of this hitherto unrecognized and later stage of the Pleistocene epoch. Such a record is profusely represented in the terraced coasts and stream valleys, the changes in the stream patterns, the fault systems and abundant continental deposits on the interior margin or landward side of the Dominguez range. The marine deposits which formerly bordered the coastward side of the uplift recorded by the range have been effaced by subsidence and regression of the sea margin. Grosser division of the Pleistocene epoch into Earlier and Later Pleistocene stages, the latter including the Wilmington group, is herewith suggested.

ROBERT T. HILL

LOS ANGELES, CALIF.,
FEBRUARY 4, 1929

MEIER-SEASHORE ART JUDGMENT TEST

THE appearance of this test book marks the introduction of scientific procedure into a new field, namely, that of analysis and measurement of art talent. In principle, it embodies some of the features of objective measurement which have developed in the psychology of musical talent in the Iowa laboratory. It consists in the development of laboratory principles for the control and recording of art judgment and furnishes a fundamental technique by means of which the measurements may be made for countless purposes in the scientific study of art principles and art talent.

Hitherto numerous efforts have been made by the method of production and by the method of paired comparison under uncontrolled conditions. There is always a place for the method of production in the study of art; but the method here introduced gives a very much more generally available tool which conforms to the requirements of rigid control and systematic variation of factors to be observed. The two fundamental principles embodied in this procedure are, first, that when two complex objects or situations are presented for judgment as to preference they shall differ only in one respect, and this feature shall be clearly indicated in the instructions and understood by the person who makes the judgment. The second principle is that the feature varied and controlled for the purpose of experiment shall appear in its full setting in the picture as a whole. For example, if we are comparing two landscapes, one of them is a faithful copy of the original, the other is an equally faithful copy of the original, but with a substitution of one changed element, let us say the position of a human figure in the foreground which affects the principle of balance. In all other respects the two pictures are the same. The question which the person tested has to answer is, "In which of the two pictures is the position of the man the better?" By this type of procedure it is evident that any of the principles of art may be presented in endless variety for objective study.

The test book, now placed on the market[1] accompanied by directions and test blanks, has been perfected under a grant to Dr. Meier from the Carnegie Corporation. It consists of 125 pairs of pictures presented in an attractive form and beautifully printed by one of the new processes. A single book may be used in testing as many cases as can be handled before the book is mutilated or soiled. The test is self-administrative. Having a set of books for a classroom, an entire class may be tested at one time; if a set is not available, a single copy may be passed around so that each pupil has approximately one hour in which to make a record. Norms are being published. The present book has been standardized chiefly with reference to the eighth grade in the public schools; but with suitable precaution, it can be used within a range of several years both above and below that age.

CARL E. SEASHORE

UNIVERSITY OF IOWA

THE PROBLEM OF THE INTERACTION OF RADIATION AND THE ELECTRON

IN the course of some thermodynamical investigations the writer was led to deduce that the electron possesses the following properties: (a) It may possess internal energy apart from kinetic energy. (b) It can radiate in two entirely different ways, *viz.*, (1) on undergoing acceleration; (2) on emitting a part of its internal energy as radiation, which is not necessarily connected with its motion. (c) The surrounding radiation gradually slows down its motion, which is attended by an increase in internal energy. (d) The force acting upon it when placed in an electric field depends on its internal energy, in a general way decreases with it. It may therefore happen that under certain conditions it does not possess any electric field at all.

A paper on this subject was read at the New York meeting of the American Association for the Advancement of Science, based on investigations contained in several papers in the course of publication. The results cited (this is not a new theory) will no doubt strike most readers as almost amazing in the light of our present knowledge of electricity, and no doubt the thought will arise that there must be something wrong in the deductions. The writer would be

[1] Published by the Bureau of Education Research, University of Iowa, at a nominal price of $1.00 per book, in the interest of the extension of scientific service in art.

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

SCHENECTADY, N. Y.

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.

GEORGE N. WOLCOTT

ESTACIÓN EXPERIMENTAL AGRÍCOLA,
LIMA, PERU

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