NEWS AND NOTICES

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

Personal Items

Dr. Om Aggarwal, for the last five years Statistician, FAO of the United Nations in Chile and Peru and a former Associate Professor at Purdue University, will join the staff of the Statistical Laboratory and the Department of Statistics at Iowa State University, Ames, on September 1, 1963. Dr. Aggarwal will become Associate Professor of Statistics and will teach and do research in the field of theory and methodology of survey sampling.

Dr. Mir M. Ali, at present an Assistant Professor of Mathematics at the University of Western Ontario, has been appointed Associate Professor at this institution.

Richard E. Barlow, formerly of the General Telephone Laboratories and San Jose State College, has accepted the position of Assistant Professor in the Department of Industrial Engineering, University of California, Berkeley.

Dr. Eberhaurd Baur, previously with Land-Air, Inc., has joined Aerojet-General and will continue his work in product reliability.

Benjamin Buchbinder received his M.S. from the University of Pennsylvania and transferred to the General Electric Company's Apollo Support Department in Daytona Beach, Florida.

Assistant Professor Foster B. Cady has been promoted to Associate Professor in the Department of Statistics, the Statistical Laboratory and the Agricultural Experiment Station at Iowa State University.

Associate Professor C. Philip Cox has been promoted to Professor in the Department of Statistics and the Statistical Laboratory at Iowa State University, Ames.

Professor S. Lee Crump, University of Rochester School of Medicine and Dentistry, passed away.

Herbert T. David has been promoted to a full Professorship in the Department of Statistics and the Statistical Laboratory, Iowa State University, Ames, Iowa.

Dr. Carol Bates Edwards, who has been Assistant Professor of Statistics at the University of Kentucky, joined the staff at the Department of Statistics of the University of Iowa, Ames, as Assistant Professor.

W. N. Jessop, formerly with Courtlands, Limited, Coventry, has accepted an appointment as Director of the Institute for Operational Research, London.

Dr. Bradford F. Kimball of Bell Telephone Laboratories, died recently.

H. S. Konijn, formerly of the Department of Statistics, University of Minnesota, Yale University and the University of Sydney, is joining the staff at City College of New York.

Emil-Roy Muller of the University of Natal, South Africa, was killed in an automobile accident in May.

Dr. K. C. S. Pillai has joined the Department of Statistics, Purdue University, as Professor of Mathematics.

Dr. Joseph Sedransk has accepted the position of Assistant Professor in the Department of Statistics and the Statistical Laboratory at Iowa State University, Ames, Iowa.

Donald R. Williams has completed his Ph.D. and has joined Aerojet-General in Sacramento, California, as a Senior Computing Specialist.

New Members

The following persons have been elected to membership in the Institute

Bartlett, Wade S., B.S., (Marietta College, Ohio); Member, Technical Staff, Bell Telephone Laboratories, Whippany, New Jersey.

Basu, Asit Prakas, B.Sc., (Calcutta University, India); Graduate Assistant, Statistical Center, Rutgers—The State University.

Brown, Junius Flagg, Jr., B.M.E., (Cornell University); Senior Engineer, Philco Corporation, W.D.L., 3825 Fabian Way, Palo Alto, California; *1850 Ednamary Way, Apt. A, Mountain View, California.*

Capobianco, Michael F., M.A., (Columbia University); Principal Mathematician, Republic Aviation Corporation, Farmingdale, New York; *208 30th Street, Brooklyn 32, New York.*

Chang, Miss Shin-hsia, B.A., (Chung Hsin University, Taiwan); Graduate Student, The George Washington University; *2127 P Street, N.W., Apt. 201, Washington 7, D.C.*

Chapman, Roger C., M.S., (Duke University); Graduate Student, University of California, Berkeley; *1760 Walnut Street, Berkeley 9, California.*

Copeland, William C., B.A., (Muskingum College, Ohio); Graduate Student, University of Minnesota; *1812 South Bryant Avenue, Minneapolis 5, Minnesota.*

Dempster, Michael A. H., M.Sc., (Carnegie Institute of Technology); Graduate Student, Carnegie Institute of Technology; *5633 Northumberland Avenue, Pittsburgh 17, Pennsylvania.*

Dougall, Miss Marsha Jean, B.S., (University of Redlands); Graduate Student, University of California at Los Angeles; *338 South Ardmore Avenue, Los Angeles 5, California.*

Fisher, Armen G., M.S., (University of Wisconsin); Teaching Assistant, Statistical Center, Rutgers—The State University; *70 Chester Circle, New Brunswick, New Jersey.*

Gilliland, Phil D., B.S., (Kansas State University); Graduate Assistant, Department of Statistics, Kansas State University.

