR. I. FANKUCHEN, formerly of the University of Cambridge, England, has joined the staff of the department of chemistry of the Polytechnic Institute of Brooklyn for the coming academic year. Dr. Fankuchen, a former associate of Dr. W. L. Bragg, is known for his investigations in the field of x-ray and electron diffraction. The laboratory will be under the supervision of A. L. Davis, of the Polytechnic staff. Both the lecture and laboratory sessions will be held on Saturdays from 9 A.M. to 1 P.M., beginning on October 10.

AT Hofstra College, Dr. J. George Lutz has been made associate professor of chemistry and acting chairman of the department; Dr. E. Russell Stabler has been appointed assistant professor of mathematics, Dr. Leonard B. Brabec, assistant professor of chemistry, and H. Hunter Smith, assistant professor of physics.

SIR JOHN ORR, director of the Rowett Research

Institute, Aberdeen, has been appointed professor of agriculture in the University of Aberdeen. He will retain the directorship of the institute.

THE John and Mary R. Markle Foundation has authorized a grant-in-aid of $7,000 over a two-year period for the support of the research in experimental renal hypertension in progress at the College of Medicine of the University of Illinois. The work is under the direction of Dr. George E. Wakerlin, professor and head of the department of physiology. Dr. C. A. Johnson, assistant professor of physiological chemistry; Dr. E. L. Smith, instructor in physiology, and others are associated in the investigation.

THE following grants have been made by the Committee on Scientific Research of the American Medical Association: Frederick M. Allen, New York Medical College, Local Refrigeration in Surgery; Walter Schiller, Cook County Hospital, Chicago, Ovarian Tumors; Meyer M. Harris, Psychiatric Institute, New York, Further Research on Muscular Disease; Arthur H. Smith, Wayne University College of Medicine, Metabolism of Citric Acid; Tuberculosis Committee, Minnesota State Medical Association, J. A. Myers, *chairman,* Tuberculosis Survey of Meeker County, Minnesota.

JOHN TEE-VAN, executive secretary of the general staff of the New York Zoological Society and an associate in the department of tropical research, has been appointed acting curator of reptiles, to succeed Raymond L. Ditmars, who died on May 12. Mr. Tee-Van became associated with the society in 1911, when he was appointed assistant keeper in the department of birds.

G. DALLAS HANNA, curator of the department of paleontology of the California Academy of Sciences, San Francisco, has been appointed in addition administrative assistant to the director.

DR. STANLEY J. SEEGER, Texarkana, Texas, chairman of the Council on Industrial Health of the American Medical Association, according to the *Journal* of the association, has been named consultant to the Division of Industrial Hygiene of the National Institute of Health.

DR. FERDINAND W. HAASIS, senior clerk, U. S. Army Quartermaster Corps, Camp Roberts, Calif., has been appointed to senior scientific aide in the Special Guayule Research Project of the U. S. Bureau of Plant Industry, Salinas, Calif.

CAPTAIN CHARLES W. O. BUNKER, commander of the Naval Medical School, Bethesda, Md., has been assigned to command the Naval Medical Center at Bethesda and has been nominated for promotion to rear admiral. He succeeds Rear Admiral Charles M. Oman, who will become commanding officer of the Naval Convalescent Hospital, Harriman, N. Y. Captain Paul W. Wilson has been named to succeed Captain Bunker as head of the School of Medicine.

DR. FRANKLIN G. EBAUGH, professor of psychiatry of the School of Medicine of the University of Colorado and medical director of the Psychopathic Hospital, has leave of absence for the duration of the war. With the rank of lieutenant colonel he will serve as chief psychiatric consultant with the Eighth Service Command. His headquarters are at Fort Sam Houston, San Antonio.

CHARLES F. BONILLA, of the department of chemical engineering of the Johns Hopkins University, who has been appointed a member of the Board of Economic Warfare, has left for an eight weeks' trip to Brazil.

DR. MAYNARD A. JOSLYN, assistant professor of fruit technology at the University of California, who has been commissioned a captain in the U. S. Army, has been selected to aid in the development of a food dehydration industry overseas. He is one of two men who will be placed in charge of the development of the industry. The other, who will be a Canadian, has not yet been selected.

W. G. HOWARD, of the Department of Forests, Albany, has been appointed state area coordinator for New York State for the new Forest Fire Fighters Service of the Office of Civilian Defense.

DR. GEORGE BAEHR, chief medical officer of the Office of Civilian Defense, has gone to England to study Britain's Emergency Medical Service and to confer with medical leaders. Dr. Baehr will remain abroad for several weeks.

DR. E. C. STAKMAN, chief of the division of plant pathology and botany of the University of Minnesota and agent for the U. S. Department of Agriculture, will deliver an illustrated lecture on "Genetic Variation in Plant Pathogens and Its Practical Importance" on Friday evening, October 23, at a joint meeting at the Palmer House of the Institute of Medicine of Chicago and the Chicago Society of Internal Medicine.

