

# SCIENCE

VOL. 84

FRIDAY, DECEMBER 11, 1936

No. 2189

<i>New Vantage Grounds in the Psychology of Music:</i> PROFESSOR CARL E. SEASHORE .....	517	<i>Special Correspondence:</i> <i>New England Intercollegiate Field Trip:</i> PRO- FESSOR LLOYD W. FISHER .....	534
<i>The Effects of American Environment on Immigrants and Their Descendants:</i> PROFESSOR FRANZ BOAS .....	522	<i>Scientific Books:</i> <i>An Invitation to Mathematics:</i> PROFESSOR ALBERT A. BENNETT. <i>British Association Mathematical</i> <i>Tables:</i> DR. D. H. LEHMER .....	535
<i>Obituary:</i> <i>Alfred McLaren White:</i> PROFESSOR EDWARD MACK, JR., PROFESSOR F. H. EDMISTER and DR. E. C. MARKHAM. <i>Albert B. Reagan:</i> J. H. S. <i>Recent</i> <i>Deaths</i> .....	525	<i>Special Articles:</i> <i>Inactivation of Tobacco-mosaic Virus by X-Rays:</i> DR. JOHN W. GOWEN and DR. W. C. PRICE. <i>Verte-</i> <i>brate Remains from Cenozoic Rocks:</i> PROFESSOR C. E. NEEDHAM. <i>Contamination and Compaction</i> <i>in Core Sampling:</i> WILLIAM F. WRATH .....	536
<i>Scientific Events:</i> <i>The Rockefeller Foundation and the Kaiser Wil-</i> <i>helm Institute; A Fraudulent Academy of Sciences;</i> <i>Annual Report of the Chief of the Weather Bu-</i> <i>reau; The Sumatra Expedition of the National</i> <i>Geographic Society and the Smithsonian Institu-</i> <i>tion; Annual Meeting of the American Society of</i> <i>Mechanical Engineers; First Annual Symposium of</i> <i>the Division of Physical and Inorganic Chemistry</i> <i>of the American Chemical Society; The American</i> <i>Science Teachers' Association</i> .....	526	<i>Science News</i> .....	6
<i>Scientific Notes and News</i> .....	529		
<i>Discussion:</i> <i>Do Brain Waves Have Individuality?:</i> PROFESSOR LEE EDWARD TRAVIS and ABRAHAM GOTTLÖBER. <i>The Use of the Terms Coenocyte and Syncytium</i> <i>in Biology:</i> PROFESSOR REXFORD F. DAUBENMIRE. <i>The Black Widow Spider in Virginia:</i> DR. G. W. JEFFERS .....	532		

SCIENCE: A Weekly Journal devoted to the Advancement of Science, edited by J. McKEEN CATTELL and published every Friday by

## THE SCIENCE PRESS

New York City: Grand Central Terminal

Lancaster, Pa.

Garrison, N. Y.

Annual Subscription, \$6.00

Single Copies, 15 Cts.

SCIENCE is the official organ of the American Association for the Advancement of Science. Information regarding membership in the Association may be secured from the office of the permanent secretary, in the Smithsonian Institution Building, Washington, D. C.

## NEW VANTAGE GROUNDS IN THE PSYCHOLOGY OF MUSIC<sup>1</sup>

By Professor CARL E. SEASHORE

THE STATE UNIVERSITY OF IOWA

THE Baconian series of lectures was established for the purpose of furnishing from time to time a high-light review of the state of progress in given fields of knowledge. Ten years ago, I had the pleasure of giving the first lecture under this new organization. At that time I reviewed the status of the psychology of music. Since that time much water has run under the bridge, and this evening I have the pleasure of returning to the same subject with the satisfaction of reporting gratifying progress.

### I. MEASURING INSTRUMENTS

The progress that has taken place in the last decade by leaps and bounds is due to the extraordinary development of recording, measuring, transmitting and gen-

erating instruments by electrical engineers. We see this progress exemplified in the radical changes which have taken place in the recording of music by phonograph and film and in broadcasting over the radio. In acoustical engineering, as in every other science, there is a normal order of evolution. Each introduction of a new fundamental principle in physics or chemistry furnishes a vantage ground for further achievement. The recent development of the microphone and the thermionic tube has been revolutionary.

By the use of such tubes, a sound may now be amplified a million times. A sound made by a parasite squirming and crunching in a grain of wheat may be amplified so as to disturb the conversation in an adjoining room. Such amplification we hear every day in listening to our radios. We may now pick up the minutest characteristic of a single vibration in a tone

<sup>1</sup> An address in the Baconian series of lectures at the University of Iowa, November 13, 1936.

---

## Four New McGraw-Hill Books

---

### *Loomis and Shull—Methods in Plant Physiology*

By W. E. LOOMIS, Iowa State College, and C. A. SHULL, University of Chicago. With a chapter on Statistical Methods by G. W. SNEDECOR, Iowa State College. *McGraw-Hill Publications in the Agricultural and Botanical Sciences.* 464 pages, \$4.50

This book is written for the plant scientist with only moderate training in chemistry and physics, and attempts to outline and explain the methods used in plant physiological research, as well as to give tested laboratory experiments with questions, for class use. The laboratory section is unusually complete, comprising thirteen chapters of experiments covering the field of plant physiology and ranging in complexity from simple demonstrations to research techniques. There are nine chapters covering chemical and physical methods for plant physiology.

### *Rieman and Neuss—Quantitative Analysis.* A Theoretical Approach

By WILLIAM RIEMAN, Rutgers University, and JACOB D. NEUSS. *International Chemical Series.* 416 pages, \$3.25

The approach is new in that more than usual emphasis is placed upon the theoretical aspects of the subject and the intimate relationship between the theory and laboratory procedures. Another distinctive feature is the early introduction of potentiometric measurements, facilitating the discussions of acidimetry, alkalimetry, oxidimetry, electroanalysis, and measurement of pH. There is an exceptionally full discussion of coprecipitation. Two hundred fifty-eight problems and questions are included.

### *Hutcheson, Wolfe and Kipps—The Production of Field Crops* A Textbook of Agronomy. *New Second Edition*

By T. B. HUTCHESON, Virginia Polytechnic Institute, T. K. WOLFE, Southern States Co-operative, and M. S. KIPPS, Virginia Polytechnic Institute. *McGraw-Hill Publications in the Agricultural and Botanical Sciences.* 434 pages, \$3.50

In revising this well-known textbook the authors have kept in mind a two-fold objective: first, to incorporate the many advances in agronomy made since the publication of the first edition of the book; and second, to adapt the material more closely to the requirements of the usual course. As before, the first part of the book is devoted to a discussion of the fundamentals underlying the production of crops in general, followed by detailed treatments of individual crops. A list of questions has been placed at the end of each chapter.

### *Emmons—Gold Deposits of the World*

By W. H. EMMONS, University of Minnesota. *In press—ready in February*

A thoroughly up-to-date, comprehensive textbook giving brief descriptions of all of the world's chief gold mining regions and most of the lesser ones. Besides presenting much new material which has not heretofore been published, the book offers about 500 maps and geological cross sections. These show in general the intrusives with which the lodes are associated, the rocks older than the intrusives, and the rocks younger than the intrusives. The principal gold deposits are located on these maps. A section on prospecting is included.

*Send for copies on approval*

---

## McGRAW-HILL BOOK COMPANY, INC.

330 West 42nd Street, New York

Aldwych House, London, W.C.2