Hillman, Richard L., B.S., (Yale University); *3 East 82nd Street, New York 28, New York.*

Hughes, Edwin J., Ph.D., (Iowa State University); Assistant Professor of Statistics, Oregon State University, Corvallis.

Hynes, Robert F., B.S., (Boston University); Mathematician, Raytheon Company, Boston Post Road, Wayland, Massachusetts; *89 Howard Street, Norwood, Massachusetts.*

Jaeger, Richard M., B.A., (Pepperdine College, California); Reliability Engineer, Philco Corporation, W.D.L., 3825 Fabian Way, Palo Alto, California.

Juola, Robert C., B.S., (University of Oregon); Graduate Assistant, Michigan State University; *923-A Cherry Lane, M.S.U., East Lansing, Michigan.*

Kurty, Michael W., M.S., (Stanford University); Senior Research Engineer, Lockheed Missiles and Space Corporation, Sunnyvale, California; *787 Pinewood Drive, San Jose, California.*

Lachenbruch, Peter A., M.S., (Lehigh University, Pennsylvania); Graduate Student,

University of California at Los Angeles; *1110 Fifth Street, Apt. G, Santa Monica, California.*

Lee, Sung Won, M.S., (North Carolina State College); Research Instructor, North Carolina State College; *Box 5773, State College Station, Raleigh, North Carolina.*

Levy, Paul S., M.A., (Columbia University); Graduate Student, Department of Biostatistics, Johns Hopkins University.

Lewis, William E., B.E.S., (Johns Hopkins University); Graduate. Student, Northwestern University; *521 Lee Street, Evanston, Illinois.*

McLean, Leslie D., M.S. (University of Arizona); Research Assistant, Department of Educational Psychology, University of Wisconsin; *502 State Street, Madison, Wisconsin.*

Mellits, E. David, B.E.S., (Johns Hopkins University); Graduate Student, Department of Biostatistics, Johns Hopkins University.

Mitchell, William L., B.M.E., (Cornell University); Graduate Student, Operations Research, Harvard University; *70 Perkins Hall, Harvard University, Cambridge 38, Massachusetts.*

Parent, Lt. (sc) Elias A., M.S., (U.S. Naval Postgraduate School, California); Graduate Student, Stanford University; *2751 Xavier Street, Palo Alto, California.*

Patrick, Charles A., B.Sc., (Karachi University, East Pakistan); Graduate Student, Department of Mathematics, University of Alberta, Canada.

Pettigrew, Hugh M., B.S., (George Washington University); Teaching Fellow in Statistics, George Washington University.

Pierskalla, William P., M.B.A., (Harvard University); Graduate Student, Stanford University; *3560 Rolison Road, Apt. 2, Redwood City, California.*

Rapperport, Michael A., M.E.E., (Yale University); Member Technical Staff, Bell Telephone Laboratories, Inc., Holmdel, New Jersey/Graduate Student, Department of Mathematics, New York University.

Royall, Richard M., B.S., Graduate Student, Stanford University; *238 Ramona Street, Palo Alto, California.*

Rudolph, Gerhard J., M.Sc., (University of Pretoria, South Africa); Research Officer, Mathematical Institute of C.S.I.R., Post Office Box 395, Pretoria, South Africa.

Schaerf, Mrs. Mirella C., Ph.D., (University of Rome, Italy); Graduate Student, Department of Statistics, Stanford University.

