first microscope while he was still in school. Before he completed his college course at Cornell University he was called home by his father to take over some of the responsibilities of the optical business.

The Bausch and Lomb Optical Company started manufacturing microscopes soon after Edward Bausch joined the company in 1874. Their microscopes won prizes at the Centennial Exposition in 1876 and were soon being produced in quantities for use in science courses in schools, and the laboratories of hospitals and research institutions. They added microscopic accessories and developed other scientific optical instruments until now they make thousands of different optical devices for use in science, industry, education and medicine.

Edward Bausch has been a leader in the invention of optical equipment and the development of mechanical means for producing it at a reasonable cost. He was born only a stone's throw from the Genesee River and has spent his long life building the enormous Bausch and Lomb Optical Company plant upon its banks. While his neighbors honor him for what he has done in the community as a man, the nation remembers him for his scientific achievements during this seventy-ninth year of a long and useful life.

SCIENTIFIC NOTES AND NEWS

THE British Royal Astronomical Society has awarded its gold medal for 1933 to Dr. V. M. Slipher, director of the Lowell Observatory, Flagstaff, Arizona, for his spectroscopic researches on planets, stars and nebulae. Dr. Slipher has been invited to deliver the George Darwin Lecture this year.

THE University of Wales has conferred the degree of D.Sc. on Dr. Francis E. Lloyd, professor of botany in McGill University, and on Professor Robert Robinson, Waynflete professor of organic chemistry in the University of Oxford.

DR. C. JUDSON HERRICK, professor of neurology at the University of Chicago, was recently tendered a dinner given by a group of his colleagues in celebration of the twenty-fifth anniversary of his professorship.

DR. CHEVALIER JACKSON, professor of bronchoscopy and esophagoscopy at Temple University, has been awarded the medal of honor of the Italian Government by the King of Italy.

ACCORDING to *Nature* the Government of Ecuador has awarded the decoration of *Al Merito,* in the degree of Gran Oficial, to Dr. George Sheppard, state geologist to the Republic of Ecuador.

PROFESSOR WILHELM SCHÜFFNER, director of the Institute for Tropical Diseases, Amsterdam, has been awarded the Hans Aronson Foundation Prize.

THE Buchan Prize of the Royal Meteorological Society for 1933 has been awarded to David Brunt, for papers contributed to the *Quarterly Journal* and *Memoirs* of the society during the years 1927–31.

THE Bavarian Academy of Sciences has awarded the gold *Bene merenti* medal to Dr. Herman Strebel, in appreciation of the gift of his observatory at Ammersee to the State Observatory.

DR. WILLIAM H. PARK, director of laboratories for the New York City Department of Health, has been appointed to the Hermann M. Biggs professorship of preventive medicine at the New York University and Bellevue Hospital Medical College. The Biggs professorship was made possible by a memorial fund established shortly after his death in 1923 and recently increased to a total amount of $200,000 by a bequest of Mrs. Hermann M. Biggs and gifts from William R. Biggs and Mrs. Katherine Biggs McKinney, son and daughter of Dr. Biggs, and the Milbank Memorial Fund.

DR. A. B. LUCKHARDT, chairman of the department of physiology of the University of Chicago, has been elected honorary president of the International Anesthesia Research Society.

HOWARD COONLEY, president of the Walworth Company, New York, has been elected to the presidency of the American Standards Association for the year 1933. F. E. Moskovics, chairman of the board of directors of the Marmon-Herrington Company, Indianapolis, has been elected vice-president.

DR. CHARLES H. MAYO, of the Mayo Foundation, Rochester, Minnesota, has been elected president of the Minnesota Public Health Association.

DR. RALPH S. LILLIE, of the University of Chicago, was recently appointed an advisory trustee of the International Cancer Research Foundation.

L. V. COLEMAN, director of the American Association of Museums, has become a member of the American National Committee on International Intellectual Cooperation of the League of Nations.

MR. H. T. TIZARD, rector of the Imperial College of Science and Technology, London, has been appointed chairman of the Aeronautical Research Committee in succession to Sir Richard Glazebrook.

MR. C. F. A. PANTIN, of Trinity College, Cambridge, has been nominated to use the university's table at the Zoological Station at Naples.

