

spaces in order to construct orthogonal arrays. In particular, this method enabled them to construct an orthogonal array (81, 10, 3, 3). They proved, on the other hand, that in the case considered the maximum number of constraints cannot exceed 12 (Theorem 2C). Hence they state: "We do not know whether we can get 11 or 12 constraints in any other way." It is shown that no such way exists.

26. Some Contributions to the Theory of Markov Chains. (Preliminary Report.) CYRUS DERMAN, Columbia University.

Suppose that a collection of particles are moving about independently according to probabilities given by a Markov chain with transition matrix $P = \{p_{ij}\}$ $i, j = 0, 1, \dots$. Let $A_n(i)$ denote the number of particles in state i at time n ($i, n = 0, 1, \dots$). Some sufficient conditions on P and on the distributions of the $A_0(i)$'s were found such that for any set i_1, \dots, i_r , the joint distribution of $A_n(i_1), \dots, A_n(i_r)$ tends as $n \rightarrow \infty$ to that of r independent Poisson distributions. Consider a recurrent Markov chain $\{X_n\}$. Let $N_n(i) = \{\text{the number of } r\text{'s such that } X_r = i \text{ for } 1 \leq r \leq n\}$ $i = 0, 1, \dots$. The following theorem was proved. If $H(n)$ is any nondecreasing unbounded function and if i and j are any two states belonging to the same class, then with probability one the inequality $|(N_n(j) - a_{ij}N_n(i))/(N_n(i) + N_n(j))^{1/2}H(N_n(i) + N_n(j))| > b_{ij}$, where a_{ij} and b_{ij} are certain constants, will be satisfied for infinitely many or at most finitely many n according as $\sum_{n=1}^{\infty} H(n) \exp(-H^2(n)/2)/n$ diverges or converges. Sufficient conditions were given such that for any i_1, \dots, i_r , the distribution of $N_n(i_1), \dots, N_n(i_r)$ properly normalized approaches a multivariate normal distribution. The asymptotic covariance matrix was computed.

27. Minimax Invariant Procedures for Estimating Cumulative Distribution Functions. OM P. AGGARWAL, University of Washington.

Let $x_1 < x_2 < \dots < x_n$ be the ordered observations on a chance variable with cumulative distribution function F . Let \hat{F} denote an estimate of F based only upon the sample. The minimax invariant procedures of estimating F are obtained for two classes of loss functions $L(F, \hat{F})$. For $L(F, \hat{F}) = \int_{-\infty}^{\infty} |F(x) - \hat{F}(x)|^r dx$, with integer $r \geq 1$, the minimax invariant procedure is to estimate F by a step function $\hat{F}(x) = c_j$ for $x_i \leq x < x_{i+1}$; $j = 0, 1, \dots, n$, where x_0 and x_{n+1} denote $-\infty$ and $+\infty$ and c_j is obtained as the root of an equation of degree $(n+r)$ when r is odd and of degree $(r-1)$ when r is even. For the special case $r = 1$ the value of c_j is the median of a Beta distribution. For $r = 2$, one obtains $c_j = (j+1)/(n+2)$. For the class of loss functions $L(F, \hat{F}) = \int_{-\infty}^{\infty} [F(x) - \hat{F}(x)]^{2k}/F(x)[1-F(x)] dx$, one again obtains for minimax invariant procedure step functions with c_j determined as root of an equation of degree $(2k-1)$. In particular for $k = 1$ this optimum procedure turns out to be the usual sample cumulative function with $c_j = j/n$. (Work supported by the Office of Naval Research.)

NEWS AND NOTICES

Readers are invited to submit to the Secretary of the Institute news items of interest

Personal Items

F. J. Anscombe of Cambridge, England has been appointed Research Associate in the Department of Mathematics, Princeton University, for the year 1953-1954.

Dr. R. R. Bahadur, formerly Professor of Statistics at the Indian Council of Agricultural Research, New Delhi, is now Visiting Assistant Professor in the Department of Mathematical Statistics, Columbia University.

Dr. Arnold Binder has accepted an Assistant Professorship in the Department of Psychology, Indiana University, Bloomington, Indiana.

Dorothy Brady has been appointed Chief of the Division of Prices and Cost of Living of the Bureau of Labor Statistics.

Dr. Kermit G. Clemens, formerly instructor in mathematics at the University of Oregon, is now a statistician at the Naval Ordnance Test Station, Inyokern, China Lake, California.

Dr. S. G. Ghurye is an Assistant Professor in the Department of Mathematics at the University of Oregon, Eugene, Oregon for the current academic year.

Professor Leo A. Goodman, formerly Assistant Professor of Statistics and Sociology at the University of Chicago, has been promoted to Associate Professor and will be on a leave of absence for the academic year 1953-54, working at Cambridge University, Faculty of Mathematics, Statistical Laboratory, St. Andrew's Hill, Cambridge, England as a Research Fellow under the Fulbright Program and as an Honorary Research Training Fellow of the Social Science Research Council.

E. J. Gumbel has been appointed Adjunct Professor of Industrial Engineering at Columbia University, New York. During the past summer term he was teaching mathematical statistics in the Free University of Berlin.

Messrs. Leo J. Tick and Leon H. Herbach, formerly of Columbia University and Brooklyn College, have joined the Staff of the Research Division, College of Engineering, New York University as Research Associates. They will be part of a newly formed statistical research and consulting group, which does contract research in applied statistics and probability, and assists other units in the Research Division with the statistical aspects of their research.

Daniel G. Horvitz, formerly Assistant Professor, Department of Biostatistics, Graduate School of Public Health, University of Pittsburgh, has accepted a position as Associate Professor in the Department of Experimental Statistics, North Carolina State College.

Dr. A. T. James, who has been at Princeton University for the past three years, has now rejoined Dr. E. A. Cornish in the Commonwealth Scientific and Industrial Research Organization, Section of Mathematical Statistics, University of Adelaide, South Australia.

Wharton F. Keppler, formerly SQC Specialist at Central Air Procurement District in Detroit, Michigan, is now employed as an Analytical Statistician in the U. S. Naval Ordnance Test Station, Assessment Division, Test Design & Evaluation Branch, China Lake, California.

Dr. Salem H. Khamis of the Statistical Office of the United Nations has accepted an Associate Professorship at the Economic Research Institute, American University of Beirut, Beirut, Lebanon.

Fred E. Kindig, formerly with the Westinghouse Electric Corporation, East

Pittsburgh, Pennsylvania, is now Director of Quality Control with the Phoenix Glass Company, Monaca, Pennsylvania.

Associate Professor Frank Massey is on leave of absence from the University of Oregon for the academic year 1953-54. He has a Ford Fellowship and plans to spend most of the year at Harvard. *

L. F. Nanni, who has been an Instructor of Mathematics at Rutgers University, is now associated with the Engineering Department in the category of an Assistant Professor where he is doing research in Communication Statistics.

Peter K. Newman, who has been a Research Associate at Stanford University, has returned to the University of Oxford, London, England.

Woodrow W. Page is presently employed as a Senior Engineer in Aerophysics Department of the Consolidated Vultee Aircraft Corporation, Fort Worth, Texas.

Stefan Peters, formerly Associate Professor of Insurance at the University of California, Berkeley, is now Actuary of Connell, Price & Company, Consulting Actuaries, Boston, Massachusetts.

A. E. Sarhan, who has been studying at Harvard University, is going to work on his Ph.D. under the supervision of Professor B. G. Greenberg, University of North Carolina.

Dr. S. S. Shrikhande has returned to his permanent position as Assistant Professor of Mathematics, College of Science, Nagpur, India.

A. J. F. Siegert from the Department of Physics, Northwestern University, has received a Guggenheim Fellowship for research in theoretical physics and will be at the Institute for Advanced Study, Princeton, New Jersey during the academic year 1953-54.