THE program of Laity Lectures for the coming session at the New York Academy of Medicine is as follows: November 12, "Food and Civilization," Dr. R. R. Williams; December 10, "War and Medicine," Colonel Edgar Erskine Hume; January 28, open; February 25, "Aggressiveness—Individual and Collective," Dr. Franz Alexander; March 25, "Growing up Normally," Dr. Myrtle McGraw; April 22, "Crime and Punishment," Dr. Bernard Glueck.

THE Association of American Geographers will

hold its 1942 annual meeting at Columbus, Ohio, on December 28, 29 and 30, with sessions conducted at the Ohio State University. The program will be devoted primarily to facts and problems related to the war and to the post-war period of reconstruction. A joint session with Section E of the American Association for the Advancement of Science in New York has also been planned. The geographical contributions to this joint session will present a series of papers dealing with Latin America.

THE fifty-sixth annual meeting of the Association of Land-Grant Colleges and Universities will be held in Chicago at the Drake Hotel on October 28, 29 and 30. Preliminary meetings will be held as required during the period from October 24 to 27. The meeting this year is encouraged and its importance emphasized by the recent statement of the Science Committee "that the present emergency calls for the greatest mobilization of scientists, scholars and educators in the history of the United States, and it is clear that the societies and associations into which they are organized have an important part in the war effort. This part includes not only direct participation by scientists, technologists, scholars and others in war activities, but also the discussion of present and future problems and the maintenance of a vigorous intellectual life."

THE annual meeting of the American Science Teachers Association will be held at the Hotel Pennsylvania, New York City, on Tuesday and Wednesday, December 29 and 30.

DR. A. V. KIDDER, president of the American Anthropological Society, has made the following announcement: "In view of the fact that scientific organizations whose activities are not directly concerned with the war effort have been requested by the coordinator of transportation not to hold meetings, the executive committee of the American Anthropological Association has voted to postpone until after the war the scheduled annual meeting in Toronto. As, however, the constitution of the association requires that a meeting be held annually for the presentation of reports, the election of officers and the passage of the budget, it has been decided to hold a meeting for business purposes only at the Cosmos Club in Washington at 8:30 on the evening of December 29. Washington has been selected for this purpose because the necessary quorum of twenty members can be obtained with a minimum of travel."

THE new Mineral Industries Building of West Virginia University at Morgantown will be dedicated on October 16.

THE American Gastroenterological Association on January 1, 1943, will publish the first issue of a new journal to be called *Gastroenterology*. It will be owned by the association and will be its official publication. It will appear monthly and will be published by the Williams and Wilkins Company. Dr. W. C. Alvarez has been made editor (after June, 1943) and Dr. A. C. Ivy, assistant editor, with the following editorial board: Drs. A. H. Aaron, Buffalo; J. A. Bargen, Rochester; H. L. Bockus, Philadelphia; W. C. Boeck, Los Angeles; B. B. Crohn, New York; R. Elman, St. Louis; F. Hollander, New York; Sara Jordan, Boston; J. L. Kantor, New York; B. R. Kirklin, Rochester; P. Klemperer, New York; F. H. Lahey, Boston; F. C. Mann, Rochester; H. J. Moersch, Rochester; V. C. Myers, Cleveland; W. L. Palmer, Chicago; J. M. Ruffin, Durham; R. Schindler, Chicago; and D. L. Wilbur, San Francisco. The journal will print clinical and investigative contributions which are of interest to the general practitioner as well as to the specialist dealing with the diseases of digestion and nutrition, including their physiological, biochemical, pathological, parasitological, radiological and surgical aspects. Manuscripts should be sent to Dr. A. C. Ivy, *Gastroenterology*, 303 East Chicago Avenue, Chicago.

THE fourth ten-year Index of the Electrochemical Society, covering the years 1932 to 1941, inclusive, is now in press. Every subject discussed in the transactions of the society during the past ten years has been indexed and cross-indexed. This book of two hundred pages is a convenient source of accurate and up-to-date information covering every topic of interest in electrothermics, electrodeposition, electronics, theoretical electrochemistry and allied fields.

AN electron microscope has recently been purchased by the University of Missouri from the RCA Manufacturing Company and is now being installed in a centrally located laboratory where it may be used by all investigators who have use for such an instrument, as those in the departments of soils, zoology, botany, chemistry, physics and geology.

ACCORDING to the *Times*, London, the University of Durham has received an offer from the Nuffield Provincial Hospitals Trust to provide a grant of £15,000 towards the cost of establishing a chair of child health at King's College, Newcastle-on-Tyne. The senate and court of the university have accepted the proposal. They have appointed Dr. J. C. Spence as professor, and the council of King's College has expressed its intention to provide him with the assistance necessary for creating a full teaching and research department. The Royal Victoria Infirmary and the Babies' Hospital, Newcastle, will cooperate with King's College by providing all possible facilities for the new department, which will be concerned with the preservation and restoration of the health of children. The department will provide undergraduate

and post-graduate teaching in child health and the diseases of childhood, will be a center of research and will be at the disposal of local public health and education authorities of the region for advice and consultation in the conduct of their child welfare and school medical services.