Sclove, Stanley L., A.B., (Dartmouth College); Graduate Student/Teaching Assistant, Department of Mathematical Statistics, Columbia University; *31 Jane Street, Apt. 6B, New York 14, New York.*

Shinozuka, Masanobu, Ph.D., (Columbia University); Assistant Professor of Civil Engineering, Columbia University.

Slaton, Capt. Frank T., B.S., (University of Kentucky); Graduate Student, Stanford University; *816 Greenland Drive, Fayetteville, North Carolina.*

Switzer, Paul, M.A., (Harvard University); Graduate Student, Department of Statistics, Harvard University; *28 Irving Street, Apt. 34, Cambridge 38, Massachusetts.*

Totman, Eric David, Ph.D., (University College London, England); Head, Operational Research, Courtlands Limited, Matlock Road, Coventry, Warwicks, England.

Trenholme, Peter C., B.S., (University of Oregon); Assistant, Department of Mathematical Statistics, Columbia University.

Wani, Jagannath, M.Sc., (University of Poona, India); Graduate Student, Department of Mathematics, McGill University, Canada.

DOCTORAL DISSERTATIONS IN STATISTICS AND PROBABILITY, U.S.A., 1921–1951

By H. P. Kuang

North Dakota State University

The Annals of Mathematical Statistics has, since 1951, published annual lists[1] of doctoral dissertations in, or related to, mathematical statistics and probability. The present list attempts to list all such theses in the preceding period, 1921 to 1951, for universities in the United States of America.

Most of the listed dissertations were obtained from university publications that abstract their own Ph.D. theses. Some titles were obtained from the National Research Council's *Reprint and Circular Series*, and others from *Doctoral Dissertations Accepted by American Universities*, a periodical that was published in the period 1934–1955. Other titles were obtained from the *Bulletin of the American Mathematical Society*.

Preliminary versions of the present list have been sent to early members of the Institute, and to individuals in many academic departments. The resulting corrections and additions have been incorporated into the list. Further to ensure accuracy, many names of authors, years of graduation, etc., have been compared with entries in *American Men of Science*, *The 1961 Directory of Statisticians*, and other biographical works. Despite these efforts, it is likely that errors and omissions remain in the list; further corrections and additions will be gratefully received.

Allen, Raymond W. "Compound statistical distribution functions." St. Louis University, 1950.

Ambrose, Warren. "Some properties of measurable stochastic processes." University of Illinois, 1939.

Anderson, Paul H. "Distributions in stratified sampling." University of Illinois, 1940.

Anderson, Richard L. "Serial correlation in the analysis of time series." Iowa State University, 1941.

Anderson, Theodore Wilbur, Jr. "The non-central Wishart distribution and its application to problems in multivariate statistics." Princeton University, 1945.

Andrews, John Jacob. "Admissibility theory applied to time series with variable probability." Saint Louis University, 1950.

Arnold, Kenneth James. "On spherical probability distributions." Massachusetts Institute of Technology, 1941.

Aroian, Leo Avedis. "A study of R. A. Fisher's z-distribution and the related F distribution." University of Michigan, 1940.

Baker, George Allen. "Random sampling from non-homogeneous populations." University of Illinois, 1929.

Ball, Saint Augustine, Sr. "Power functions and distribution functions related to Student's test." Catholic University of America, 1942.

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[1] The first listing was in **22** (1951), p. 147 and pp. 320–21. Subsequent listings, through **31** (1961), are given on p. 649 of *Indexes to Volumes 1–31, 1930–1960*, to the *Annals*. Dissertations already listed in the Annals have not been repeated on the present list.

Bancroft, Theodore Alfonso. "Tests of significance considered as an aid in statistical methodology." Iowa State University, 1943.

Baten, W. D. "Theorems concerning probability." University of Michigan, 1929.

Beeler, Fred A. "A study of the variation in the moments of a frequency distribution due to grouping." University of Michigan, 1950.

Bernard, R. R. "Probability in dynamical transformation groups." University of Virginia, 1949.

Berrettoni, Julia Narcisco. "Theoretical and statistical cost curves." University of Minnesota, 1944.