Paul B. Simpson, formerly Associate Professor of Economics, University of Oregon, Eugene, Oregon, is now acting Chief, Business Finance and Capital Markets Section, Division of Research and Statistics, Board of Governors, Federal Reserve System, Washington, D. C.

Dr. Paul N. Somerville, who has been doing graduate work at the University of North Carolina at Chapel Hill, has been appointed Associate Professor in the Department of Statistics and Statistical Laboratory, Virginia Polytechnic Institute.

Fred L. Strodbeck, formerly of Yale University, has accepted a position as Associate Professor in the Law School and in the Department of Sociology, University of Chicago. As a member of the Ford Foundation Law-Behavioral Sciences Research Project, he is conducting experimental studies of jury behavior in addition to other duties.

Seiji Sugihara is now employed as a Statistician at the Office of the Naval Inspector of Ordnance, Rochester, New York.

W. A. Thompson, who has been a student at the University of North Carolina for the past three years, is now doing research work at Virginia Polytechnic Institute.

John S. White has accepted a position as Assistant Professor in the Department

of Actuarial Mathematics and Statistics at the University of Manitoba, Winnipeg, Canada.

John Woodward has accepted a position as Analytical Statistician in the Surveillance Laboratory, BRL, Aberdeen Proving Ground, Maryland.

New Members

The following persons have been elected to membership in the Institute

August 19, 1953 to November 16, 1953

- Abrams, Israel J.**, M.A. (Univ. of California), Graduate Research Statistician, Department of Mathematics, Statistical Laboratory, University of California, Berkeley, California, *2216 Carleton Street, Berkeley 4, California.*
- Bashara, Nicholas M.**, B.S. (Nebraska Univ.), Physicist, Minnesota Mining and Manufacturing, *367 Grove Street, St. Paul, Minnesota.*
- Brunk, Hugh D.**, Ph.D. (Rice Inst.), Associate Professor of Mathematics, University of Missouri, *809 Sunset Lane, Columbia, Missouri.*
- Cadwell, James H.**, M.A. (Cambridge Univ.), Principal Scientific Officer, Ministry of Supply, *102 Station Crescent, Ashford, Middlesex, England.*
- Doynow, David N.**, M.S. (North Carolina State College), Statistician, Bell Telephone Laboratories Inc., *2911 Barnes Avenue, New York City 67, New York.*
- Ferguson, Thomas S.**, A.B. (Univ. of California), Graduate Research Statistician, Statistical Laboratory, University of California, Berkeley, California.
- Folkert, Jay E.**, M.A. (Univ. of Michigan), Associate Professor of Mathematics, Hope College, Holland, Michigan, *202 W. 15th Street, Holland, Michigan.*
- Garner, Norman R.**, M.S. (North Carolina State College), Analytical Statistician, Thiokol Corporation, Redstone Division, Huntsville, Alabama, *43 Bide-A-Wee Drive, Huntsville, Alabama.*
- Golomski, William A.**, M.S. (Marquette Univ.), Instructor in Mathematics, Marquette University, Milwaukee 3, Wisconsin.
- Haight, Frank Avery**, M.S. (Iowa), Senior Lecturer in Mathematics, Auckland University College, Auckland, New Zealand.
- Horton, William H.**, M.S. (Oklahoma A. & M. College), Statistician, Metallurgical Development Section, Materials Division (K-90), Westinghouse Electric Corporation, East Pittsburgh, Pennsylvania.
- Kennard, Robert W.**, M.S. (Univ. of Delaware), Teaching Assistant, Carnegie Institute of Technology, Graduate Student in Mathematics, *149 S. Negley Avenue, Pittsburgh 6, Pennsylvania.*
- Laine, Roland O.**, A.B. (George Washington Univ.), Analyst, Civil Service, Department of Defense, *876 North Kensington Street, Arlington 5, Virginia.*
- Moore, Peter G.**, B.S. (London Univ.), Assistant Lecturer in Statistics, University College, London, Department of Statistics, University College, Gower Street, London W.C.1, England (Temporary address until June 1, 1954) *185 Graduate School, Princeton University, Princeton, New Jersey.*
- Moore, Roger A.**, M.A. (Univ. of California), Statistician, Systems and Tactics Group, Engineering Department, North American Aviation, Inc., Los Angeles, California, *907 W. Hillcrest Boulevard, Apartment #2, Inglewood, California.*
- Moranda, Paul B.**, Ph.D. (Ohio State Univ.), Research Engineer, North American Aviation Company, Downey, California, *4442 Adenmoor, Long Beach 8, California.*
- Moss, Norman R.**, B.S. (Univ. of Pittsburgh), Quality Control Statistician, Firth Sterling, Inc., Pittsburgh 30, Pennsylvania, *250 Maryellen Street, East McKeesport, Pennsylvania.*

- Stapleton, James H.**, B.A. (Michigan State Normal College), Research Assistant, Purdue University, *103 W. Stadium, West Lafayette, Indiana.*
- Sweeny, Hale C.**, M.S. (Virginia Polytechnic Inst.), Assistant Professor, Department of Statistics, Virginia Polytechnic Institute, *Box 646, Blacksburg, Virginia.*
- Wilkes, John D.**, Ph.D. (California Tech.), Research Coordinator, Office of Naval Research Branch Office, San Francisco, California, *901 California Street, San Francisco, California.*
- Zumbado B., Fernando**, M.A. (Univ. of Michigan), Actuary and Statistician, Instituto Nacional de Seguros, San José, Costa Rica and Professor of Mathematics and Statistics, University of Costa Rica, *Box 428, San José, Costa Rica, Central America.*
- Zyskind, George**, B.S. with honors (McGill Univ.), Graduate Student and Teaching Fellow in Mathematics, *14, Borden Street, Toronto, Ontario, Canada.*

Positions at Iowa State College

A number of graduate assistantships and associateships in statistics are available for the 1954-55 academic year at Iowa State College for work connected with experimental design, theory and sample survey research. These include several Research and Development assistantships supported by the Iowa Agricultural Experiment Station to train students as statistical consultants in agricultural and biological areas. Assistantships are for 9 or 12 months and pay \$125 a month. A variable number of available positions will be supported by current contractual research projects. Also there are openings for several assistants or associates (instructors) on the teaching budget of the Department of Statistics. Associates on half-time appointments for 12 months receive \$1800; those on full-time, \$3600. For more information, write to the Statistical Laboratory, Iowa State College.

Summer Sessions at Iowa State College

Statistics courses will be offered at Iowa State College during the two six-weeks sessions of summer quarter 1954, June 14-August 27, for the 29th consecutive year. This summer's offerings of the Department of Statistics are designed primarily for graduate students minoring in statistics and majoring in some other substantive subject-matter area, and for beginning graduate students majoring in statistics who may find it necessary to satisfy prerequisite requirements for the more advanced courses in statistics.

Senior staff members of the Statistical Laboratory and the Department of Statistics are available at least part of the summer quarter for consultations on special problems courses in statistics and on research connected with graduate theses.

In addition, during the first six-weeks session (June 14-July 21), the following will be offered: Statistical Methods for Research Workers, Experimental Designs for Research Workers, Statistical Theory for Research Workers. During the second session (July 21-August 27), the following will be offered: a continuation of the two courses, Statistical Methods for Research Workers and Statistical Theory for Research Workers, and Survey Designs for Research Workers.

Summer Sessions at Berkley, California

This year's program at the Statistical Laboratory of the University of California, Berkeley, California, consists of two sessions: June 21–July 31 and August 2–September 11, 1954. The faculty of the summer sessions will include Professor C. R. Rao of Presidency College, Calcutta; Professor J. Neyman, Professor Harry M. Hughes and Professor Terry A. Jeeves of the Statistical Laboratory, University of California.

