

sampling theory as it has been developed for use in sample surveys.

Professor Cochran is to be commended for not only writing an excellent, well-organized exposition of sampling, but also for attempting to impart some of his own experiences to help the reader develop a "feel" for the manner in which sample surveys are used. The author succeeds admirably in this respect. The tempo of the book is one at which the reader is being led through new material, always with Professor Cochran's kind but steady guidance.

Sampling Techniques is written so that the reader possessing knowledge of elementary algebra and the equivalent of a first course in statistics will be able to comprehend most of the material. Among the different techniques discussed are simple random sampling, stratified sampling, systematic sampling, subsampling, and double sampling. The chapters devoted to ratio and regression estimates are particularly well written.

Illustrating much of the sampling theory are many carefully explained, well-chosen examples. Many of the exercises completing the chapters consist of real data that enable the reader to get the necessary practice for a fuller understanding of sampling theory. The book is carefully documented with many up-to-date references.

The main emphasis is to help the reader attain a grasp of sampling theory without being bogged down with too many mathematical details. There is much in this well-written book to recommend it to practicing statisticians, students of statistics, and those who wish to learn about sampling through individual study. This volume will long remain a classic in the field of sample surveys.

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Association Affairs

AAAS Symposia at the Boston Meeting

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Associate Administrative Secretary, AAAS

SCIENTISTS well established in their fields and young specialists alike have come to anticipate the AAAS symposia which have become an increasingly important aspect of the annual meetings of the Association. Characteristically, AAAS symposia explore relatively neglected areas of scientific inquiry or constitute up-to-date surveys of knowledge in particular fields. Such programs are significant and valuable because they focus attention upon critical areas, summarize the present status of current research, and provide positions from which to direct further research. Typically, these programs originate in the minds of the officers of the eighteen sections and subsections of the Association and are developed by them, either personally or by others deputized as program chairmen. Often the sectional symposia are concerned with interdisciplinary problems and are sponsored by two or more sections; participating societies also may collaborate. If the potential demand warrants it, the papers of such programs are gathered together and published by the Association as symposium volumes.

In recent years there has become established the practice of arranging, for each annual meeting, several symposia of especially wide interest or timeliness. The responsibility for developing these general symposia, sponsored by the Association as a whole, rests upon the AAAS Symposium Committee, appointed each year by the president of the Association. Upon occasion, a proposed sectional program may be chosen

to be developed as a general symposium; more commonly, the Symposium Committee, which represents a variety of scientific fields, plans and arranges these general sessions itself. The Committee may invoke the aid of consultants and appoint others to implement the general symposia.

This year the Symposium Committee consists of E. U. Condon, director of research, Corning Glass Works, and president, AAAS (*chairman*); Frank A. Beach, professor of psychology, Yale University, and vice president for AAAS Section I; Bart J. Bok, associate director, Harvard College Observatory, and vice president for AAAS Section D; Charles D. Coryell, professor of chemistry, Massachusetts Institute of Technology; A. M. Gaudin, professor of mineral engineering, Massachusetts Institute of Technology; A. Baird Hastings, professor of biological chemistry, Harvard Medical School; Jerome C. Hunsaker, professor emeritus of aeronautical engineering, Massachusetts Institute of Technology; James R. Killian, Jr., president, Massachusetts Institute of Technology; Paul C. Mangelsdorf, director, Botanical Museum, Harvard University; Philip M. Morse, professor of physics, Massachusetts Institute of Technology; Alfred C. Redfield, associate director, Woods Hole Oceanographic Institution; Francis O. Schmitt, head, Department of Biology, Massachusetts Institute of Technology; Earl P. Stevenson, president, Arthur D. Little, Inc., and general chairman, Seventh Boston Meeting; George B. Wislocki, professor of anatomy, Harvard Medical School; and Raymond L. Taylor (*secretary*).

Of the general symposia at this 120th meeting of the Association, "Species Which Feed Mankind" was

suggested by Paul C. Mangelsdorf and "The Sea Frontier" was proposed originally by James B. Conant.

General Symposia

I. **Species Which Feed Mankind.** Arranged by Paul C. Mangelsdorf, director, Botanical Museum, Harvard University, and M. R. Irwin, professor of genetics, University of Wisconsin.

Part 1. Plant Species. 9:30 A.M., Sunday, Dec. 27; Paul Revere Hall, Mechanics Building.

