inclined to think so too if he had not succeeded in proving them thermodynamically along several different lines.

By means of these results and the laws of conservation of energy and momentum, and that radiation is *emitted* in quanta (the nature of the process of emission of radiation does not seem to be determined by thermodynamics), the various phenomena depending on the interaction of radiation and the electron may be explained—at least there is nothing the writer has not, so far, brought into line. For example, all the inherent difficulties of the Bohr atom, and its antagonism to the Lewis, Langmuir atom, completely disappear. The results thus furnish the solution of a problem in physics and chemistry that has absorbed the attention of scientists for the last thirty years.

R. D. KLEEMAN

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MOSAIC OF SUGAR-CANE IN PERU

DURING the past year and a half, since the establishment of the agricultural experiment station of the National Agrarian Society of Peru, a survey has been made of the principal sugar-cane-growing sections of the country for the purpose of determining the presence and distribution of the mosaic disease of that crop. Heretofore this disease has not been reported from Peru.

In this survey visits have been made to all of the valleys of the coast where sugar-cane is of importance, and to three valleys of the interior, east of the Andes mountains. Up to the present time mosaic has been found in sugar-cane in only one valley, the Carabayllo, near Lima. The disease is generally distributed on the haciendas of this valley, the infection varying from less than one per cent. to more than 90 per cent. The counts made have not shown more than 15 per cent. infection with the exception of one hacienda, and fortunately the growing of cane is to be discontinued there this year. The varieties affected include Bourbon or white cane, Louisiana Purple and some varieties of Barbados.

The mosaic was introduced into commercial cane fields in the Lima region about eight years ago and became distributed before the disease was known here. The original source of the disease is said to have been stalks of cane which were introduced from Argentina.

E. V. ABBOTT

ESTACIÓN EXPERIMENTAL AGRÍCOLA,
LIMA, PERU

THE discovery of the mosaic disease of sugar-cane in Peru makes desirable a statement regarding the aphids present in the cane fields of this country.

Although not previously reported, the common yellow aphis of sugar-cane, *Sipha flava* Forbes, is present on sugar-cane throughout the northern valleys of Peru, being most abundant on the Bourbon or white cane, and also being noted on lemon grass, but in no observed case being sufficiently common to cause appreciable damage to the crop. As it occurs on the tips of the leaves, it can in no way be connected with the transmission of the virus of the mosaic disease of sugar-cane.

The corn aphid, *Aphis maidis* Fitch, has been noted on various grasses in cane fields in all parts of Peru, and also on the large grass locally known as "carrizo," *Arundo donax,* which commonly grows along ditch banks in the cane fields. The omnipresence of this aphid, the known vector of mosaic disease of sugar-cane, emphasizes the importance of the prompt elimination of all stools of infected cane, and the inadequacy and futility of the steps, already being enforced on some plantations, to prohibit the growing of corn. Despite the abundance of this aphid on corn, and the apparent indication of corn as its normal host by both its common and scientific names, yet it is most distinctly not the individuals occurring on corn that are primarily instrumental in transmitting the mosaic disease of sugar-cane, but rather those which occur on grasses in the cane fields and are forced to attempt to obtain nourishment from the cane when the aerial portions of these grasses are destroyed by hoeing and cultivation of the young cane.

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ESTACIÓN EXPERIMENTAL AGRÍCOLA,
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QUOTATIONS

CONGRESS HONORS THE YELLOW FEVER COMMISSION

THE work of Walter Reed and his associates of the Yellow Fever Commission has now been officially recognized by the congress of the United States and approved by the president. The twenty-two members of the military establishment who participated in the experimental investigation of yellow fever in Cuba are to constitute a roll of honor that shall be published annually in the *Army Register*. In further recognition of their public service, gold medals will be presented to those who are living and posthumously to representatives of those who have died. Congress provided also a pension of $125 a month to the sixteen living members and to the widow of one of the soldiers. The everlasting benefit resulting from the courage of these men has received consideration on

previous occasions, and from time to time aid has been extended to some of those in need. The report of these experiments published for the use of the Senate in 1911 is one of the most interesting volumes in American medicine. However, these men have not been honored by congress alone. The American Medical Association at the Saratoga session in 1902 sent the members of the Yellow Fever Commission a vote of thanks and resolved that the far-reaching beneficence of their discovery was second in magnitude only to that of Jenner's discovery of vaccination. Scientific societies throughout the country paid similar respects; the Virginia state medical society has made the birthplace of Reed a national shrine, and monumental structures have been named in honor of other members.