The program includes two of the usual undergraduate courses in each session. In addition Professor Rao will give a new course designed to acquaint students with multivariate analysis, including analysis of variance and covariance, factor analysis, and discriminant functions. Professor Neyman will be available for consultations on work leading to higher degrees. Further information may be obtained by writing the Statistical Laboratory, 5416 Dwinelle Hall, University of California, Berkeley 4, California.

REPORT OF THE WASHINGTON MEETING OF THE INSTITUTE OF MATHEMATICAL STATISTICS

The fifty-eighth meeting and the sixteenth annual meeting of the Institute of Mathematical Statistics was held in Washington, D. C., on December 27–30, 1953, in conjunction with meetings of the American Statistical Association, Econometric Society, Biometric Society, and other social science societies.

The following 363 members of the Institute attended the meeting:

Helen Abbey, Forman S. Acton, Beatrice Aitchison, Sigurd L. Anderson, R. L. Anderson, Walter J. Angulo, Francis J. Anscombe, Kenneth J. Arnold, Leo Avedis Aroian, R. R. Bahadur, Edward W. Bailey, John C. Bain, Alfonso T. Bancroft, Edward W. Barankin, James B. Bartoo, N. M. Bashara, Geoffrey Beall, Robert E. Bechhofer, J. N. Berbettoni, Agnes P. Berger, Joseph Berkson, Charles A. Bicking, Patrick P. Billingsley, Allan Birnbaum, Z. William Birnbaum, David Blackwell, Archie Blake, Julius R. Blum, Isadore Blumen, Colin R. Blyth, John Boddie, Nathan B. Borden, Paul Boschan, Albert H. Bowker, Ralph A. Bradley, Alva Esmond Brandt, Maurice F. Bresnahan, Robert L. Brickley, Glenn W. Brier, Irwin D. J. Bross, Bernice Brown, Richard H. Brown, K. Alexander Brownlee, Robert W. Burgess, R. S. Burlington, Irving W. Burr, Joseph M. Cameron, Edward W. Cannon, Gerald T. Cargo, Douglas G. Chapman, Jack Chassan, Yunien Chen, Herman Chernoff, Willard H. Clatworthy, William G. Cochran, A. C. Cohen, Jr., Samuel E. Cohen, William S. Connor, Clyde H. Coombs, Ellsworth B. Cook, Arthur H. Copeland, Sr., Louis J. Cote, L. M. Court, John H. Cover, David Cowan, Dudley J. Cowden, Edwin L. Cox, Cecil C. Craig, Harald Cramér, Marcus T. Crapsey, Jean Crickett, Edwin L. Crow, Lee Crump, John H. Curtis, Joseph F. Daly, Cuthbert Daniel, Donald A. Darling, Reed B. Dawson, Jr., Besse B. Day, Walter L. Deemer, D. George Deihl, Francis R. Del Priore, W. Edwards Deming, Lucille Derrick, Wilfrid J. Dixon, James L. Dolby, Tom G. Donnelly, Robert Dorfman, Harold F. Dorn.

Acheson J. Duncan, David B. Duncan, C. W. Dunnett, David Durand, Arthur M. Dutton, Meyer Dwass, Churchill Eisenhart, Daniel R. Embody, Benjamin Epstein, Walter T. Federer, Alvin V. Fend, Robert Ferber, Clarence B. Fine, Carl H. Fischer, Evelyn Fix, John C. Flanagan, J. Sutherland Frame, Lester R. Frankel, David Frazier, John E. Freund, Holly C. Fryer, W. R. Gaffey, Norman R. Garner, John E. Garrett, Donald P. Gaver, Lincoln J. Gerende, Dorothy M. Gilford, Leon Gilford, John W. Gilmore, Meyer A. Girshick, William A. Golomski, Mina H. Gourary, Samuel W. Greenhouse, Joseph A. Greenwood, Evelyn Grossman, Harold Gulliksen, Emil J. Gumbel, Lee S. Gunlogson, John Gurland, Margaret Gurney, Raef K. Haddad, Robert John Hader, John Hagan, Keet W. Halbert, K. David C. Haley, Max Halperin, James F. Hannan, Morris H. Hansen, Robert H. Hanson, Bernard Harris, Theodore E. Harris, Boyd Harshbarger, Herman Otto Hartley, Willis LeRoy Hasty, Leon H. Herbach, G. Ronald Herd, Warren M. Hirsch, Williston C. Hobbs, Joseph L. Hodgès, Jr., R. G. Hoffmann, Paul G. Homeyer, Robert Hooke, J. Burke Horton, Daniel G. Horvitz, Harold Hotelling, Earl E. Houseman, Hendrik S. Houthakker, William G. Howard, Elvin A. Hoy, John Paul Hoyt, Harry M. Hughes, Helen M. Humes, J. Stuart Hunter, David V. Huntsberger, Cuthbert Hurd, Eric R. Immel, Paul E. Irick, Walter W. Jacobs, J. Edward Jackson, Terry A. Jeeves, Howard L. Jones, Wayne H. Jones, Alice S. Kaitz, Leo Katz, J. Kiefer, Allyn W. Kimball, Edgar P. King, Tjalling C. Koopmans, Carl F. Kossack, Richard L. Kozelka, Kenneth H. Kramer, William H. Kruskal, Roy R. Kuebler, Jr., Morton Kupperman, Badrig M. Kurkjian, George M. Kuznets, Robert Boyd Ladd, Jack Laderman, Roland O. Laine, Donald E. Lamphiear, Otis E. Lancaster, Lucien M. LeCam, Erich L. Lehmann, Werner R. Leimbacher, William A. Lesansky, Howard Levene, Joseph Levi, Edward Abraham Lew, Benjamin Libstein, Gerald J. Lieberman, Gilbert Lieberman, Julius Lieblein, Rensis Likert, Richard F. Link, Stuart P. Lloyd, Michel Loève, Frederic M. Lord, Fred W. Lott, Ardie Lubin, Eugene Lukacs, George F. Lunger, Ralph L. Madison, William G. Madow, Clifford J. Maloney, Benjamin Malzberg, John Mandel, Charles L. Marks, Eli S. Marks, A. S. Marthens, Robert H. Matthias, Philip J. McCarthy, Brockway McMillan, Robert G. McMillan, Gertrude A. McQuaid, Paul Meier, Margaret Merrell, Herbert A. Meyer, Max R. Mickay, Jr., Max F. Millikan, Albert Mindlin, Robert Mirsky, Sutton Monro, William J. Moonan, Cordell B. Moore, Marjorie E. Moore, Peter G. Moore, Milton Morrison, J. E. Morton, Lincoln E. Moses, Bruce D. Mudgett, Ikhtiar-Ul Mulk, Luis F. Nanni, Raymond Nassimbene, Mary G. Natrella, Morton J. Netzorg, Paul M. Neurath, Russell T. Nichols, Harold Nisselson, Gottfried E. Noether, Monroe L. Norden, James A. Norton, Jr., Edwin G. Olds, Ingram Olkin, Ernest L. Osborne, James G. Osborne, D. B. Owen, Toby Oxtoby, William R. Pabst, Jr., Woodrow W. Page, Emanuel Parzen, Allan E. Paull, Edward Paulson, Ken-Chen Peng, George W. Petrie, Bernard E. Phillips, Lillian H. Phillips, Eugene W. Pike, K. C. Sreedharan Pillai, James H. Powell, Don C. Price, Frank Proschan, James A. Rafferty, Howard Raiffa, Lili Knudsen Randolph, P. H. Randolph, Lowell J. Reed, Mina Rees, Albert T. Reid, Joseph S. Rhodes, Herbert Robbins, Robert Roeloffs, Harry G. Romig,