Karl S. Quisenberry, assistant chief, Bureau of Plant Industry, U.S.D.A., *Presiding*

A. The World's Principal Food Plants. Karl S. Quisenberry.

B. America's Principal Food Species: *Zea mays*

1. Origin and Evolution of Maize. Paul C. Mangelsdorf.

2. The Nature of Variation in Maize. Edgar Anderson, associate director, Missouri Botanical Garden.

3. The Inflorescences of Maize. O. T. Bonnet, professor of plant genetics, University of Illinois.

4. Chromosomes, Cytoplasm, and Mutations in Maize. Marcus M. Rhoades, professor of botany, University of Illinois.

Part 2. Animal Species. 2:00 P.M., Sunday, Dec. 27; Paul Revere Hall, Mechanics Building.

Roy C. Newton, vice president, Swift & Company, *Presiding*

A. Agriculture versus Chemistry in the Nutrition of Man. Frederick J. Stare, professor of nutrition, Harvard School of Public Health.

B. Animal Species Which Feed Mankind

1. The Role of Nutrition. L. A. Maynard, director, School of Nutrition, Cornell University.

2. The Role of Physiology. S. A. Asdell, professor of animal physiology, Cornell University.

3. The Role of Genetics. T. C. Byerly, director of animal and poultry research, Bureau of Animal Industry, U.S.D.A.

II. **The Sea Frontier.** Arranged by Alfred C. Redfield, associate director, Woods Hole Oceanographic Institution, and Jerome C. Hunsaker, professor emeritus of aeronautical engineering, Massachusetts Institute of Technology.

Part 1. 9:30 A.M., Tuesday, Dec. 29; Paul Revere Hall, Mechanics Building.

Henry B. Bigelow, curator of oceanography, Harvard University, *Presiding*

1. The Origin of Ocean Water. William W. Rubey, staff geologist, U.S. Geological Survey. (lantern, 30 min.)

2. Some Recent Results in Geology and Physical Geography of Ocean Basins. W. Maurice Ewing, professor of geology, Columbia University. (lantern, 30 min.)

3. The Sea as a Productive System. Alfred C. Redfield, Woods Hole Oceanographic Institution. (lantern, 30 min.)

4. Biological Resources of the Sea in Relation to Man. Lionel A. Walford, chief, Branch of Fishery Biol-

ogy, U.S. Fish and Wildlife Service. (lantern, 30 min.)

Part 2. 2:00 P.M., Tuesday, Dec. 29; Paul Revere Hall, Mechanics Building.

Karl T. Compton, chairman of the Corporation, Massachusetts Institute of Technology, *Presiding*

1. The Edge of the Sea. Rachel L. Carson, Silver Spring, Maryland. (lantern, 30 min.)

2. The Continental Shelf. Henry C. Stetson, research oceanographer, Harvard University. (lantern, 30 min.)

3. Fresh Water from the Sea. Robert V. Kleinschmidt, consulting engineer, Boston. (lantern, 30 min.)

4. Shores and Their Sands. Frederick K. Morris, Air University and Massachusetts Institute of Technology. (lantern, 30 min.)

5. Making Ore Reserves. Antoine M. Gaudin, professor of mineral engineering, Massachusetts Institute of Technology. (lantern, 30 min.)

Sectional Symposia

B—Physics

Physics of the Upper Atmosphere (two sessions); arranged by G. G. Harvey.

Physics in Biology (two sessions); arranged by Richard S. Bear.

C—Chemistry

Comparative Nutrition Requirements of Animal Species (two sessions); arranged by Robert S. Harris and Frederick J. Stare.

Chemicals in Food (one session); arranged by Charles N. Frey.

Recent Advances in Food Technology (one session); arranged by Bernard E. Proctor.

Growth and Nutrition of Plants (one session); arranged by P. W. Zimmerman.

Chemistry of the Sea as Related to Food Problems (one session); arranged by Harold J. Humm.

D—Astronomy

Current Progress in Radio Astronomy (three sessions); arranged by Bart J. Bok.

Origin of Meteorites (three sessions); arranged by H. H. Uhlig and F. L. Whipple.

E—Geology and Geography

New England Geology (two sessions); arranged by Louis W. Currier.

Water for Industry (two sessions); arranged by Jack B. Graham and Meredith F. Burrill.

The Metropolis (one session); arranged by Victor Roterus.

G—Botanical Sciences

Second National Pollen Conference (three sessions); arranged by Stanley A. Cain.

The Uses of Large Scale Algal Cultures (two sessions); arranged by Barry Commoner.