Bickerstaff, Thomas A. "Certain order probabilities in non-parametric sampling." University of Michigan, 1948.

Blackwell, David H. "Some properties of Markoff chains." University of Illinois, 1941.

Blanche, Ernest E. "A systematic analysis of frequency distributions by the Edgeworth method." University of Illinois, 1941.

Borowski, Anthony J. "Seasonal influences in vital statistics." University of Michigan, 1935.

Bowker, Albert. "Asymptotic expansions for the distribution of certain likelihood ratio statistics." Columbia University, 1949.

Bradley, Ralph A. "Sampling distributions for non-normal universes." University of North Carolina, 1949.

Bronfenbrenner, Jean A. "Asymptotic bias in least squares estimates of the parameters of a single linear stochastic equation in a complete system." University of Chicago, 1951.

Brookner, Ralph J. "Choice of one among several statistical hypotheses." Columbia University, 1943.

Bross, Irwin D. J. "Maximum utility statistics." North Carolina State College, 1949.

Brown, George M. "On sampling from compound populations." University of Michigan, 1933.

Brown, George William. "The reduction of a certain class of composite statistical hypotheses." Princeton University, 1940.

Burr, Irving Wingate. "Cumulative frequency functions." University of Michigan, 1941.

Butter, Franklin A., Jr. "A contribution to the theory of the arithmetic-geometric mean." Stanford University, 1935.

Campbell, Frances Louise. "A study of truncated bivariate normal distributions." University of Michigan, 1945.

Carpenter, Osmer S. "Sequential tests of the linear hypothesis." Iowa State University, 1948.

Chand, Uttam. "On certain composite hypotheses concerning regression coefficients and means." University of North Carolina, 1949.

Chapman, Douglas G. "I. Applications of the hypergeometric distribution to sample census problems. II. A class of lower bounds for the variance of an estimate." University of California, Berkeley, 1949.

Chen, Way M. "Power function of the analysis of variance and covariance of a normal bivariate population." University of California, Berkeley, 1945.

Cheng, Tseng T. "On the sum of independent random variables." Cornell University, 1949.

Chernoff, Herman. "Studentization in testing of hypotheses." Brown University, 1948.

Christiano, John G. "A Markoff study of polymer chains on a cubic lattice." University of Pittsburgh, 1950.

Chung, Kai-Lai. "On the maximum partial sums of sequences of independent random variables." Princeton University, 1947.

Chung, T. T. "On the sums of independent random variables." Cornell University, 1949.

Cohen, Alonzo Clifford, Jr. "Estimation of parameters in truncated Pearson frequency distributions." University of Michigan, 1941.

Craig, Allen Thornton. "On the distribution of certain statistics obtained from small random samples." University of Iowa, 1931.

Craig, Cecil Calvert. "An application of Thiele's semi-invariants to the sampling problem." University of Michigan, 1927.

Crump, Samuel L. "The estimation of components of variance in multiple classifications." Iowa State University, 1947.

Dale, Julia. "Some properties of the exponential mean." Cornell University, 1924.

Daly, Joseph Francis. "On the unbiased character of likelihood-ratio tests for independence in normal systems." Princeton University, 1939.

Dantzig, George B. "I. Complete form of the Neyman-Pearson fundamental lemma. II. On the non-existence of tests of 'Student's' hypothesis having power functions independent of sigma." University of California, Berkeley, 1946.

Darling, Donald A. "Continuous stochastic processes." California Institute of Technology, 1947.

Dixon, Wilfrid Joseph. "Further contributions to the theory of serial correlation." Princeton University, 1944.

Dresch, F. W. "Applications of index numbers to the study of general economic equilibria." University of California, Berkeley, 1937.

Dressel, Paul Leroy. "A study of statistical semi-invariants and their estimates with particular emphasis on their relation to algebraic semi-invariants." University of Michigan, 1939.

Duncan, David B. "Significance tests for differences between ranked variates drawn from normal populations." Iowa State University, 1947.

Dwyer, Paul S. "Combined expansions of products of symmetric power sums and of sums of symmetric power products with application to sampling." University of Michigan, 1936.