DISCUSSION

CHROMOSOME NUMBERS IN MAMMALS AND MAN

HAVING had occasion recently to survey the chromosome numbers in Marsupials and placental mammals, a group in which many new and accurate counts have been made in recent years, it seems worth while pointing out some of the relationships which emerge. In Marsupials the most common diploid number is 22, although certain genera have 12 or 14. On the other hand, the armadillo (Edentata) has 60, which is also the usual number in Ungulates so far as known, the horse, cattle, yak, goat and sheep all having this number. In domestic pigs and in peccaries the known numbers are respectively 38 and 30. In Carnivora the numbers range from 34 in the fox to 78 in the dog. This suggests the possibility that in dogs doubling has taken place through crossing under domestication. In Rodentia the numbers are variable, 40 and 42 being frequent numbers in mice and rats, while the squirrels appear to range from 28 to 62, and even higher numbers have been counted in certain genera of rodents. The single species of bats whose chromosome number has been determined has 48. This number is found in all the Primates hitherto studied, that is the Rhesus monkey, chimpanzee and man, with the exception of a brown Cebus monkey having 54.

Although many counts remain to be made, certain tendencies are already clear. The placental mammals have numbers which are generally more than double those found in the marsupials, the ungulates having generally higher numbers than the primates. The evolutionary tendency has clearly been to an increase in chromosome numbers. In plants such increases in numbers have frequently been through allo- or autopolyploidy, and this can be confirmed by a study of the nucleoli.[1] It is still uncertain in how far the number of nucleoli in animals can be used as an index of the number of sets of chromosomes.

It was formerly assumed that polyploidy in animals would upset the sex chromosome mechanism, although I predicted[1a] that, in dioecious plants such as Salix, chromosome doubling would be followed by a process of readjustment of the sex chromosomes, so that the sex balance would be maintained. The more careful papers on mammal cytology have all described an unequal XY pair, or rarely an XO condition which, however, can hardly be regarded as certainly authenticated in any case. In dioecious plants, where the conditions are essentially similar to those in most animals, it turns out that doubling of the chromosomes does not necessarily have the effect predicted. For example, tetraploid forms of *Melandrium album*, produced by heat treatment, had in the male $2n = 44 + XXYY$ and in the female $2n = 44 + XXXX$.[2] When these 4n males and females were crossed together, the plants (with $44 + XXXY$) were not intersexes but pure males, apparently owing to a strong dominant factor for maleness in the Y-chromosome. Even $4n \times 2n$ gave triploid males and females with $2n = 33 + XXX$ (♀), and $2n = 33 + XXY$ (♂), respectively. Blakeslee[3] independently showed that in dioecious Melandrium when the chromosomes are doubled the species ultimately settles down to a balanced tetraploid condition with equal numbers of male (XXXY) and female (XXXX) individuals. Similarly, tetraploidy was induced in *Carica papaya* by the use of colchicine.[4] Of the 4n plants so obtained, 9 were ♀, 4 ♂, 1 ☿. As might be expected, the sex balance differs from one species to another.

Chromosome doubling in the higher mammals is therefore by no means ruled out, and it is possible that the 48 chromosomes of the primates and man may be a secondary tetraploid number. This might help to explain the relatively frequent occurrence of intersex conditions in man. Various critical studies of the sex chromosomes in man, *e.g.*, by Painter (1923) and Koller (1937),[5] indicate that the X and Y bear satellites and therefore probably produce the nucleoli. A study of the nucleoli in human spermatogenesis should furnish evidence on the possible presence of more than one pair of nucleoli, but as the number 48 is evidently an ancient one, it is probable that in man (as in some varieties of rice) the mutational loss of a pair of nucleolus-producing loci will have occurred long since, leaving only one pair.

That chromosome evolution is going on in man is indicated by the fact (Koller, 1937) that a man descended in the second generation from a cross between a Scotswoman and a Frenchman was heterozygous for an inversion in a chromosome segment. The study of meiosis in racial hybrids may therefore disclose chro-

[1] See Gates, *Bot. Review*, 8: 337–409, 1942.

[1a] Polyploidy and sex chromosomes. *Nature*, 117: 234. 1926.

[2] M. Westergaard, *Dansk. Bot. Arkiv.*, 10: 1–131, 1940.

[3] Effect of induced polyploidy in plants, *Amer. Nat.*, 75: 117–135. 1941.

[4] J. D. J. Hofmeyr and H. van Elden, *S. Afr. Jour. of Sci.*, 38: 181–185, 1942.

[5] T. S. Painter, *Jour. Exp. Zool.*, 37: 291–336, 1923; P. C. Koller, *Proc. Roy. Soc. Edinb.*, 57: 194–214, 1937.