H—Anthropology

Theoretical Models for the Study of Culture Change (one session); arranged by Evon Z. Vogt.

The Indians of New England: Their Archaeology and Ethnology (one session); arranged by Douglas S. Byers.

Nonhuman Primates and the Problems of Human Evolution (two sessions); arranged by James A. Gavan.

I—Psychology

Experimental Approaches to the Study of Brain Function (one session); arranged by Walter A. Rosenblith.
Comparative Studies of Social Behavior (one session); arranged by Burton S. Rosner.
Human Engineering and Information Theory (one session); arranged by Leonard C. Mead.
Sensory Processes (one session); arranged by Edwin B. Newman.

K—Social and Economic Sciences

The Scientist in American Society (two sessions); arranged by a committee of Section K, Conrad Taeuber, chairman, and a subcommittee of the Symposium Committee, Charles D. Coryell, chairman.
Regional Analysis (one session); arranged by Walter Isard.
The Economic State of New England (three sessions); arranged by Sumner H. Slichter and Walter Isard.

L—History and Philosophy of Science

Validation of Scientific Theories (one session); arranged by Philipp G. Frank.
Science and Its History: Three Currents of Interpretation (one session); arranged by Henry Guerlac.
Art and Science (one session); arranged by I. Bernard Cohen.
New Developments in Psychology of Thought (one session); arranged by J. S. Bruner.
Science and General Education (one session); arranged by Raymond J. Seeger.

M—Engineering

Communication Aids for the Blind (one session); arranged by Eugene F. Murphy.
Conservation of Human Resources: Highway Safety (two sessions); arranged by Irving P. Orens.

Nm—Medicine

Antimetabolites and Cancer (four sessions); arranged by Allan D. Bass and Cornelius P. Rhoads.

Nd—Dentistry

Recent Animal Experimentations in Caries Research (one session); arranged by Reidar F. Sognnaes.
Pathologic Disturbances of the Dental Pulp Resulting from Dental Operative Procedures (one session); arranged by Helmut A. Zander.
Periodontia (one session); arranged by Irving Glickman.

Np—Pharmacy

Professional Resources in Pharmacy in the United States (one session); arranged by George F. Archambault.
Accreditation of Hospitals: Its Effect on Pharmaceutical Services and Better Patient Care (one session); arranged by George F. Archambault.

O—Agriculture

Agronomic Problems of the Northeastern States (four sessions); arranged by Karl S. Quisenberry and C. E. Millar.

P—Industrial Science

Identification and Development of Senior Executives in American Industry: Contributions of Modern Science (two sessions); arranged by the Section Committee, Francis J. Curtis, chairman, and Allen T. Bonnell, secretary.

Q—Education

The Next Generation of Young Scientists and Their Science Teachers (one session); arranged by Morris Meister.
The Prediction of Child Development and Its Educational Implications (one session); arranged by J. R. Wittenborn.
Why Teachers Do and Do Not Use Films (one session); arranged by Mark A. May.
Visual Efficiency in Industry (two sessions); arranged by N. Franklin Stump.
Research on Higher Mental Processes (one session); arranged by Gerald V. Lannholm.

Symposia of the Participating Societies

Among the paper-reading sessions, seminars, and other events of the more than sixty participating societies and other organizations, are the following symposia:

American Society of Zoologists

Bioluminescence as a Tool in the Study of Cell Processes (one session); arranged by E. Newton Harvey.

Society of Systematic Zoology

The Phoronidea, Bryozoa and Entoprocta, and Brachiopoda: Their Status as Phyla and Their Relationships (one session); arranged by Waldo L. Schmitt.
Nomenclature: Results of the Sessions at the Copenhagen Congress (one session); arranged by R. E. Blackwelder and J. A. Peters.
The Subspecies versus the Cline: Their Biological and Nomenclatural Significance (one session); arranged by J. A. Peters.

American Society of Human Genetics *et al.*

Human Genetics and Medical Education (one session); arranged by Madge T. Macklin.
Genetic Factors Affecting Intelligence (one session); arranged by Frederick Osborn.
Genetics and the Races of Man (one session); arranged by William C. Boyd.

American Society of Naturalists and Genetics Society of America

Some Biological Effects of Radiation from Nuclear Detonations (one session); arranged by Alexander Hollaender.

National Academy of Economics and Political Science

Scientific Research and National Security (one session); arranged by Amos E. Taylor.