Edgett, George Lewis. "Frequency distributions with given statistics which are not all moments." University of Illinois, 1931.

Eggers, H. C. T. "The graduation of experimental data." University of Michigan, 1931.

Elyash, Ernest S. "Several limiting laws of the Kolmogorov-Smirnov type." Cornell University, 1950.

Epstein, Benjamin. "On a certain class of transforms." University of Illinois, 1941.

Eudey, Mark W. "I. On the treatment of discontinuous random variables. II. Statistical model for comparing two methods of diagnosis." University of California, Berkeley, 1949.

Federer, Walter T. "Evaluation of variance components from a group of experiments with multiple classifications." Iowa State University, 1948.

Feldman, Hyman Morris. "Product moments of samples drawn from a set of infinite populations." Washington University, St. Louis, Missouri, 1933.

Fischer, Carl Hann. "On correlation surfaces of sums with a certain number of random elements in common." University of Iowa, 1931.

Fix, Evelyn. "Distributions which lead to linear regressions." University of California, Berkeley, 1948.

Forsythe, George E. "Summability of random variables." Brown University, 1941.

Fraser, Donald A. S. "Generalized hit probabilities with a Gaussian target." Princeton University, 1949.

Fryer, Holly Claire. "An analysis of group differences arising from a Poisson distribution of observations obtained from irradiation experiments." Iowa State University, 1940.

Gale, David. "Solution of finite two-person games." Princeton University, 1949.

Girshick, Meyer A. "Contributions to the theory of sequential analysis." Columbia University, 1946.

Goldberg, Samuel. "On a singular diffusion equation." Cornell University, 1950.

Greenberg, B. G. "Statistical techniques in the evaluation of factors affecting the incidence of syphilis, and a method of forecasting future prevalence." North Carolina State College, 1949.

Grubbs, Frank Ephraim. "Sample criteria for testing outlying observations." University of Michigan, 1949.

Gurland, John. "I. Asymptotically normal estimates. II. Inversion formulae for the distribution of ratios." University of California, Berkeley, 1948.

Gutzman, Wayne Wallace. "On the distribution of means of middle items." University of Iowa, 1941.

Hader, Robert J. "Double sampling acceptance inspection on measurable quality characteristics." North Carolina State College, 1949.

Halmos, Paul Richard. "Invariants of certain stochastic transformations: the mathematical theory of gambling systems." University of Illinois, 1938.

Harris, Theodore Edward. "Some theorems on the Bernoullian multiplicative process." Princeton University, 1947.

Harshbarger, Boyd. "On the analysis of a certain six by six four-group lattice design." George Washington University, 1942.

Harter, Harman L. "On the distribution of Wald's classification statistic." Purdue University, 1949.

Hatke, Sister Mary Agnes. "A certain cumulative probability function." Purdue University, 1947.

Haviland, Edward Kenneth. "On the theory of absolutely additive distribution functions." The Johns Hopkins University, 1934.

Hibbard, D. L. "Mathematical risks." Massachusetts Institute of Technology, 1933.

Hildebrandt, Emanuel Henry. "Systems of polynomials connected with the Charlier expansions and the Pearson differential and difference equations." University of Michigan, 1932.

Hodges, Joseph L., Jr. "Studies in optimum statistical procedure: I. Initial sample size in the Stein procedure. II. Stringency in acceptance sampling." University of California, Berkeley, 1948.

Hogg, Robert V. "On ratios of certain algebraic forms in statistics." University of Iowa, 1950.

Hsu, Chung T. "Tests of certain statistical hypotheses concerning bivariate normal populations." Columbia University, 1941.

Hunt, Gilbert A. Jr. "On stationary stochastic processes." Princeton University, 1948.

Johnsen, Madeline. "Approximate evaluation of double probability integrals." Stanford University, 1946.

Juncosa, Mario Leon. "On the asymptotic behavior of the minimum in a sequence of random variables." Cornell University, 1948.

Kalinowski, W. C. "A postulational treatment of the probability for certain types of emissions." St. Louis University, 1947.

