stitute of Technology for January are a series by Professor Harry N. Holmes, of Oberlin College, who will discuss "Colloid chemistry," "Emulsions," and "Gels" on January 9, 10 and 11; and a series by Professor Alfred Stansfield, of McGill University, between January 14 and 19 on "The electric furnace for iron and steel." Other public lecturers for whom definite dates have not yet been arranged are Dr. John R. Freeman, consulting engineer of Providence, R. I., and Dr. H. Foster Bain, director of the United States Bureau of Mines.

ON December 8, Dr. W. M. Wheeler, of the Bussey Institution, Harvard University, delivered an address at Toronto before the Royal Canadian Institute on "Social Insects."

DR. HENRY LEFFMANN spoke before the Franklin Institute of Pennsylvania on December 13, on "Hydrogen-ion concentration in relation to animal and plant growth."

DR. ALICE HAMILTON, of the Department of Industrial Diseases of the Harvard Medical School, lectured before the Boston University School of Medicine on October 19 on "What we know about industrial diseases."

DR. THEOBALD SMITH, of the Rockefeller Institute for Medical Research, gave an address on comparative pathology at the University of Edinburgh on November 27.

THE Academy of Natural Sciences of Philadelphia announces the foundation, as a trust with the Academy, of "The Joseph Leidy Memorial Fund." The terms of the trust provide for the award of a memorial bronze medal every third year in recognition of "the best publication, exploration, discovery or research in the Natural Sciences in such particular branches thereof as may be designated." The foundation, which has been established by Dr. Joseph Leidy II, nephew of Dr. Joseph Leidy, also provides for an honorarium to accompany the award.

THE Baillie Library of Chemistry, in connection with the department of chemistry of McGill University, was formally opened by a reception on Tuesday, December 11. Dr. Ruttan, the director, gave a short account of the development of the departmental library of chemistry and announced that the Baillie Library would be a continuation and development of the old departmental library, for which purpose an endowment of $25,000 had been made by the late Mr. John Baillie. The library, which already possesses thirty-nine sets of journals and periodicals, most of which are complete, was endowed in memory of George Irvine Baillie, a student in chemical engineering who was killed at the battle of Amiens in 1918. The reading room contains a portrait of Lieut. Baillie and a small, but unique, memorial window. The library will be developed as a reference library and new sets of reference journals in chemistry, as well as the missing volumes required to complete the present sets, are now being added as rapidly as possible.

THE Medical School of Western Reserve University, in Cleveland, announces the availability of a "Crile Research Fellowship" at $1,500 per annum for graduates in medicine or others who have proper qualifications and desire to pursue research work in one of the departments of the Medical School. The candidate is eligible for reappointment at $2,000 the second year. Applicants may address inquiries or brief statements as to qualifications to the committee through Professor Carl J. Wiggers.

NEIL M. JUDD, curator of American archeology in the U. S. National Museum, returned to Washington recently after seven months' exploration in New Mexico and Utah for the National Geographic Society. During the months of May to September, inclusive, Mr. Judd directed the important excavations in Pueblo Bonito, largest of the great communal dwellings in Chaco Canyon, New Mexico. This season's activities concluded the third year of the Pueblo Bonito project; it is anticipated that at least two more years will be required for the complete exploration of this prehistoric village. Following his researches in New Mexico, Mr. Judd led a small reconnaissance party into San Juan county, Utah, to explore an unknown section lying north of the Rio San Juan and east of the Colorado. The prime purpose of the expedition was to ascertain whether further exploration in this region is desirable. Inasmuch as portions of the area visited had never before been entered by white men it is not improbable that the reconnaissance will be resumed on a larger scale at some future date.

UNIVERSITY AND EDUCATIONAL NOTES

NORTHWESTERN UNIVERSITY has received a gift of three million dollars from Mrs. Montgomery Ward, to be expended in the construction of a medical center. It is to be known as the Montgomery Ward Memorial and will house the medical and dental schools and serve for medical welfare work.

SIR HEATH HARRISON, Bart., founder of the chair of organic chemistry in the University of Liverpool, has generously contributed a further sum of £2,500 towards the endowment of the chair.

ANNOUNCEMENT has been made of the appointment of two vice-presidents of the University of Chicago. These are: Professor James H. Tufts, dean of faculties, and Trevor Arnett, formerly auditor of the uni-

versity and the past five years a secretary of the General Education Board. Professor Tufts will be charged with the responsibility of the development of the enlarging educational program of the university. Mr. Arnett will perform the function of business manager upon the retirement of the present business manager, Wallace Heckman, next June.