Society for the Advancement of Criminology

A Scientific Approach to the Problems of Delinquency (one session); arranged by Donal E. J. MacNamara.

American Association of Hospital Consultants

The Research Function of the Hospital (one session); arranged by E. M. Bluestone.

American Book Publishers Council, American Textbook Publishers Institute, and AAAS

Transmission of Ideas (two sessions); arranged by William E. Spaulding, John A. Behnke, and Richard H. Thornton.

Summary of Participating Organizations

With sessions of their own

AAAS Committee for Social Physics

AAAS Cooperative Committee on the Teaching of Science and Mathematics

Academy Conference
 Alpha Chi Sigma
 Alpha Epsilon Delta
 American Academy of Forensic Sciences
 American Association of Hospital Consultants
 American Book Publishers Council
 American Geophysical Union
 American Industrial Hygiene Association
 American Meteorological Society
 American Nature Study Society
 American Psychiatric Association
 American Society of Human Genetics
 American Society of Naturalists
 American Society of Zoologists
 Beta Beta Beta
 Conference on Scientific Editorial Problems II
 Conference on Scientific Manpower III
 Genetics Society of America
 Herpetologists League
 History of Science Society
 Honor Society of Phi Kappa Phi
 Massachusetts Zoological Society
 National Academy of Economics and Political Science
 National Association of Biology Teachers
 National Association of Science Writers
 National Geographic Society
 National Science Teachers Association
 National Speleological Society
 Philosophy of Science Association
 Pi Gamma Mu
 Scientific Research Society of America
 Sigma Pi Sigma
 Society for the Advancement of Criminology
 Society for the Study of Evolution

Society of Exploration Geophysicists
 Society of Systematic Zoology
 Society of the Sigma Xi
 United Chapters of Phi Beta Kappa

Cosponsors

American Academy of Arts and Sciences
 American Association of Colleges of Pharmacy
 American College of Apothecaries
 American Drug Manufacturers Association
 American Educational Research Association
 American Eugenics Society
 American Institute of Nutrition
 American Pharmaceutical Association, Scientific Section
 American Pharmaceutical Manufacturers Association
 American Society of Hospital Pharmacists
 American Society of Plant Physiologists, New England Section
 American Textbook Publishers Institute
 Association of American Geographers, New England Division
 Ecological Society of America
 Engineering Manpower Commission
 Geological Society of America
 Institute for the Unity of Science
 International Association for Dental Research, North American Division
 National Planning Association, New England Committee
 National Research Council
 National Science Foundation
 New England Council
 Scientific Manpower Commission

The AAAS Cooperative Committee on the Teaching of Science and Mathematics

A Report on Recent Activities

THE Cooperative Committee was organized in 1941 by representatives of several scientific societies to work on educational problems, the solution of which can be attained better by cooperative action than by any single scientific group working alone. Initially consisting of the representatives of five professional societies in several fields of science and science teaching, the Committee has grown to include representation from eighteen professional organizations. The present Committee Chairman is Morris Meister, Bronx High School of Science, and the Secretary is Bernard B. Watson, Operations Research Office, Johns Hopkins University.

The member societies and their representatives are:

American Association of Physics Teachers: Bernard B. Watson, Operations Research Office, Johns Hopkins University.

American Astronomical Society: Thornton Page, Operations Research Office, Johns Hopkins University.

American Chemical Society: C. H. Sorum, University of Wisconsin.

American Geological Institute: Arthur L. Howland, Northwestern University.

American Institute of Physics: J. W. Buchta, University of Minnesota.

American Nature Study Society: Richard L. Weaver, University of Michigan.

American Society for Engineering Education: Milton O. Schmidt, University of Illinois.

American Society of Zoologists: L. V. Domm, Loyola University, Chicago.

Botanical Society of America: Glenn W. Blaydes, Ohio State University.

Central Association of Science and Mathematics Teachers: Donald W. Lentz, Parma (Ohio) Public Schools.

Division of Chemical Education of the American Chemical Society: Laurence L. Quill, Michigan State College.

Executive Committee of the AAAS: Duane Roller, Hughes Aircraft Company.

Mathematical Association of America: J. R. Mayor, University of Wisconsin.

National Association of Biology Teachers: Prevo L. Whitaker, Indiana University.

National Association for Research in Science Teaching: George G. Mallinson, Western Michigan College of Education.

National Council of Teachers of Mathematics: George E. Hawkins, Lyons Township High School and Junior College, LaGrange, Illinois.