Kaplan, Edward Lynn. "Infinite permutations of stationary random sequences." Princeton University, 1951.

Katz, Leo. "Characterization of frequency functions defined by first order difference equations." University of Michigan, 1946.

Kinney, John R. "Continuity properties of sample functions of Markov processes." University of Illinois, 1951.

Kramer, Morton. "Frequency surfaces in two variables each of which is uniformly distributed." The Johns Hopkins University, 1939.

Kullback, Solomon. "An application of characteristic functions to the distribution problem of statistics." George Washington University, 1934.

Landau, Hyman G. "On the relations between certain criteria for the estimation of statistical parameters." University of Pittsburgh, 1946.

Larsen, Harold D. "On the bias in the simple arithmetical index number." University of Wisconsin, 1936.

LeVeque, W. J. "On the distribution of values of number-theoretic functions." Cornell University, 1947.

Lehmann, Erich L. "Optimum tests of a certain class of hypotheses specifying the value of a correlation coefficient." University of California, Berkeley, 1946.

Lemme, Maurice Miller. "On a new cumulative frequency function." Purdue University, 1947.

Leone, Fred Charles. "Some extensions of Bayes' theorem." Purdue University, 1949.

Levene, Howard. "Contributions to the theory of non-parametric tests of randomness." Columbia University, 1947.

Li, Jerome Ching. "Design and statistical analysis of confounded factorial experiments." Iowa State University, 1943.

Li, Tehyin Y. "The development of the correlation theory and its application to economic statistics." University of Wisconsin, 1935.

Linfield, B. Z. "On the theory of discrete variates." Harvard University, 1923.

Livers, Joe James. "Use of partitions in multivariate moment sampling theory." University of Michigan, 1945.

Madow, William G. "Contributions to the theory of multivariate statistical analysis." Columbia University, 1938.

Maloney, Clifford J. "Stratification in survey sampling." Iowa State University, 1947.

Mark, Abraham M. "Limit theorems in the theory of probability." Cornell University, 1948.

Marsaglia, George. "Stochastic processes and classes of random variables." Ohio State University, 1950.

Massey, Frank J. Jr. "Estimation of a distribution function by confidence limits." University of California, Berkeley, 1947.

McCarthy, Philip J. "Approximate solutions for means and variances in a certain class of box problems." Princeton University, 1946.

Meyer, H. A. "On certain inequalities with applications in actuarial science." University of Iowa, 1929.

Miller, W. M. "On the variance of interpolated observations." University of Illinois, 1927.

Monroe, Robert J. "On non-linear systems in the estimation of nutritional requirements of animals." North Carolina State College, 1949.

Mood, Alexander McFarlane. "The distribution theory of runs." Princeton University, 1940.

Moore, Edwin F. "A study of the effect of irregular fluctuations upon the statistical measurement of seasonal variation in time series analysis." University of Missouri, 1949.

Mosteller, Frederick C. "On some useful inefficient statistics." Princeton University, 1946.

Mouzon, E. D. "Equi-modal frequency distributions." University of Illinois, 1929.

Mullan, C. E. "A method of approximating the probability distribution of generating capacity forced outages in electric light and power systems." University of Pittsburgh, 1949.

Murdock, Bennet B. "Skew frequency curves." Yale University, 1933.

Nanda, Dwarka N. "Some contributions to the theory of multivariate analysis." University of North Carolina, 1947.

Nicholson, George E., Jr. "The application of a regression equation to a new sample." University of North Carolina, 1948.

Nicol, Britton Archie. "Statistical compositing techniques for the direct compositing and comparison of classical and small sample measures." University of Southern California, 1941.

Noether, Gottfried E. "Asymptotic properties of the Wald-Wolfowitz test of randomness." Columbia University, 1949.

Olds, Edwin Glenn. "The nature of distributions in small samples." University of Pittsburgh, 1931.

Olsheb, Abraham C. "Transformations of the Pearson type III distribution." University of Iowa, 1937.

Ostle, Bernald. "On certain criteria for optimum estimation." Iowa State University, 1949.