DR. GREGORY SHWARTZMAN has received a grant from the Committee on Scientific Research of the American Medical Association for work on the "Rous

Agent" to be done in the Mount Sinai Hospital laboratories.

DR. EDWIN O. JORDAN, chairman of the department of hygiene and bacteriology of the University of Chicago, is spending the winter quarter in Jamaica, where he is conducting a special investigation under the auspices of the International Health Board of the Rockefeller Foundation.

PROFESSOR ROBERT REDFIELD, of the department of anthropology of the University of Chicago, in order to continue his field researches in Maya ethnology, is spending six months in southern Mexico.

EARL HANSON, of the department of terrestrial magnetism of the Carnegie Institution of Washington, has returned to the United States after spending eighteen months in the northern part of South America making surveys of terrestrial magnetism.

ABBÉ GEORGES LEMAITRE, professor of mathematics and of the history of the physical and mathematical sciences at the University of Louvain, has left Pasadena, where he has been conferring with Dr. R. A. Millikan, Dr. Albert Einstein and others, to return to Louvain. He will visit Washington and England on the way.

DR. F. BERNSTEIN, director of the institute of mathematical statistics of the University of Göttingen, is visiting the United States, more especially to study the work of Dr. William H. Park and Dr. Keresturi at the Willard Park Hospital on the B. C. G. method of combatting tuberculosis and of Miss Maude Slye, at the Sprague Memorial Institute of the University of Chicago, on the inheritance of cancer in mice.

LLEWELLYN N. EDWARDS, senior highway bridge engineer on the U. S. Bureau of Public Roads, sailed on January 20 for England where he plans to spend three months on research work. On February 15 he will read a paper on "The Evolution of American Bridges" before the Newcomen Society in London.

DR. L. B. TUCKERMAN, retiring president of the Philosophical Society of Washington, on January 14 delivered an address before the society entitled "From Material to Structure."

PROFESSOR WALTER S. RODMAN, of the department of engineering of the University of Virginia, spoke on January 12 on "Thomas Jefferson as a Scientist" before a combined meeting of the Virginia chapters of Sigma Xi and Phi Beta Kappa.

DEAN FRANK C. WHITMORE, of the School of Chemistry and Physics of the Pennsylvania State College, spoke before the Maryland Section of the American Chemical Society in Baltimore on January 20 on "Recent Work on Molecular Rearrangements."

DR. EUGENE C. BINGHAM, professor of chemistry at Lafayette College, will address the sections of the American Chemical Society in the Middle West on "Recent Progress in Rheology" at Indianapolis, Indiana, on February 1; at Dayton, Ohio, on February 2, and at Columbus, Ohio, on February 3.

M. W. STIRLING, chief of the Bureau of American Ethnology, gave a lecture on January 4 at Cornell University entitled "By Airplane to Pigmy Land."

DR. HARRISON S. MARTLAND, chief medical examiner for Essex County, New Jersey, will deliver the ninth Ludvig Hektoen Lecture of the Frank Billings Foundation on February 24. His subject will be "Recent Progress in the Medicolegal Field in the United States."

DR. MARIUS BARBEAU, ethnologist at the National Museum of Canada, delivered an address illustrated with motion pictures and lantern slides on "French Canada: Its Survival" before the Washington Academy of Sciences on January 12.

SIR T. CRISP ENGLISH will give the Hunterian Oration of the Hunterian Society, London, on February 27.

FRIENDS of Sir James G. Frazer have founded a lectureship in the University of Glasgow, a condition of the foundation being that Sir James Frazer, during his lifetime, should deliver in Glasgow one lecture each year. It has been arranged that Sir James Frazer will deliver his first lecture on March 3, 1933.

THE Royal Society Mond Laboratory at Cambridge will be opened by the chancellor of the university, the Right Honorable Stanley Baldwin, on February 3.

WESTERN RESERVE UNIVERSITY has received a gift of three hundred thousand dollars to found the Oliver H. Payne chair of surgery in the School of Medicine. Dr. Carl H. Lenhart has been appointed the first incumbent.

THE late Dr. William Sydney Thayer, of the Johns Hopkins University, left his collection of medical books to the Welch Library of the university and valuable prints to Harvard University.

BY the will of the late William J. Holland his collection of insects is left to the Carnegie Museum, on condition that a fund of $10,000 for making additions to it is set up. Should the Carnegie Museum not accept the bequest the collection goes to the U. S. National Museum.

