at times he assumed, as did Carnot, that the quantities of heat entering and leaving the cylinder of an engine, irrespective of the performance of work, were equal. If for the sake of completeness Holtzmann's work be referred to in this volume, so too should that of Marc Léguin (1839), who as far as the performance of an engine is concerned anticipated other workers (except possibly Rumford and Davy) in a partial statement of the law of the equivalence of heat and work.

Had this volume been written by American physicists, emphasis would have been placed on parts of the subject not here noticed. Wood on resonance spectra, Nichols and Merritt on fluorescence, Miller, Webster, Sabine on sound, Michelson on the rigidity of the earth, Pupin, G. W. Pearce on wireless telegraphy, would have been recorded.

But when we come to view the great body of philosophical thought which has come to us in this past generation we must give to Teutonic physicists credit for a large share. Boltzmann's conception of the entropy of a body in terms of the probability of state; the extension by Planck of the idea of entropy and temperature to radiation, leading to the distribution of energy in the spectrum of a full radiator and to the bewildering quantum theory; Einstein's contributions to molecular theory and to the theory of relativity—these stand out as substantial portions of "Die Kultur der Gegenwart." G. F. HULL

SPECIAL ARTICLES

PEANUT MOSAIC

ON September 28, 1915, while looking over a field in which peanuts (*Arachis hypogœa*) had been grown annually for the past six years a plant was observed, one shoot of which bore mottled leaves. A careful search of the entire field was made, but no other plant bearing mosaic leaves was found. This made the writer suspect that the trouble was not infectious. It seemed advisable to test this point further, especially since the mosaic plant was otherwise healthy except for a few leaf spots produced by *Cercospora personata*.

This mosaic plant was transferred to the greenhouse. Before final potting two of the mature pods were removed from the plant and opened, and four peas taken from them were planted at once in a pot of greenhouse soil. The four resulting plants together with two other seedlings which came up later from peas left on the mosaic plant, have been under observation during the past five months. In no case have any signs of mosaic developed. It would thus appear that this mosaic was not carried by the seed.

The transplanted mosaic plant continued to grow and produce new leaves at the ends of the shoots, but in no case did any but the mosaic shoot produce new mosaic leaves.

To obtain further data as to the infectious nature of this mosaic a pot of four peanut plants from a 1914 crop of seed was selected. Two plants were slashed near the ends of the shoots with a flamed scalpel to serve as checks. The other two plants were treated in a similar way, except that into the slashed stems bits of macerated mosaic leaflet were inserted. These plants have been under observation for the past five months but no signs of mosaic have developed on either the checks or inoculated plants.

On October 14, 1915, a pot containing peanut plants from the 1914 seed was taken to the laboratory. By means of India ink circular areas were marked on each leaflet of one plant. Within these circles the tissues were pierced several times with a flamed dissecting needle. This plant served as a check. The second plant in the same pot was treated in a similar way except that before piercing the leaf tissues the needle was moistened in the juice from mosaic leaflet freshly removed from the potted mosaic plant. Similar checks and inoculations were made on garden peas (*Pisum* spp.) growing in pots, using juice from the mosaic peanut leaflet. On November 13, 1915, the above plants were carefully examined, but neither the checks nor the inoculated plants showed any sign of mosaic on either young or old leaves.

On November 13, 1915, to further test the infectious nature of this peanut mosaic one check was prepared by injuring each leaflet of the plant by pinching it between the thumb

and finger nail. Eight other plants of the same age and all from the 1914 crop of seed were treated similarly except that the finger nail was moistened in macerated mosaic leaves before pinching each leaflet to be inoculated. Over three months have elapsed since the above inoculations were made, but no signs of mosaic have developed on any of the checks or on the inoculated plants. On all the leaves, however, the scars of the finger nail injury are visible.

As the original mosaic plant has matured in the meantime, leaving no fresh leaves to use for inoculation, it seems advisable to present this data so that others may be led to record any observation they may make along this line.

J. A. McClintock
Virginia Truck Experiment Station

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

SECTION C—CHEMISTRY—AT THE NEW YORK MEETING

On Wednesday, December 27, at Columbia University, there was a joint session of Sections B and C, the American Chemical Society and the American Physical Society, devoted to a symposium on the structure of matter. The attendance was very large, and Havemeyer Hall was filled to capacity. The main items on the program have already been printed in a recent number of Science.[1] These papers[2] and the subsequent discussion brought out the fact that there is still a wide divergence between the various views, particularly between those of the physicist and those acceptable to the chemist; the mere fact of such a divergence of view emphasizes the usefulness of this discussion—and, indeed, of further discussion—of this very important topic.

On Thursday, December 28, Section C met with the American Chemical Society and the Society of Chemical Industry at the College of the City of New York, when the following addresses were presented:

Dr. William McPherson, retiring chairman of Section C, professor of chemistry, Ohio State University, "Asymmetric Syntheses and their Bearing upon the Doctrine of Vitalism."

Dr. Phoebus A. Levene, Rockefeller Institute for Medical Research, "The Individuality of Tissue Elements."

Dr. Hugh S. Taylor, Princeton University, "The Photo-Chemistry of the Chlorination Processes."

Dr. George F. Kunz, New York City, "Preparedness Chemistry Exhibit of the United Chemical Societies at the American Museum of Natural History."

Dr. C. G. Derick, Buffalo, "Equilibrium Constants and Chemical Structure."

Dr. S. Dushman, Schenectady, "Application of Atomic Theories in Chemistry."

Through the courtesy of the college, a complimentary luncheon was tendered to the section, which was highly appreciated. In the afternoon the following papers were read:

A Preliminary Report of the Chemical Committee of the National Research Council, by Marston Taylor Bogert, chairman.

"An Increase in the Sucrose Content of Sugar Beets after their Removal from the Soil," by F. G. Wiechmann.

"Valency and Valence," by M. L. Crossley.

"Conductivity Measurements on Oxidation-Reduction Reactions," by Graham Edgar.

"Stability of Paraffin Hydrocarbons," by G. Egloff and R. J. Moore.

The following by title only:

"The Effect of Fineness of Division of Pulverized Limestone upon Various Crop Yields," by N. Kopeloff.

"A Relation between the Chemical Constitution and the Optical Rotatory Power of the Phenylhydrazides of Certain Acids of the Sugar Group," by C. S. Hudson.

"*d*-Mannoketoheptose. A New Sugar from the Avocado," by F. B. La Forge.

Section C elected new officers, as follows:

Vice-president and Chairman of the Section: Professor W. A. Noyes, University of Illinois.

Secretary: Professor James Kendall, Columbia University.

Member of Council: Professor M. A. Rosanoff, Pittsburgh.

Member of General Committee: Dr. R. F. Bacon, Pittsburgh.

Member of Sectional Committee: Dr. Irving Langmuir, Schenectady.

John Johnston,
Secretary

[1] Vol. 44, p. 885, 1916.

[2] It will, we hope, prove feasible to have all of these papers printed together in some suitable place.