DR. RUDOLF BENNITT, of Harvard University, has been appointed assistant professor of zoology at DePauw University. He takes the place of Dr. Walter N. Hess, who has been granted a leave of absence to accept the Johnston Scholarship in the department of zoology at the Johns Hopkins University.

DR. C. E. WEATHERBURN, of Ormond College, Melbourne, has been appointed professor of mathematics at Canterbury University College, Christchurch, New Zealand.

DISCUSSION AND CORRESPONDENCE

ON THE MODEL OF THE HELIUM ATOM

IN a recent paper[1] Kramers shows that the energy of the crossed orbit model of the helium atom in its normal state when computed on the basis of classical dynamics comes out too low, 5.5235 W (W = energy of the hydrogen atom in its normal state), while the best experimental value is 5.807 W. He concludes that classical dynamics fails in atomic systems containing more than one electron, an idea also confirmed by a theoretical investigation of the excited states of helium by Born and Heisenberg.[2] As a suitable modification of classical dynamics the assumption appears reasonable that the moving electrons of such systems, instead of acting gradually and continuously upon each other in the classical manner, interchange energy and momentum in a sudden discrete way. The nature and magnitude of these exchanges shall be found by demanding a correspondence between the discontinuous and the classical processes.

This idea when applied to the crossed orbit configuration of the helium atom leads to a model of the same general character as the classical one. The electrons each have half a quantum of moment of momentum along the normal of the invariable plane, and their motion in the meridian plane is an oscillation under the influence of the nucleus alone, with abrupt changes of momentum at the end points, the magnitude of which shall be determined from the correspondence requirement. The ionization potential of such a model was found to be 5.799 W. The most important question is whether this reasoning can be generalized and applied to other systems.

RALPH DE LAER KRONIG
COLUMBIA UNIVERSITY

1 *Zeit. für Physik,* 13 (1923), 312.
2 *Zeit. für Physik,* 16 (1923), 229.

PLANT LICE AND LIGHT EXPOSURE

BECAUSE the true sexes in plant lice generally make their appearance in the temperate zone in the fall, the generally accepted explanation has been that the approach of cold weather or temperature is the causal factor. Along with the decrease in temperature in the fall, there is a much more marked relative shortening of the days; and it is this relative length of day to which the insects are exposed that appears to stimulate the production of the sexes; just as Garner and Allard[1] have succeeded in making ordinary fall flowering plants blossom in summer or at any other season by the employment of a short day.

In Tennessee the normal appearance of the oviparous females of *Aphis forbesi,* the strawberry root louse, is in the month of November; but by subjecting the insects, a few days after the eggs hatched February 23, to a short day of seven and one half to eight hours, out of doors in a ventilated dark chamber, the oviparous females appeared May 7 and eggs were deposited May 22.

The method used of subjecting the plants to a short day was to place the potted strawberry plants with the lice in the dark chamber at 5 o'clock in the afternoon. The following morning the plants were removed at 9:30 and placed in the light. Garner and Allard have shown that the difference in temperature inside and outside the dark house in their experiments was negligible, as the temperature inside was but 2° or 3° F. higher than the temperature outside; hence any responses on the part of the plants could not be attributed to lower temperatures.

Having been successful in the production of the sexes by the employment of a short day, and since the fall migrants or sexuparae of various plant lice are the antecedents of the oviparous forms, it was thought possible that the migration of plant lice is also due to the relative length of daily light exposure. And such was found to be the case with several species. Males and sexuparae of *Aphis rumicis* L., *Capitophorous hippophaes* Koch. and *Aphis Sorbi* Kalt. were produced experimentally in June when the temperature is high by keeping curled dock (*Rumex crispis*), smartweed (*Polygonum sp.*) and plantain (*Plantago lanceolata*), the respective summer hosts of the above species, exposed to a short day for about seven weeks. There was also obtained some evidence, which will be published shortly, that the production of spring migrants in such forms as *Aphis Sorbi,* the destructive rosy apple aphis, where they may occur in any subsequent generation after the 3rd, is governed by the increasing length of day of the spring months. The late appearance in *A. Sorbi* of the spring migrants which may result in a destructive outbreak,

1 *Journal of Agricultural Research,* Volume 18: 553–606.