J. H. Roseboom, Harry M. Rosenblatt, John R. Rosenblatt, Irving Roshwalb, Michael B. Rowan, S. N. Roy, Ernest Rubin, Herman Rubin, David Rubinstein, Evelyn L. Rumer, Charles H. Rust, Rose Sachs, Marion M. Sandomire, I. Richard Savage, Leonard J. Savage, Mary Ann Savas, Henry Scheffé, Sylvia Schlachter, Samuel A. Schmitt, Marvin A. Schneiderman, Ellsworth B. Shank, Donald J. Shaw, Richard H. Shaw, David Sheppard, Irving H. Siegel, Jack Silver, Walt R. Simmons, Monroe G. Sirken, Rosedith Sitgreaves, Clarence D. Smith, H. Fairfield Smith, John H. Smith, Robert T. Smith, III, Milton Sobel, Anson Solem, Herbert Solomon, Paul N. Somerville, Dudley E. South, Mortimer Spiegelman, Ralph B. Stauber, Charles Stein, Joseph Steinberg, Rothwell Stephens, Fred L. Strodbeck, R. M. Sundrum, Hale C. Sweeney, Nancy A. Simens, Z. Szatrowski, William F. Taylor, Henry Teicher, D. Teichroew, Benjamin J. Tepping, Donovan J. Thompson, W. R. Thompson, Leo J. Tick, Fred H. Tingey, G. Tintner, Malcolm W. W. Tomlinson, Donald R. Truax, Albert W. Tucker, John W. Tukey, C. R. M. Tuttle, M. C. Kenneth Tweedie, George W. Tyler, Jose Vergara, David F. Votaw, Jr., F. M. Wadley, Helen M. Walker, David L. Wallace, W. Allen Wallis, Lionel Weiss, Samuel Weiss, Everett L. Welker, Phillips Whidden, Alfred G. Whitney, Frank Wilcoxon, Samuel S. Wilks, Max A. Woodbury, Charles A. Wright, Jacob Yerushalmy, W. J. Youden, Marvin Zelen.

The Program follows:

SUNDAY, DECEMBER 27, 1953

10:30 a.m. Logical Foundations of Probability Theory and Statistical Inference

- Chairman: T. A. Bancroft, Iowa State College
- Papers: 1. *Inductive Approach*, Gerhard Tintner, Iowa State College
 2. *Set Theory Approach*, M. Loève, University of California
 3. *Frequency Approach*, A. Copeland, University of Michigan
- Discussion: F. J. Anscombe, Cambridge, England and J. W. Tukey, Princeton University

2:00 p.m. Stochastic Processes I.

- Chairman: D. Blackwell, Howard University
- Papers: 1. *Stochastic Learning Theory*, M. M. Flood, Columbia University
 2. *Interpolatory Stochastic Processes and Some Simple Tests*, D. Darling, University of Michigan
 3. *Statistical Inference in Poisson Processes*, Allan Birnbaum, Columbia University
 4. *Relationship of Certain Learning Models to More General Stochastic Processes*, T. E. Harris, Rand Corporation

4:00 p.m.

Stochastic Processes II.Chairman:
Papers:

- T. A. Jeeves, University of California
1. *Stochastic Processes Arising in Some Tests of Goodness of Fit*, J. Kiefer, Cornell University
 2. *Information Contained in a Finite Time Interval*, Herman Rubin, Stanford University
 3. *Small Sample Distribution and Bias of Least Squares Estimators in a Discrete Markov Process*, John Gurland, Iowa State College

8:00 p.m.

1953 Council Meeting**MONDAY, DECEMBER 28, 1953**

9:00 a.m.

Contributed Papers I.Chairman:
Papers:

- M. Halperin, National Heart Institute
1. *Confidence Intervals of Fixed Length for the Poisson Mean and the Difference Between Two Poisson Means*, Allan Birnbaum, Columbia University
 2. *Convexity Properties of the Alpha-Beta-Set Under Composite Hypotheses*, Herman Rubin and Oscar Wesler, Stanford University
 3. *Critical Regions in Terms of Lower Dimensional Critical Regions*, L. M. Court, Diamond Ordnance Fuze Laboratory
 4. *A Stochastic Model of Traffic Congestion*, C. B. Winsten, Cowles Commission (introduced by H. S. Hou-thakker)
 5. *On a Property of Certain Linear Functions of Order Statistics from Some Normal Populations.* (By title), K. C. Seal, University of North Carolina
 6. *A Historical Note on the Relation Between Extreme Values and Tensile Strength.* (By title), Julius Lieblein, National Bureau of Standards
 7. *A Note on Statistics and Sigma-Subfields.* (By title), R. R. Bahadur, Columbia University

9:00 a.m.

Application of Stochastic Methods to Studies of Growth (co-sponsored by the American Statistical Association and Biometric Society)Chairman:
Papers:

- H. Fairfield Smith, North Carolina State College
1. *Stochastic Processes and Their Application to Growth of Populations, Epidemics, and Rumors*, A. T. Reid, Columbia University

2. *A Stochastic Model for Selection of Micro-Nuclei in Paramecium Growth. (Preliminary Report)*, A. W. Kimball and A. S. Householder, Oak Ridge National Laboratory

- 11:00 a.m.** **Rietz Lecture (co-sponsored by the Econometric Society)**
- Chairman: M. A. Girshick, Stanford University
- Speaker: Professor Harald Cramér, *On Some Questions Connected with Mathematical Risk*
- 2:00 p.m.** **Structural Relations Between Random Variables (co-sponsored by Econometric Society)**
- Chairman: T. C. Koopmans, University of Chicago
- Papers: 1. *The General Problem of Linear Structural Relations*,
T. A. Jeeves, University of California
2. *The Problem of Efficiency of Estimates of Structural Parameter*, C. M. Stein, Stanford University
- Discussion: Leonid Hurwicz, University of Minnesota and Herman Rubin, Stanford University
- 4:00 p.m.** **Survey of Nonparametric Theory and Methods (co-sponsored by American Statistical Association)**
- Chairman: Lincoln E. Moses, Stanford University
- Papers: 1. *Characterization of Distribution-Free Statistics*, Z. W. Birnbaum, University of Washington
2. *A Genesis of Rank Tests and Some Conjectures Based on It*, E. L. Lehmann, University of California
3. *Optimum Nonparametric Tests for Small Samples*, I. R. Savage, National Bureau of Standards
- Discussion: Meyer Dwass, Northwestern University, Howard Levene, Columbia University and R. M. Sundrum, University of North Carolina
- 9:00 p.m.** **Informal Reception (co-sponsored by American Statistical Association)**

TUESDAY, DECEMBER 29, 1953

- 9:00 a.m.** **Preliminary Tests of Significance and Pool Rules (co-sponsored by American Statistical Association and Biometric Society)**
- Chairman: W. G. Cochran, Johns Hopkins University
- Papers: 1. *To Pool or Not to Pool*, A. E. Paull, Abitibi Power and Paper Company, Ltd.
2. *Some Applications*, T. A. Bancroft, Iowa State College
3. *An Extension*, D. Huntsberger, Iowa State College

Discussion: Robert Bechhofer, Cornell University and J. W. Tukey, Princeton University

9:00 a.m. The Theory of Organizations (co-sponsored by the Econometric Society)

Chairman: William Vickrey, Columbia University

- Papers:
1. *Aspects of Design in the Theory of Organization*, David Rosenblatt, American University
 2. *Some Factors Affecting Economic Organization*, Stanley Reiter, Stanford University
 3. *The Firm as a Team*, Jacob Marschak and Roy Radner, Cowles Commission for Research in Economics

Discussion: Robert Dorfman, University of California and Merrill M. Flood, Columbia University

2:00 p.m. Recent Developments in Decision Theory

Chairman: Jack Laderman, Office of Naval Research

- Papers:
1. *Explicit Characteristics of Complete Classes for Some Testing Problems*, Allan Birnbaum, Columbia University
 2. *An Extension of Wald's Theory of Statistical Decision Functions*, Lucien LeCam, University of California
 3. *Optimum Invariant Decision Functions*, M. A. Girshick, Stanford University
 4. *Point Estimation and the Theory of Decision*, L. J. Savage, University of Chicago

4:00 p.m. Contributed Papers II.