DR. JAMES ALEXANDER URE, who died on November 20, bequeathed his estate to the University of Glasgow. The bequest, of the approximate value of £13,000, is to be used for scholarships and prizes in medicine, and especially for research on cancer and tuberculosis.

WE learn from the London *Times* that the British Association held on January 6 at Birkbeck College the usual meetings of organizing sectional committees to lay down the lines of the program of the Leicester meeting next September. As under a new statute the annual office of president of the association corresponds with the calendar year, occasion was taken to welcome Sir Frederick Gowland Hopkins, president of the Royal Society, to the chair. Sir Alfred Ewing, the retiring president, in introducing Sir Frederick Hopkins, said that there was no need for him to say how fortunate the association was in securing Sir Frederick Hopkins as president, a man already so preeminent as to be president of the Royal Society. Last year it had been, so to speak, the turn of that part of science which dealt with the constitution of non-living matter and with purely mechanical processes, which could certainly kill, but could not make alive. Now they turned, perhaps with relief and greater hope, to the still more difficult science of life, of whose fascinating problems no one could speak with more authority and clearer discernment than Sir Frederick Hopkins. One felt certain that in his hands the association would lose nothing of the public attention and interest its great annual conference continued to command. More than ever, he believed, the public wished to know about the advances of science, partly because these were now confessedly tentative and incomplete and partly because they might provide some guidance in the urgent perplexities of social affairs. Science had brought new powers and with them new dangers, grave dangers of which the community were scarcely yet aware. It was clearly the duty of science to point these out. After his installation Sir Frederick Hopkins said it was indeed no light task to continue the high tradition attaching to the presidency of the association and he would be well content if he could even approach the standard which Sir Alfred Ewing had so fully maintained.

AT a recent meeting of the directors of the American Chemical Society, the secretary was requested to express the very sincere appreciation of the society to the chemical industry for the aid it has given to *Chemical Abstracts,* and to send those whose agreements expire in 1932 the society's very sincere thanks. The secretary was further instructed to explain to the industry that while there is no hope of *Chemical Abstracts* being continued for any length of time with real efficiency without the continued help of the industry, the society feels that it must draw on its own reserves in 1933 rather than call for further help from the industry under present conditions. The proposal of the editor of *Industrial and Engineering Chemistry* to issue the "Analytical Edition" six times a year instead of four times, as at present, was approved by the directors. His proposal to issue the "News Edition" once a month, on the fifteenth, instead of twice a month, as at present, was not approved, and an additional amount was added to the budget to continue the "News Edition" as at present. It was also voted to defer the issuance of a new directory of the society.

PLANS for an arboretum comparable with the best in the United States are described in the report of the Arthur H. Scott Horticultural Foundation, prepared by John C. Wister, director, and issued as a supplement to the annual report of Swarthmore College. The purpose of the foundation is expressed as a desire "to help horticulture by visual demonstration which can be best realized by the planting in a public place of such trees, shrubs and flowers as can be used by people of average means living in the Philadelphia district." On the campus of Swarthmore the emphasis is placed on showy flowers that are suitable for planting in small gardens. There are at present about fifty kinds of lilacs, nearly fifty kinds of rhododendrons, fifty kinds of azaleas, over thirty kinds of cherries, about thirty kinds of apples, and over 100 kinds each of iris, peonies, daffodils and chrysanthemums—in all about 1,200 different plants. The largest project to be undertaken is the formation of the Scott Arboretum in the Crum Creek Valley, some one hundred and seventy-five acres of virgin timber and uncultivated river silt, which will be divided into four sections. One will contain only those plants, shrubs and trees native to Delaware County; a second area will have trees native to Pennsylvania but not native to Delaware County; a third will have plants and trees native to the North American Continent, and the final group trees which grow in this climate in other parts of the world.

THE next annual congress of the Royal Institute of Public Health will be held at Eastbourne from May 30 to June 4, under the presidency of Viscount Leverhulme. The scientific work of the congress will be conducted in the following sections: (1) State medicine and industrial hygiene; (2) women and children and the public health; (3) tuberculosis; (4) pathology, bacteriology, biochemistry and veterinary medicine; (5) climatology and hydrology. Delegates are being invited from the governments, the municipalities, the universities and other public bodies of Great Britain and Ireland and the British Dominions, as well as from Continental and foreign countries. Arrangements have been made with the railway companies for a reduction in the fares. The headquarters of the institute are now at 23, Queen Square, W.C.1.