These are the Americans who risked their lives to help discover the method of transmission of a fatal epidemic disease. They volunteered to be injected with blood from patients dying of yellow fever or to be bitten by infected mosquitoes, to sleep in beds in which patients died and to wear the clothes of patients who died. Thus they helped to drive yellow fever almost from the face of the earth. Our own land had previously been invaded at least ninety-five times with a loss of not less than a hundred thousand lives. It seems incredible in the light of present knowledge that epidemics of yellow fever have taken 3,454 lives in New York, 10,038 in Philadelphia, 4,565 in Charleston, 7,759 in Memphis, 2,000 in Norfolk and 41,348 in New Orleans, besides sweeping through Baltimore and many smaller cities. In those days people fled from their homes, for nobody knew whence or how the scourge came.

When the U. S. Army Commission was sent to Cuba in 1900 to investigate the cause, yellow fever was still taking the lives of American soldiers, although three years before Sanarelli believed that he had discovered the cause. Major Reed, the chairman, knew that Sanarelli's work had been accepted by some American investigators. The commission therefore gave its entire time at first to a search for *Bacillus icteroides* and after a study of twenty-one cases during life and eleven necropsies concluded that it bore no causative relation to the disease. Attention was then given to Finlay's theory that yellow fever was transmitted by mosquitoes. A camp was built near Havana, the buildings being screened so that mosquitoes could be kept in or out, as desired. The work was organized so that every step was controlled. Here the volunteers whom congress has honored offered their lives and lived for weeks in the face of death. Some of these men did not contract yellow fever but twenty-two cases were produced in the course of the experiments. All except Dr. Jesse W. Lazear recovered. It was proved that yellow fever is transmitted by *Stegomyia fasciata,* that it can be transmitted by the injection of blood from yellow-fever patients and that it is not transmitted by exposure to fomites.

In the further recognition of this achievement and in honoring and assisting these men, congress has reflected great credit on the whole country. The world has received the benefaction they bestowed.—*The Journal of the American Medical Association.*

SCIENTIFIC APPARATUS AND LABORATORY METHODS

SOME USEFUL PETROGRAPHIC METHODS

"A LOCATION Finder for Microscopes" described in the February 15 issue seems to me a rather cumbersome and complicated method of doing what we have been doing for years with an ordinary mechanical stage on a (Leitz) petrographic microscope. The slide always fits into the stage in a fixed position relative to the optic axis of the microscope, and the coordinates of the object in view are simply read off and recorded, as 15/7, for example.

While on the subject, it may interest users of petrographic microscopes to learn of a method of determining refractive indices in thin sections, powders, etc., which has entirely superseded in this laboratory the Becke Line method, shading the mirror with a card, etc. The object is viewed with a No. 3 objective (Leitz microscope) with the polarizer in and the condenser out. The analyzer is slowly moved in, and the boundary between the adjacent mineral grains, or the mineral and immersion liquid, becomes sharply illuminated or shaded, as the relative index is less or greater. The method is exceedingly delicate; and the optical theory will be evident on brief consideration of the passage of light in the optical system.

Another small item which has been found useful is in the use of the pinhole and the oil-immersion ($^1/_{12}$) lens in securing interference figures of very small grains. It has been found that with the ocular removed, as is necessary for securing sharp definition, the Bertand lens makes a quite satisfactory provisional ocular, and may be used for orthoscopic vision while centering, etc., for conoscopic.

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RECORDING BY PERFORATING

PHYSIOLOGISTS and psychologists may be interested in a new principle of accurate recording which has proved to be practical, convenient and inexpensive.