Chairman: J. Lieblein, National Bureau of Standards

- Papers:
1. *Completeness, Similar Regions, and Unbiased Estimation, Part II, (Preliminary Report.)* E. L. Lehmann and Henry Scheffé, University of California, Berkeley.
 2. *On Linear Regression Analysis when the Dependent Variable is Rectangular*, E. G. Olds, Carnegie Institute of Technology
 3. *Some Further Results in Simultaneous Confidence Interval Estimation*, S. N. Roy, University of North Carolina
 4. *A Method for Generating Random Variates on Electronic Computers*, D. Teichroew, National Bureau of Standards
 5. *Theory of Successive Multiphase Sampling. (Preliminary Report)*, B. D. Tikkiwal, Columbia University (introduced by M. A. Schneiderman)

6. *Estimation of the Size of a Stratified Population*, Douglas G. Chapman and C. O. Junge, Jr., University of Washington and Washington State Department of Fisheries
7. *Sequential Life Tests in the Exponential Case*. (By title), Benjamin Epstein and Milton Sobel, Wayne University and Cornell University
8. *Distributions of Some Integrals of Certain Gaussian Stochastic Processes and the Limiting Distributions of Some "Goodness of Fit" Criteria*. (By title), T. W. Anderson, Columbia University
9. *Some Sampling Results on the Power of Nonparametric Tests Against Normal Alternatives*. (By title), W. J. Dixon and D. Teichroew, National Bureau of Standards

6:00 p.m.

Membership Meeting

WEDNESDAY, DECEMBER 30, 1953

8:30 a.m.

Contributed Papers III.

Chairwoman:
Papers:

- M. Gurney, Bureau of the Census
1. *On the Large Sample Power of Rank Order Tests in the Two-Sample Problem*, Meyer Dwass, Northwestern University
 2. *Multiple Tests and Intersection Region Procedures*, David L. Wallace, Massachusetts Institute of Technology
 3. *Some Significance Test Procedures for Multiple Comparisons*, H. O. Hartley, Iowa State College
 4. *A Sequential Test of Randomness Against Linear Trend*, Gottfried E. Noether, Boston University
 5. *Further Results in the Theory of Quality Control Charts*, Leo A. Aroian, Hughes Research and Development Laboratories
 6. *Minimum Life in Fatigue*, E. J. Gumbel and A. M. Freudenthal, Columbia University
 7. *Bounds for the Distribution Function of a Sum of Independent, Identically Distributed Random Variables*. (By title), Wassily Hoeffding and S. S. Shrikhande, University of North Carolina and University of Nagpur.
 8. *Sequential Rank Sum Tests. (Preliminary Report.)* (By title), Chia Kuei Tsao, Wayne University
 9. *A Remark on the Geometrical Method of Construction of*

an Orthogonal Array. (By title), Esther Seiden, University of Chicago

10. *Some Contributions to the Theory of Markov Chains. (Preliminary Report.)* (By title), Cyrus Derman, Columbia University

11. *Minimax Invariant Procedures for Estimating Cumulative Distribution Functions.* (By title), Om P. Aggarwal, University of Washington

9:00 a.m. Applications of Survivorship Methods (co-sponsored by American Statistical Association, Biometric Society, and American Public Health Association)

Chairman: Allan Birnbaum, Columbia University

Papers: 1. *Estimation of Length of Hospital Stay from Discharge Data*, C. A. Bachrach, Johns Hopkins University
2. *Parametric Estimation of Survivorship*, D. J. Davis, Rand Corporation

Discussion: B. Epstein, Wayne University and P. Densen, University of Pittsburgh

10:30 a.m. Multiple Decision Problems (co-sponsored by the American Statistical Association)

Chairman: L. Weiss, University of Virginia

Papers: 1. *On Optimum Slippage Tests for the Variances of k Normal Distributions*, Donald Truax, Stanford University
2. *A Single-Sample Multiple Decision Procedure for Ranking Means of Normal Populations with Known Variances*, Robert Bechhofer, Cornell University
3. *A Two-Sample Multiple Decision Procedure for Ranking Means of Normal Populations with a Common Unknown Variance*, Charles Dunnett, Lederle Laboratories
4. *A Sequential Multiple Decision Procedure for Ranking Means of Normal Populations with Known Variances*, Milton Sobel, Cornell University

Discussion: Cuthbert Daniel, New York and J. W. Tukey, Princeton University

10:30 a.m. Estimation of Rates (co-sponsored by American Statistical Association and Biometric Society)

Chairman: E. G. Olds, Carnegie Institute of Technology

Papers: 1. *Estimation of the Interval Rate in Actuarial Calculations: A Critique of the Person-Years Concept*, J. Berkson, Mayo Clinic

2. *Improvement Rate of Mental Patients*, E. Fix, University of California
 3. *Problem of Within-Family Attack Rates*, W. R. Gaffey, University of California
 4. *Consistency* of Estimators Under a Specialized Bioassay Procedure*, W. F. Taylor, School of Aviation Medicine
- 2:00 p.m.** **Survey of the Theory of Finite Sampling (co-sponsored by the American Statistical Association)**
- Chairman: Morris H. Hansen, Bureau of the Census
- Papers: 1. *Aims and Methods*, W. G. Cochran, Johns Hopkins University
2. *Finite Sampling Concepts in Experimental Statistics*, J. Cornfield, National Institute of Health
3. *The Design of Sample Surveys*, J. F. Daly, Bureau of the Census
- Discussion: H. O. Hartley, Iowa State College and J. W. Tukey, Princeton University
- 4:00 p.m.** **1954 Council Meeting**

HAROLD NISSELSON
Assistant Secretary

REPORT OF ANNUAL MEMBERSHIP MEETING, DECEMBER 29, 1953

The Annual Business Meeting, in the Shoreham Hotel, Washington, D. C., December 29, 1953 was called to order at 6:10 P.M. by Morris H. Hansen, President.

The President reported on the activities of the Institute during 1953.

The Secretary-Treasurer submitted his report for the year 1953.

The Editor submitted his annual report.

The report of the Program Coordinator was submitted for him by the incoming Program Committee.

The election of a President-Elect for 1954 (President in 1955), and of five members of the Council for the term 1954-1956 was held. Later in the meeting the tellers announced the election of Henry Scheffé as President-Elect and of T. W. Anderson, Jr., Joseph Berkson, Z. W. Birnbaum, D. H. Blackwell, and W. G. Madow as members of the Council.

The Secretary moved, on behalf of the Council, that the present Exception B of Article 2 of the Bylaws be deleted. This section reads, "Any member may make a payment in place of all succeeding annual dues based on a suitable table and rate of interest specified by the Council." The motion carried. The motion having been previously approved by the Council, the section is deleted.

The President announced that the next items of business related to two peti-

tions from members and to action by the Council relative to these petitions. The bodies of the petitions had been mailed to the members and are not repeated here. The motions to amend which were part of these petitions appear below. The President reviewed the events leading up to the presentation of these matters at the membership meeting and had distributed copies of the report to the Council from a committee consisting of W. G. Cochran, Chairman, Henry Scheffé and S. S. Wilks.

The Secretary moved, on behalf of 43 members of the Institute, the adoption of the following amendment to the Bylaws:

“All meetings of the Institute shall be held on the basis of no racial segregation. In particular, prior to determining the place of a forthcoming meeting, the Secretary of the Institute shall ascertain that meeting halls, eating facilities, and housing accommodations adequate for the expected attendance shall be available on a nonsegregated basis, and that all social events connected with the meeting shall be nonsegregated.”

The Secretary then moved, on behalf of 31 members of the Institute, that the amendment just introduced be amended by

- “1. deleting ‘eating facilities and housing accommodations’ and substituting ‘and eating facilities.’ and
- “2. adding at the end ‘Every effort shall be made to provide nonsegregated housing accommodations consistent with the laws of the locality of the forthcoming meeting.’ ”

A difference in wording of the first sentence of the proposed bylaw between that given in the initial petition and that of the restatement in the second petition has not been called into question and is therefore considered not substantive.

