# REPORT OF THE NEW YORK MEETING OF THE INSTITUTE

The Seventh Annual Meeting of the Institute of Mathematical Statistics was held from Saturday to Tuesday, December 27–30, 1941, in conjunction with the meetings of the Allied Social Science Associations. With the exception of the session on Tuesday afternoon, all sessions were held at the Biltmore Hotel. The following one hundred seventy-seven members* of the Institute attended the meeting:

F. L. Alt, H. E. Arnold, K. J. Arnold, L. A. Aroian, K. J. Arrow, R. W. Bachelor, I. L. Battin, B. M. Bennett, Carl Bennett, Joseph Berkson, Felix Bernstein, E. E. Blanche, C. I. Bliss, A. J. Bonis, Paul Boschan, A. H. Bowker, D. S. Brady, A. E. Brandt, R. H. Brown, R. W. Burgess, J. H. Bushey, Belle Calderon, B. H. Camp, J. M. Clarkson, W. G. Cochran, A. C. Cohen, Jr., M. S. Cohen, Isadore Cohn, J. B. Coleman, L. M. Court, D. R. G. Cowan, Gertrude Cox, C. C. Craig, B. B. Day, D. B. DeLury, W. E. Deming, W. J. Dixon, H. F. Dodge, H. F. Dorn, Paul Dorweiler, David Durand, J. H. Dutka, P. S. Dwyer, Churchill Eisenhart, W. F. Elkin, J. S. Elston, M. L. Elveback, D. R. Embody, W. D. Evans, Willy Feller, J. W. Fertig, Irving Fisher, W. C. Flaherty, M. M. Flood, R. M. Foster, L. R. Frankel, H. A. Freeman, G. R. Gause, Hilda Geiringer, C. H. Graves, J. A. Greenwood, J. I. Griffin, C. C. Grove, F. E. Grubbs, E. J. Gumbel, M. J. Hagood, H. J. Hand, M. H. Hansen, Myron Heidingsfield, Edward Helly, G. M. Hopper, Harold Hotelling, E. A. Hoy, William Hurwitz, Seymour Jablon, W. W. Jacobs, Rachel Jenss, Myron Kantorovitz, Karl Karsten, Leo Katz, C. J. Kiernan, B. F. Kimball, A. J. King, L. F. Knudsen, H. S. Konijn, Tjalling Koopmans, R. L. Kozelka, A. K. Kurtz, A. R. Kury, S. M. Kwerel, Jack Laderman, Oscar Lange, D. H. Leavens, B. A. Lengyel, Howard Levene, Ida Levin, M. J. Liss, Irving Lorge, A. J. Lotka, Eugene Lukacs, G. A. Lundberg, P. J. McCarthy, W. G. Madow, Benjamin Malzberg, Henry Mann, Jakob Marschak, J. W. Mauchly, G. F. T. Mayer, Margaret Merrell, J. N. Michie, J. R. Miner, Nathan Morrison, J. E. Morton, F. C. Mosteller, M. R. Neifeld, Harold Nisselson, G. E. Niver, M. L. Norden, Nilan Norris, J. I. Northam, C. O. Oakley, E. G. Olds, P. S. Olmstead, J. G. Osborne, R. F. Passano, Edward Paulson, C. K. Payne, Victor Perlo, J. M. Perotti, L. M. Petit, G. A. D. Preinreich, Harry Press, Elsie Ratkowitz, L. J. Reed, F. V. Reno, J. S. Ripandelli, Selby Robinson, H. G. Romig, A. C. Rosander, Ernest Rubin, H. A. Ruger, P. A. Samuelson, M. M. Sandomire, Max Sasuly, F. E. Satterthwaite, Henry Scheffe, H. L. Schug, H. A. Secrist, Nathan Seiden, W. A. Shelton, R. W. Shephard, W. A. Shewhart, H. M. Shulman, Harry Siller, R. R. Singleton, L. E. Smart, J. H. Smith, G. W. Snedecor, Emma Spaney, Mortimer Spiegelman, Arthur Stein, M. S. Stevens, J. S. Stock, M. M. Torrey, M. N. Torrey, W. R. Van Voorhis, D. F. Votaw, Jr., W. C. Waite, H. M. Walker, W. A. Wallis, A. N. Watson, E. W. Wilson, C. P. Winsor, Jacob Wolfowitz, M. A. Woodbury, W. J. Youden, Joseph Zubin.

The opening session on Saturday afternoon on *The Role of Tests of Significance in Biological Research* was held jointly with the Biometrics Section of the American Statistical Association. Professor E. B. Wilson of the Harvard School of Public Health acted as chairman. The session was in the form of a round table discussion, the principal discussants being: W. Edwards Deming, Bureau of the Census; Harold Hotelling, Columbia University; Lowell J. Reed, Johns Hopkins University; and George W. Snedecor, Iowa State College.

