Series"; "Pattern in Color Variation"; "Striped Varieties and Bud Variation"; "The Effect of Outside Factors on Color Variation"; "Connection Between Color and Other Plant Characters"; and "The Chemical Interpretation of Factors for Flower Color;" all discussed from the standpoint of the geneticist. In addition there is appended a bibliography of 645 titles, to the majority of which Miss Wheldale has added a short descriptive notice indicating the nature of the contents of the paper.

To any one who has followed Miss Wheldale's researches it is needless to add that the work is thoroughly done. Apparently as much space has been given to the papers of her critics as to her own work, so that the reader can draw his own conclusions as to the facts involved. If there is any one fault to find with the work it would seem to the writer to be that the author has not drawn upon her imagination sufficiently to formulate theories which would appear to be warranted by the facts which she presents. This is not a common fault in works of this nature where chemical and biological phenomena are involved and perhaps the author is correct in being extremely conservative. At any rate she can not be accused of attempting, by publishing this monograph, to further any pet hypothesis.

ROSS AIKEN GORTNER
UNIVERSITY OF MINNESOTA

DR. KEEN ON MEDICAL RESEARCH

DR. W. W. KEEN, the Nestor of the American medical profession, has given us a delightful little book on "Medical Research and Human Welfare," being the Colver Lectures of Brown University for 1917.

Dr. Keen is peculiarly fitted for his task, as he was trained in the old septic era of surgery before the civil war, and was a part and parcel of the war with all its attendant horrors, its infections and gangrenous wounds with maggots, and its enormous percentage mortality, and yet has lived not only to witness but to promote the new era of antiseptics and to enjoy the phenomenal changes thus wrought in his own work and that of his colleagues.

This interesting little book has a twofold value, it will attract the lay public asking for a conspectus of the progress of the last forty years in charming readable non-technical terms; it will also interest doctors, who will enjoy a brief historic retrospect of professional achievements told in just such simple terms as they themselves are apt to use over a fireside conversation when the older men are prone to indulge in reminiscences and comparisons.

A further use is to furnish material for those who wish to forestall interference on the part of the anti-research people (who call themselves "antivivisectionists"), with medical progress.

The medical profession in our day has stepped forward into an era of medical statesmanship, and now needs constantly to appeal to the public for moral support and cooperation in many matters of vital interest to the whole body politic. It would be well for this reason if this book were widely read and the facts kept well in mind and often used in arousing the sympathy of the public in one of the greatest of all causes—medical progress, the saving of life and health.

HOWARD A. KELLY

THE ANNUAL MEETING OF THE NATIONAL ACADEMY OF SCIENCES

THE program of the scientific sessions of the meeting held in Washington beginning on April 22 was as follows:

MONDAY, APRIL 22

Morning Session

The effects of a prolonged reduced diet on twenty-five college men:

I. On basal metabolism and nitrogen excretion, by Francis G. Benedict.

II. On neuromuscular processes and mental condition (illustrated), by Walter R. Miles (introduced by F. G. Benedict).

III. On efficiency during muscular work and general muscular condition (motion pictures), by H. Monmouth Smith (introduced by F. G. Benedict).

The partial occlusion of great arteries in man and animals (illustrated), by W. S. Halsted.

Three papers (illustrated):

(*a*) The favorable effect of subcutaneous injec-

tion of magnesium sulphate in tetanus; (*b*) the possible danger of intravenous injection of magnesium sulphate; (*c*) The antagonistic and curative action of calcium salts in these cases, by S. J. Meltzer.

The Liberty field hospital ward. Designed on the unit construction plan. Portable. Adapted to American overseas summer and winter service (motion pictures), by Henry Fairfield Osborn.

The war and medical research (illustrated), by Simon Flexner.

Afternoon Session

Conformal geometry, by Edward Kasner.

Magnestism by rotation (illustrated), by S. J. Barnett (by invitation. Comstock prize recipient).

On the correction of optical surfaces, by A. A. Michelson.

Some recent observations of the brighter nebulæ (illustrated), by W. W. Campbell.

Physical researches for the war, by R. A. Millikan.

Evening Session

First William Ellery Hale Lecture, by John C. Merriam, professor of paleontology, University of California. Subject: The beginnings of human history from the geologic record. (Open to the public.)

TUESDAY, APRIL 23

Morning Session

Notes on isotopic lead, by F. W. Clarke.

The physico-chemical properties of gluten, by Lawrence J. Henderson (introduced by Raymond Pearl).

Correlation of the tertiary formations of the southeastern United States, Central America and the West Indies, by Thomas Wayland Vaughan (introduced by David White).

Coast survey charts and fringing reefs of the Philippine Islands (illustrated), by W. M. Davis.

Recent researches on the skeletal adaptations and modes of locomotion of the Sauropod Dinosaurs (illustrated), by Henry Fairfield Osborn and William K. Gregory.

Some additional data on the Cambrian Trilobites (illustrated), by Charles D. Walcott.

The development of governmental regulations during the world war, by C. R. Van Hise.

Afternoon Session

The big bears of North America, by C. Hart Merriam.

The growth of the Pribilof fur-seal herd between 1912 and 1917 (illustrated), by G. H. Parker.

A comparison of the growth changes in the nervous system of the rat with the corresponding changes in man (illustrated), by Henry H. Donaldson.

Measuring the mental strength of an army (illustrated), by Robert M. Yerkes (by invitation).

Second William Ellery Hale Lecture, by John C. Merriam, professor of paleontology, University of California. Subject: The beginnings of human history from the geologic record.

SPECIAL ARTICLES

A SIMPLE METHOD OF MEASURING PHOTOSYNTHESIS[1]

In collaboration with Loeb[2] one of us observed that certain marine algæ when exposed to sunlight cause the sea water to become more alkaline. Similar observations had been previously made by others[3] upon fresh-water plants in solutions containing bicarbonates.

It seemed to the writers that this procedure might be utilized in the study of photosynthesis. After investigating a number of marine plants it was found that *Ulva* (sea lettuce) is very satisfactory for such experiments. A piece of *Ulva* was placed in a beaker and covered with sea water to which a little phenolphthalein[4] had been added. It was then placed in direct sunlight. In the course of an hour the solution turned pink. The pink color grew steadily more pronounced and at the end of another hour was intense.

It seemed evident that by measuring the alkalinity which produced the change of color we might arrive at a simple and satisfactory method of studying photosynthesis.

In order to measure the degree of alkalinity produced by *Ulva,* a piece of the frond was placed in a tube of Pyrex glass[5] (about 12 mm. in diameter) in such a manner that it com-

[1] Preliminary communication.

[2] Loeb, J., "Dynamics of Living Matter," 1906, p. 98.

[3] *Cf.* Czapek, F., "Biochemie der Pflanzen," 1913, 1: 519.

[4] Ten drops of saturated alcoholic phenolphthalein was added to 1 liter of sea water. For class demonstration more may be added.

[5] This glass was chosen because it does not give off measurable quantities of alkali during the period of the experiment.