The Secretary then moved, on behalf of the Council, that action on the proposed amendments be deferred to the September 1954 meeting, under circumstances where every member of the IMS will have adequate opportunity to vote by mail or in person after receiving the benefit of study and advice by the Council on these amendments.

W. G. Cochran was recognized by the chair and opened debate on the motion to defer.

The meeting supported the chair in a ruling that voting would not be in progress until the vote was called for at the meeting. The meeting reversed the chair on a ruling that a motion to hold the meeting open for six weeks was in order. This motion was therefore declared out of order.

After considerable discussion in which many members participated, a move to close debate carried by a vote of 114 to 22.

The motion to defer was carried by a vote of 103 to 28.

The Secretary then moved the unanimous recommendation of the Council that the meeting direct the Council that (1) for the next three years, it shall conduct all negotiations in the spirit and letter of the Kingston resolution¹, and (2) at the end of this period, it shall summarize and¹ discuss the experience with this policy,

¹The text of the Kingston resolution is given in the Report of the President, page 193.

and shall report to the membership its conclusions and recommendations for appropriate action, if any.

A motion to amend by reducing the period specified to "until a vote is taken by the membership on these amendments" was defeated by a vote of 58 for to 67 against.

The motion introduced on behalf of the Council was carried by a large majority.

The meeting adjourned at 8:45 P.M.

K. J. ARNOLD
Secretary

REPORT OF THE PRESIDENT OF THE INSTITUTE FOR 1953

The work of the Institute has continued with emphasis on the *Annals* and on meetings as the areas of principal service to members and to mathematical statistics. These are the primary functions through which research and applications are supported and stimulated. Increased interest in mathematical statistics is reflected in the growing membership and in the number and quality of the papers. Advances in theory and in applications are continuing apace, the role of mathematical statistics is being extended into new fields, and is achieving wider recognition.

The Secretary-Treasurer's report again reflects a sound financial condition for the Institute. This has resulted primarily from steps taken in earlier years. The improved financial outlook has made it possible to focus attention now on new activities that could not be considered during the period of stress that we experienced only a few years ago. One result is an amendment to the Bylaws adopted at the Kingston meeting, providing for a further reduction of dues for students and for members residing outside the continental United States and Canada. This further dues reduction for these groups was made in order to promote membership and the availability of the *Annals* in areas where costs, especially in terms of dollars, represent a serious problem. Also steps have been initiated for publishing a more adequate membership directory.

Another action arising out of our improved financial condition is the appointment of a Finance Committee to advise on the extent to which it is desirable to accumulate a surplus, the investment of funds, and other financial matters. In addition, a Committee on Activities and Development was recently appointed to make recommendations to the Council on any proposed extensions or modifications of the activities of the Institute. This Committee, with A. H. Bowker as Chairman, will welcome suggestions from the membership.

At the Kingston meeting the Council passed the following Resolution in order to facilitate full participation of all members at meetings.

* "It is the policy of the Institute of Mathematical Statistics that all its meetings shall be held on a completely nonsegregated basis. In particular, prior to determining the place of

a forthcoming meeting, the Secretary of the IMS shall ascertain that meeting halls, eating facilities and housing accommodations adequate for the expected attendance will be available on a nonsegregated basis, and that all social events connected with the meetings shall be nonsegregated."

There has been considerable discussion as to whether such a policy is appropriately incorporated in the Bylaws or should remain as a policy statement of the Council. Also, there has been considerable discussion of the circumstances that constitute compliance with the policy. A committee consisting of William G. Cochran, Chairman, Henry Scheffé, and S. S. Wilks, has made a study and submitted a report to the Council. On the basis of this report and additional discussion the Council unanimously reaffirmed the policy adopted at Kingston and recommended that the membership adopt a resolution supporting the Council position. In addition, it recommended that action on incorporating such a policy statement in the Bylaws be deferred to the September 1954 meeting so that members will have adequate opportunity to vote by mail or in person after receiving the benefit of study and advice by the Council. These Council recommendations were favorably acted upon at the membership meeting. The consequence is that the Council policy as adopted at Kingston is reaffirmed, while the desirability of incorporating such a policy statement in the Bylaws will receive additional consideration.

The two persons who carry the heaviest load of Institute work are the Secretary-Treasurer, K. J. Arnold, and the Editor, Erich Lehmann. In addition, a heavy load of work is carried by the Editorial Committee, the Executive Committee, and a number of others. I should like to mention particularly Leo Goodman who served as Program Coordinator and also as Chairman of the Program Committee responsible for organizing the December meeting at Washington, D. C.; D. B. DeLury who was the Program Committee Chairman for the September meeting in Canada, at Kingston, Ontario; Ralph A. Bradley, who served as Chairman of the Eastern Regional Program Committee that organized the May meeting in Washington, D. C.; and A. H. Bowker who served as Chairman of the Western Regional Program Committee, which was responsible for organizing the West Coast meeting at Stanford in June. Associate Secretary Lionel Weiss and Assistant Secretaries Glenn Burrows, G. L. Edgett, Harold Nisselson, and Rosedith Sitgreaves, carried the heavy load on physical arrangements for the meetings, as well as participating in the regular work of the Program Committees.

The Membership Committee, with W. D. Baten as chairman, has initiated a program of canvassing and inviting graduate students of statistics to become members. An excellent response has been received. This seems to be especially worthwhile because new members who are likely to have a lasting interest in the Institute are recruited.

The activities of the Committee on Academic Institutional Memberships, with T. A. Bancroft as chairman, resulted in two new Institutional members.

The extent of participation of many members in activities supporting the work of the Institute is indicated by the committees that have served during the year.

A list of the names and membership of the committees is appended, and I wish to express the indebtedness of the Institute to the Chairmen and members for the work they have done.

‡ The Rietz memorial lecture was authorized for this year and Harald Cramér accepted the invitation from the Institute to deliver the lecture. It was presented at the joint meetings with the American Statistical Association and other societies in Washington, D. C. in December.

The following members of the Institute were recommended by the Committee on Fellows and have been elected as Fellows by the Council:

R. G. D. Allen	J. C. Kiefer
Herman Chernoff	J. Marschak
Leo A. Goodman	D. van Dantzig
Max Woodbury	

The following persons have agreed to serve on the Nominating Committee for next year:

Max Woodbury, *Chairman*
Walter Bartky
Ralph A. Bradley
Edward Paulson
George M. Kuznets

Committees of the Institute, 1953

1. The Council and Committees of the Council

(a) *Members of the Council*

Term expires 1953	Term expires 1954
Harald Cramér	A. H. Bowker
A. M. Mood	T. C. Koopmans
Jerzy Neyman	H. E. Robbins
S. S. Wilks	H. G. Romig

Term expires 1955

W. G. Cochran
Churchill Eisenhart
Henry Scheffé
J. W. Tukey

(b) *Executive Committee*

M. H. Hansen,	E. L. Lehmann,
<i>President</i>	<i>Editor</i>
E. G. Olds,	K. J. Arnold,
<i>President-Elect</i>	<i>Sec-Treas.</i>

(c) *Committee on Fellows*

Term expires 1953	Term expires 1954
Churchill Eisenhart,	Gerhard Tintner
<i>Chairman</i>	S. S. Wilks
Jerzy Neyman	

Term expires 1955

W. G. Madow
Edward Paulson

(d) *Associate Secretaries*

W. H. Kruskall Lionel Weiss

(e) *Associate Treasurer*

E. S. Pearson

2. Editorial Committee

(a) *Associate Editors*

David Blackwell	W. G. Madow
J. L. Hodges, Jr.	A. M. Mood
Wassily Hoeffding	J. Wolfowitz