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\* The list of attendance has been compiled from the registration list supplied by the Director of the New York Convention and Visitors Bureau.

On Saturday evening, under the chairmanship of Dr. Walter A. Shewhart of Bell Telephone Laboratories, a session was held jointly with the Econometric Society on *Theory of Runs and Confidence Intervals*. The following program was presented:

1. *The theory of runs in random data.*
   Harold T. Davis, Northwestern University.
2. *Five time series significance tests based on signs of differences.*
   Geoffrey H. Moore, Rutgers University.
   W. Allen Wallis, Stanford University.
3. *Conference intervals for the unknown median of any type of universe.*
   John H. Smith, University of Chicago.

The morning and afternoon sessions on Sunday on *Numerical Computational Devices* were held jointly with the American Statistical Association, with the co-operation of the Committee on Addresses in Applied Mathematics of the American Mathematical Society. Dr. C. R. Langmuir of the Carnegie Foundation for the Advancement of Teaching acted as chairman of the morning session on *Statistical and Matrix Calculation*. The following papers were presented:

1. *Some matrix methods in least square and other multivariate problems.*
   Harold Hotelling, Columbia University.
2. *The Mallock electrical calculating machine for solving simultaneous linear equations.*
   Elizabeth Monroe Boggs, Cornell University.
3. *Mathematical operations with punched cards.*
   J. C. McPherson, International Business Machines Corporation.
4. *Recent developments in correlation technique.*
   Paul S. Dwyer, University of Michigan.

The subject of the afternoon session was *Mechanical Solution of Differential Equations*. Dr. R. M. Foster of the Bell Telephone Laboratories presided for the following program:

1. *Punch card calculation of orbits.*
   W. J. Eckert, Naval Observatory.
2. *Punch card methods for solving linear differential equations of second order.*
   Martin Schwarzschild, Columbia University.
3. *Differential analyzers.*
   Harold L. Hazen, Massachusetts Institute of Technology.
   *Discussants:*
   L. S. Dederick, Aberdeen Proving Ground.
   Norbert Wiener, Massachusetts Institute of Technology.

Professor Helen Walker of Columbia University held the chair at the Sunday evening session, a joint session with the American Statistical Association. The following program was given under the title: *On Some Technical Aspects of Sampling*.

1. *On the relative efficiencies of various areal sampling units in population inquiries.*
   M. H. Hansen, Bureau of the Census.
   William Hurwitz, Bureau of the Census.

 2. *On the monthly sample survey of unemployment.*
  L. R. Frankel, Work Projects Administration.
  J. S. Stock, Work Projects Administration.
 3. *On certain biases in surveys by questionnaire.*
  J. Cornfield, Bureau of Labor Statistics.
 4. *On the relation of probability to sampling.*
  W. G. Madow, Bureau of the Census.
 5. *Recent developments in sampling for agricultural statistics.*
  G. W. Snedecor, Iowa State College.
  A. J. King, Iowa State College.
*Discussants:*
  W. G. Cochran, Iowa State College.
  J. A. Greenwood, Duke University.

Another joint session with the American Statistical Association was held on Monday morning. The topic considered was: *What Can the Census Do With Sampling?* Professor L. Edwin Smart of Ohio State University presided for the following program:

 1. *An appraisal of the 1940 sampling scheme.*
  T. O. Yntema and Dickson H. Leavens, Cowles Commission for Research in Economics.
 2. *Some requirements of sampling design and presentation.*
  W. Edwards Deming, Bureau of the Census.
 3. *Compromises, losses, and gains brought about by the introduction of sampling.*
  L. E. Truesdell, Bureau of the Census.
 4. *The proposed annual sample census.*
  Philip M. Hauser, Bureau of the Census.
*Discussants:*
  A. N. Watson, Curtis Publishing Company.
  F. F. Stephan, Office of Production Management.
  S. A. Stouffer, University of Chicago.

On Monday afternoon, a session was held for the reading of contributed papers on *Probability and Statistics.* Professor Harold Hotelling acted as chairman, and the following papers were read:

 1. *Scanning data to determine significance of difference between frequency of an event in contrasted groups.*
  Joseph Zubin, New York State Psychiatric Institute.
 2. *Compounding probabilities from independent significance tests.*
  W. Allen Wallis, Stanford University.
 3. *A class of multivariate distributions.*
  Walter Jacobs, Securities and Exchange Commission.
 4. *Definition of the probable error.*
  E. J. Gumbel, New School for Social Research.
 5. *A generalized analysis of variance.*
  F. E. Satterthwaite, University of Iowa.
 6. *On the power function of the analysis of variance test.*
  Abramham Wald, Columbia University.
 7. *Method of computing the roots of cubic and quartic equations by hyperbolic and circular functions.*
  E. E. Blanche, Michigan State College.