Nature reports that the preparatory work of the organizing committee at Stockholm of the next World

Power Conference, which will take place in 1933 in Scandinavia, is proceeding steadily. The first plenary World Power Conference was held in London in 1924, the next in Berlin in 1930. There have also been sectional meetings with special programs, for example, at Basel in 1926 and London in 1928. The Scandinavian Conference will be such a special meeting, dealing with the energy problems of large industry and transport. Participation and collaboration of fifteen countries outside Scandinavia is assured and more than one hundred and seventy reports are announced. Some forty reports to be published at the meeting deal with problems of energy supply in large-scale industry, such as combined power and heat supply, the rôle of large-scale industry in national power schemes, etc. Many of the technical papers deal with the problems of long distance gas transmission, while other papers are devoted to more special power problems concerning the iron and steel industry, pulp and paper, and cement, sugar, textile and other steam heat consuming industries. Energy questions of transport provide the subjects for sixty-two reports; railway and marine transport, the peculiarities of city and suburban traffic are to be discussed with due emphasis on the new aspects which have been introduced by electric traction and Diesel engines.

DISCUSSION

ETHER STRUCTURE

IN SCIENCE for February 21, 1930, I proposed an explanation of the action of electric force and induction across a vacuum, that is, across the ether. The suggestion was to extend to the ether the conception used by Debye, that the dielectric properties of gases and electrolytes depend upon polarized ions or "dipoles" of the medium. The ether is thus to be conceived as having a structure, that is, with "ether dipoles" or polarized cells. From this we get directly the idea that an electric field produces linear arrangements of the ether dipoles, and this may have an effect on polarized light similar to crystal action. I have made an experiment to detect such possible effect. The electric field was between two aluminum strips 60 centimeters long and 1 centimeter wide and 0.5 centimeter apart. This condenser was in a high vacuum. The vacuum was so high that no discharge took place when the condenser plates were charged by a Holtz machine to approximately 30,000 volts. The electric field was horizontal. A beam of polarized light, with polarization plane at 45° to the horizontal was passed across the electric field. Not the slightest effect on the light could be detected when the field was put on and off. The analyzer was of the strained glass bar type ("Rayleigh Compensator") used by the late Lord Rayleigh in his experiment to detect a possible double refraction due to ether drift.[1] The sensitiveness was at least six seconds of rotation per centimeter beam length in the field. The field was about 60,000 volts per centimeter. Thus this experiment to detect an ether structure, like experiments for ether drift, gave a negative result. On a corpuscular light theory, the above experiment can also be interpreted as showing no electric moment of the light corpuscle or photon in the above conditions.

ALBERT P. CARMAN

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[1] *Phil. Mag.*, p. 680, 1902.

ENERGY OF UREA SYNTHESIS

IN the study of the energy change in the synthesis of urea from ammonia and carbon dioxide by liver slices we have found that synthesis of urea is accompanied by a definite and measurable increase in oxygen consumption. Our present facilities do not permit of precise measurements, but the results so far obtained suggest that one additional molecule of oxygen is used for every molecule of urea synthesized. Similar values were obtained with both glucose and d-l lactate as fuel, and with and without ornithine. Comparison of the rates of synthesis of urea suggest that the fuel in this reaction is lactate or some product derived from it. It seems unlikely that more than a fraction of the specific dynamic action of protein can be accounted for by the superfluous energy released in the synthesis of urea from ammonia. Further experiments are in progress.

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HETEROSIS: SPECIFIC NOT GENERAL IN NATURE

IN studies of hybrid vigor or heterosis in F_1 oat plants, variable results were obtained from different crosses. In the F_1 of some crosses nearly all the measurable parts are greater in the F_1 hybrid than in the larger parent. In other crosses possibly only one or two characters are noticeably increased. The difficulty of obtaining oat crosses in large numbers is a serious obstacle to studies of heterosis in oats, but it is believed that an increase of 10 per cent. over the larger parent may safely be considered a significant increase where small numbers are involved. Examples of these results are found in the cross Richland × Fulghum and Richland × Markton. In the first cross the F_1 plants averaged 13.2 per cent. taller, bore