(b) *Cooperating Members*

Z. W. Birnbaum	G. E. Noether
R. C. Bose	Edward Paulson
Kai Lai Chung	M. Peisakoff
J. F. Daly	H. E. Robbins
J. L. Doob	S. N. Roy
T. E. Harris	L. J. Savage
Paul G. Hoel	Herbert Solomon
J. Kiefer	Charles M. Stein
William H. Kruskal	Lionel Weiss
Howard Levene	Max A. Woodbury
H. B. Mann	

3. Committees Related to Program(a) *Annual Meeting—Washington*

L. A. Goodman, <i>Chairman</i>	Joseph Berkson David Blackwell
Harold Nisselson, <i>Asst. Sec.</i>	A. M. Mood Howard Levene
Elizabeth L. Scott	R. L. Anderson

(b) *Summer Meeting—Kingston*

D. B. DeLury, <i>Chairman</i>	D. J. Thompson B. J. Tepping
G. L. Edgett, <i>Asst. Sec.</i>	G. J. Lieberman C. F. Kossack
Benjamin Epstein	D. A. S. Fraser

(c) *Eastern Region*

R. A. Bradley, <i>Chairman</i>	I. D. J. Bross W. N. Hurwitz
Lionel Weiss, <i>Assoc. Sec.</i>	H. E. Robbins D. F. Votaw
Glenn Burrows, <i>Asst. Sec.</i>	M. A. Woodbury

(d) *Central Region*

P. R. Rider, <i>Chairman</i>	D. A. Darling Oscar Kempthorne
W. H. Kruskal, <i>Assoc. Sec.</i>	Irving W. Burr D. Ransom Whitney Leo Katz

(e) *Western Region*

A. H. Bowker, <i>Chairman</i>	J. L. Hodges, Jr. P. G. Hoel
W. J. Dixon	A. M. Mood
Z. W. Birnbaum	

(f) *Program Coordinator*

L. A. Goodman

(The Program Coordinator is an ex-officio member of all program committees)

(g) *Special Invited Papers*

David Blackwell, <i>Chairman</i>	R. A. Bradley P. R. Rider
T. W. Anderson	A. H. Bowker
L. A. Goodman	E. L. Lehmann
D. B. DeLury	

* (h) *West Coast Committee for Joint Meeting with AAAS in San Francisco in 1964*

Includes West Coast Program Committee plus Elizabeth L. Scott, who has responsibility of organizing joint IMS and AAAS sessions.

4. Promotional Committees(a) *Membership*

W. D. Baten, <i>Chairman</i>	D. B. DeLury T. N. E. Greville
C. R. Blyth	D. E. South

(b) *Institutional Members*

Academic	Nonacademic
T. A. Bancroft, <i>Chairman</i>	H. G. Romig, <i>Chairman</i>
A. H. Bowker	C. C. Hurd
L. A. Knowler	F. E. Grubbs
A. E. Treloar	Mary N. Torrey

5. Other Committees(a) *Nominating Committee*

Appointed by 1952 President

M. A. Girshick

J. L. Hodges, Jr., <i>Chairman</i>	Solomon Kullback J. F. Daly
L. J. Savage	Herbert Solomon
Howard Levene	

(b) *Rietz Lecture Committee*

J. Neyman, <i>Chairman</i>	C. C. Craig Will Feller
-------------------------------	----------------------------

* (c) *Professional Standards of Statisticians in Government Service*

W. E. Deming, <i>Chairman</i>	E. E. Houseman G. M. Kuznets
H. F. Dorn	B. F. Kimball
M. A. Bershad	W. R. Pabst
Samuel Weiss	Churchill Eisenhart

* (d) *Editorial Committee for the Publication of Wald's Selected Papers*

T. W. Anderson, <i>Chairman</i>	E. L. Lehmann J. L. Hodges, Jr.
Harald Cramér	A. M. Mood
H. A. Freeman	C. M. Stein

* (e) *Committee to Consider Proposal for Summer Statistical Institute*

J. Neyman, <i>Chairman</i>	H. A. Meyer Herbert Solomon
G. M. Cox	R. M. Thrall
W. G. Madow	

** (f) *Committee to Explore the Desirability of Reducing Dues for Students and for Members outside Continental United States*

H. W. Norton, <i>Chairman</i>	K. J. Arnold J. Neyman
C. H. Fischer	Milton Sobel

*Ad hoc committee

** Committee has completed its assignment and been discharged.

- * (g) *Committee to Prepare Manual for Guidance of President*
 K. J. Arnold, E. G. Olds
 Chairman M. H. Hansen
 P. S. Dwyer
- (h) *Advisory Committee on Statistical Computations*
 Z. W. Birnbaum, Churchill Eisenhart
 Chairman C. C. Craig
 A. H. Bowker
- ** (i) *Committee on Life Membership Rates*
 C. H. Fischer
- ** (j) *Committee on Delegates to International Congress of Mathematicians 1954*
 Mina Rees, J. Neyman
 Chairman J. Wolfowitz
 Gertrude Cox Harald Cramér
- (k) *Finance Committee*
 Mortimer Spiegelman, Carl Fischer
 Chairman K. J. Arnold
- * (l) *Committee to Consider two Amendments to the Bylaws*
 W. G. Cochran, Henry Scheffé
 Chairman S. S. Wilks
- * (m) *Committee on Activities and Development*
 A. H. Bowker, W. E. Deming
 Chairman H. O. Hartley
 R. C. Bose Erich Lehmann
 George W. Brown Eli S. Marks
 J. H. Curtiss John Riordan
- ** (n) *Committee on Bureau of Standards Issue 1953*
 John Tukey, H. Robbins
 Chairman W. A. Shewhart
 F. C. Mosteller S. S. Wilks
- (o) *Committee on Exchanges*
 Paul S. Dwyer, K. J. Arnold
 Chairman E. L. Lehmann
- * (p) *Committee on Scheduling Winter Meetings*
 C. C. Craig, R. Murphy
 Chairman C. Kossack
 R. L. Anderson J. L. Hodges, Jr.
- * (q) *Committee on Committee Procedures*
 H. Robbins, K. J. Arnold
 Chairman Z. W. Birnbaum
 J. F. Curtiss H. W. Norton

Representatives of the Institute for 1953

To the American Association for the Advancement of Science

Harold Hotelling (Term expires 1954)

To the National Research Council, Division of Mathematics

S. S. Wilks (Term expires June 1954)

To the Mathematical Policy Committee

Mina Rees (Term expires 1953)

To the Joint Committee for Development of Statistical Applications in Engineering and Manufacturing

A. H. Bowker (Term expires 1954)

On the Committee on Mathematical Training of Social Scientists

W. G. Madow and T. W. Anderson

To advise National Science Foundation regarding Classification List of Specialties in Mathematics

B. J. Tepping (Term expires on completion of specific assignment)

To the American Academy of Political and Social Sciences

Max A. Woodbury and John Mauchly

December 29, 1953

MORRIS H. HANSEN

President

**REPORT OF THE SECRETARY-TREASURER OF
THE INSTITUTE FOR 1953**

At the end of 1953 the Institute had 1399 individual members and 9 institutional members. The Laboratory of Statistical Research, University of Washington was welcomed as a new institutional member during the year. The Statistical Laboratory of the State College of Iowa and Michigan State College, Department of Mathematics will be welcomed to institutional membership on January 1, 1954. The year 1952 ended with 1280 individual members. During 1953, 157 new members were accepted, 28 former members were reinstated, 33 members resigned, 31 were dropped for non-payment of dues and 2 died.

Meetings 55, 56, 57 (15th Summer) and 58 (16th Annual) were held during 1953. Reports of the first three have appeared in the *Annals*. The report of the Annual Meeting will appear in the March, 1954 issue of the *Annals*. On behalf of the Institute, the Secretary wishes to express appreciation to all who were instrumental in making each of these meetings eminently successful. The Program Committee for each meeting is listed in the report of the President. The duties of an Associate Secretary for the meeting in Washington, D. C., on April 29-30 were performed by R. A. Bradley, Program Chairman and for the meeting in Stanford, California, on June 19-20, by Rosedith Sitgreaves, Assistant Secretary.