8. *Additive partition functions.*
   J. Wolfowitz, Columbia University.
9. *Limited type of probability distribution applied to flood flows.* (*Preliminary report*)
   B. F. Kimball, New York State Public Service Commission.
Abstracts of these papers follow this report.

Professor Harold Hotelling acted as chairman for the session on Tuesday morning, held jointly with the Econometric Society and the American Statistical Association. The program consisted of invited addresses on *Recent Advances in Mathematical Statistics* by Professors Burton H. Camp of Wesleyan University and Cecil C. Craig of the University of Michigan.

The session on Tuesday afternoon was held at The Boyce Thompson Institute, Yonkers, New York. It was a joint session with the Biometrics Section of the American Statistical Association on *The Design of Experiments.* Dr. W. J. Youden of The Boyce Thompson Institute acted as chairman and had various experimental designs on display in the greenhouse. Through the courtesy of members of the Institute staff, transportation between the railroad station and the Institute was provided. After the program, tea was served. The following papers were read:

1. *Biological interpretation of interactions.*
   W. C. Jacobs, Cornell University.
2. *Adapting the design to the experiment.*
   Gertrude M. Cox, North Carolina State College.
3. *Sampling theory when the sampling units are of unequal size.*
   W. G. Cochran, Iowa State College.
4. *Sampling errors of systematic and random surveys of cover type areas.*
   J. G. Osborne, U. S. Forest Service.

A luncheon meeting Monday noon was held jointly with the Econometric Society and was attended by ninety-four persons. Professor W. C. Mitchell of Columbia University presided and called on Irving Fisher, Harold Hotelling, W. G. Cochran, and W. A. Wallis for brief remarks.

The annual business meeting of the Institute was held late Monday afternoon, with President Hotelling presiding.

The report of the Secretary-Treasurer was read. The report appears on pp. 107-109.

President Hotelling stated that Mr. George W. Petrie, III, had audited the books and records of the Treasurer and' found them to be in agreement with the Report presented.

Dr. Madow, who acted as teller, reported that the mail balloting had resulted in the election of the following officers for 1942:

*President:* Professor C. C. Craig
*Vice-Presidents:* Professor A. T. Craig
Mr. E. C. Molina
*Secretary-Treasurer:* Professor E. G. Olds

After discussing various ways of broadening the service of the Institute, a motion was carried which recommended that the Board of Directors appoint committees to study the following matters: junior memberships, local chapters, and advertising for the official journal. Later the Board approved this recommendation and committees were appointed.

EDWIN G. OLDS,
*Secretary*

## REPORT OF THE DALLAS MEETING OF THE INSTITUTE

The twelfth meeting of the Institute was held jointly with the meetings of Section A of the American Association for the Advancement of Science and of the Econometric Society in Dallas on December 29–30, 1941. Professor Dunham Jackson, Secretary of Section A of the A. A. A. S., has kindly sent the following information regarding the meeting:

Sessions of the joint meeting of the Institute of Mathematical Statistics with the Econometric Society and Section A of the A. A. A. S. were held Monday afternoon, December 29, and Tuesday morning and afternoon, December 30, at Southern Methodist University. The number of contributed papers offered on Tuesday was such as to cause extension of the session into the afternoon.

On Monday afternoon addresses were delivered, in accordance with the programs issued in advance, by Professor A. B. Coble of the University of Illinois, retiring Vice President for the Section, on *A Certain Set of Ten Points in Space*, and Professor S. S. Wilks of Princeton University on *Representative Sampling*.

The order of papers on Tuesday was as follows:

1. *On the theory of the tetrahedron.*
   N. A. Court, University of Oklahoma.
2. *A method for integrating the linear hyperbolic equation in three independent variables.*
   E. W. Titt, University of Texas.
3. *On powers of a matrix whose elements are sets of points.*
   S. T. Sanders, Jr., Southwestern Louisiana Institute.
4. *Analytic theory of parametric linear partial differential equations.*
   W. J. Trjitzinsky, University of Illinois.
5. *The theory of the Riesz integral.*
   H. J. Ettlinger, University of Texas.
6. *Obtaining differences from tables which are in the form of punched cards.*
   Harry Pelle Hartkemeier, University of Missouri.
7. *On investment and the valuation of capital.*
   Montgomery D. Anderson, University of Florida.
8. *Advantages of singling out degrees of freedom in analyses of variances.*
   W. D. Baten, Michigan State College.
9. *The incidence of an income tax on saving.*
   Abram Bergson, University of Texas.
10. *Certain tests for randomness applied to data grouped in small sets.*
    Edward L. Dodd, University of Texas.