INSTITUTE OF MATHEMATICAL STATISTICS

Statement of Condition

December 31, 1953

ASSETS

Bank	\$10,845.17	
Dues Receivable	61.79	
Accounts Receivable, Back Issues	974.00	
U. S. Government Bonds	11,888.00	
Certificates of Deposit	20,000.00	
Inventory of Back Issues	18,588.37	
Total assets		\$62,357.33

LIABILITIES AND RESERVES

Amount Due Printer for December <i>Annals</i> (Estimate)	\$3,228.59	
Withholding Tax Payable	160.80	
Miscellaneous Liabilities	148.08	
Reserve for Dues Advanced	3,536.35	
Reserve for Subscriptions Advanced	4,062.90	
Reserve for Life Memberships	2,872.50	
Reserve for <i>Biometrika</i> Subscriptions	292.50	
Reserve for Maintaining Supply of Back Issues	20,429.52	
Total Liabilities and Reserves		34,731.24
Surplus (Excess of Assets over Liabilities and Reserves)		27,626.09

Revenue and Expense Statement
January 1, 1953 to December 31, 1953

Revenues

Dues Revenue	\$13,647.00	
Subscriptions Revenue	9,242.65	
Revenue from Sale of Back Issues	\$6,598.98	
Cost of Back Issues Sold	2,095.72	
Net Revenue from Sale of Back Issues	4,503.26	
Interest in Investments	325.00	
Miscellaneous Revenue	131.36	\$27,849.27

Expenses

Current <i>Annals</i>	\$11,449.68	
Current <i>Annals</i> to inventory	1,111.77	
Net cost of current <i>Annals</i>	\$10,337.91	
Miscellaneous Printing, Stationery, Postage	1,921.99	
Salary	3,180.00	
Miscellaneous Office Expense	478.63	
Contributions to American Mathematical Society	133.72	
Editorial Expenses	286.26	
Meeting Expenses	65.71	
President's Expenses Account	27.86	
Travel Expense	12.06	16,444.14
Excess of Revenue over Expense		11,405.13
Transfer from Surplus to Reserve for Maintaining Supply of Back Issues		1,221.00
Increase in Surplus		10,184.13
Surplus, December 31, 1952		17,441.96
Surplus, December 31, 1953		\$27,626.09

The financial statements this year introduce some changes in accounting procedure intended to more accurately reflect the policy of the Institute to keep back issues of the *Annals* continuously in stock. These changes are discussed below.

The surplus account has again increased although the amount of increase is not quite as great as in 1952. The increase in the size of the *Annals* and the consequent increase in cost has been partially offset by an increase in receipts from dues and subscriptions. The Editor has warned that Volume 25 (1954) can be expected to be larger still. The expense of publishing a directory in 1953 has also contributed to cutting down the rate of increase of surplus. A directory containing more information about each member is scheduled for 1954. Lower rates for dues for students and for members outside the United States and Canada become effective in 1954. The income from investments (other than our investment in back issues) has increased and can be expected to increase even more in 1954.

The new asset account, Inventory of Back Issues, is the result of Council action

in December, 1952. The Statement of Condition has regularly carried a footnote in which an estimate of the value of inventory has been given. The Council directed that an estimate of the value of inventory appear in the Statement of Condition. Other changes in the form of the financial statements are correlative. The encumbrance of a large fraction of our net worth by the policy of maintaining a supply of back issues has been recognized by setting up a reserve account. The Revenue and Expense Statement now recognizes depletion of inventory as a current expense which, along with storage costs, service charges, postage, and binding expenses, have been subtracted from gross income from sale of back issues to obtain net income for the revenue item.

A Finance Committee with Mortimer Spiegelman as chairman was appointed late in 1953 and has, in addition to giving advice to the Council on policy with regard to investments, been of great assistance to the Treasurer in the day-to-day problems of carrying out the policy determined by the Council. The results of the actions of the Finance Committee will undoubtedly show clearly in the financial statements at the end of 1954.

K. J. ARNOLD
Secretary-Treasurer

December 29, 1953

REPORT OF THE EDITOR OF THE ANNALS FOR 1953

During 1953 the rate of submission of new manuscripts continued to increase. The publication of 44 papers and 17 notes, together with the usual reports, abstracts, and news and notices brought the 1953 volume to the new high of 708 pages. In addition, during the year a backlog has built up, equivalent to about 100 printed pages. A corresponding expansion of the *Annals* seems highly desirable.

Another Special Invited Paper, "Distribution-free tests of fit," by Z. W. Birnbaum, was published this year, the third one to appear so far. The Committee on Special Invited Papers has now functioned for five years. As a cumulative result of its activities during this time an increase in the number of these valuable expository papers may be expected starting with the coming year.

The Editor wishes to thank the previous editor, Professor T. W. Anderson, for his assistance in many editorial problems during this first year of operation of a new board. In particular, an informal manual on current editorial procedure, prepared by Professor Anderson, was of invaluable help.

On behalf of the Editorial board, the Editor takes the opportunity to acknowledge the generous refereeing assistance of the following: G. E. Albert, R. L. Anderson, Kenneth Arrow, Julius Blum, C. R. Blyth, A. H. Bowker, K. A. Bush, Herman Chernoff, W. H. Clatworthy, A. C. Cohen, Jr., W. S. Connor, C. C. Craig, George Dantzig, D. A. Darling, W. J. Dixon, Monroe Donsker, Meyer Dwass, P. R. Dwyer, D. A. S. Fraser, M. A. Girshick, Leo Goodman, Ulf Grenander, John Gurland, Alan Hoffman, Harold Hotelling, S. L. Isaacson, T. A.

Jeeves, N. L. Johnson, Solomon Kullback, L. M. LeCam, Michel Loève, Eugene Lukacs, F. J. Massey, Jr., M. R. Mickey, Lincoln Moses, Frederick Mosteller, C. R. Ohman, Roy Radner, Murray Rosenblatt, H. L. Royden, Henry Scheffé, Elizabeth Scott, Seymour Sherman, S. S. Shrikhande, Rosedith Sitgreaves, J. L. Snell, Milton Sobel, George Steck, W. F. Taylor, J. W. Tukey, J. E. Walsh, Wolfgang Wasow, L. H. Wegner and S. S. Wilks.

The Editor is greatly indebted to Mrs. K. Wehner who prepared the manuscripts for the printer, provided other editorial assistance, and carried out most of the secretarial work.

E. L. LEHMANN

Editor

December 29, 1953

PUBLICATIONS RECEIVED

Anuario Estadístico de España, Instituto Nacional de Estadística, 1953, 870 pp.

BIAZZI, ALBERTA, *Le Teorie Economiche dei Costi Comuni*, and FELICE VINCI, *Sui Fondamenti dell' Economica*, Vol. 18, Università degli studi di Milano, Istituto di Scienze Economiche e Statistiche, Milan, 1953, 45 pp., 500 lire.

KELLS, LYMAN M., *Elementary Differential Equations*, 4th ed., McGraw-Hill Book Co., New York, 1954, x + 266 pp., \$4.00.

PAIGE, L. J. AND OLGA TAUSKY, editors, *Simultaneous Linear Equations and the Determination of Eigenvalues*, National Bureau of Standards, Applied Mathematics Series 29, U. S. Government Printing Office, Washington, D. C., 1953, iv + 126 pp., \$1.50.

VINCI, FELICE, *Statistica ed Economica nella nostra Enciclopedia Matematica*, Vol. 17, Università degli studi di Milano Istituto di Scienze Economiche e Statistiche, Milan, 1953, 25 pp. 400 lire.