O'Toole, Alphonsus Lawrence. "On symmetric functions and symmetric functions of symmetric functions." University of Michigan, 1931.

Paull, Allan E. "On a preliminary test for pooling mean squares in the analysis of variance." North Carolina State College, 1948.

Paulson, Edward. "Asymptotic expansions for the distribution functions of some discrete statistics." Columbia University, 1948.

Poiser, A. M. "Some applications of Fourier analysis and calculus of probability to the study of real roots of algebraic equations." Cornell University, 1944.

Pierce, Joseph A. "A study of a universe of n finite populations with application to moment-function adjustments for grouped data." University of Michigan, 1938.

Pollard, Harry S. "On the relative stability of the median and arithmetic mean with particular reference to certain frequency distributions which can be dissected into normal distributions." University of Wisconsin, 1933.

Porter, Robert A. "The probability of a target's surviving a burst of a gun with a high rate of fire in aerial combat." North Carolina State College, 1949.

Rauch, S. E. "Mapping properties of the second arithmetic mean of the geometric series." Stanford University, 1942.

Raymond, John H. "An extension of Chebyshev's inequality." University of Washington, Seattle, 1949.

Regan, Francis. "The application of the theory of admissible numbers to time series." University of Michigan, 1932.

Richardson, Clarence H. "The statistics of sampling." University of Michigan, 1927.

Roa, Emeterio. "A number of new generating functions with applications to statistics." University of Michigan, 1923.

Romig, Harry G. "Allowable average in sampling inspection." Columbia University, 1939.

Rubin, Herman. "Systems of linear stochastic equations." University of Chicago, 1948.

Salvosa, Louis Rada. "Generalizations of the normal curve of error." University of Michigan, 1928.

Satterthwaite, Franklin E. "Developments on the theory of Chi-square." University of Iowa, 1941.

Schotland, Joseph H. "An analysis of methods of plane fitting." New York University, 1936.

Scott, Elizabeth L. "I. Contribution to the problem of selective identifiability of spectroscopic binaries. II. Note on the consistent estimates of the linear structural relation between two variables." University of California, Berkeley, 1949.

Seiden, Esther. "I. On a problem of confounding in symmetrical factorial design. II. Contribution to the theory of tests of composite hypotheses." University of California, Berkeley, 1949.

Seth, Gobind Ram. "On the variance of estimates." Columbia University, 1948.

Shen, Ching L. "Fundamentals of the theory of inverse sampling." University of Michigan, 1934.

Slaichert, William M. "Techniques for estimating coefficient of correlation from a fourfold table." Iowa State University, 1951.

Smith, Clarence DeWitt. "On generalized Tchebycheff inequalities in mathematical statistics." University of Iowa, 1927.

Smith, John H. "Statistical deflation in the analysis of economic series." University of Chicago, 1941.

South, Dudley E. "The characteristics of correlation surfaces which are the sum of two normal components." University of Michigan, 1939.

Springer, Melvin D. "Joint sampling distribution of mean and standard deviation for a Chi-square universe." University of Illinois, 1947.

Stearnes, Reaumur C. "A mathematical analysis and evaluation of the Pearson coefficients of correlation and regression." New York University, 1936.

Steel, Robert George D. "Minimum generalized variance for a group of linear functions." Iowa State University, 1949.

Stein, Charles. "A two-sample test for a linear hypothesis having power independent of the variance." Columbia University, 1947.

Stuit, Dewey B. "Correlation analysis as a means of studying problems of functional relationship." University of Illinois, 1934.

Swanson, A. G. "Factorial moments." University of Michigan, 1936.

Taylor, Ward Hastings. "The significance of choice of unit in standardized scores." University of Iowa, 1925.

Tsao, Fei. "General solution of the analysis of variance and covariance in the case of unequal or disproportionate numbers of observations in the subclasses." University of Minnesota, 1945.

Vatnsdal, John Russell. "Minimal variance and its relation to efficient moment tests." University of Michigan, 1941.

Votaw, David F., Jr. "Testing compound symmetry in a normal multivariate distribution." Princeton University, 1947.

Wagner, Charles Conroy. "A statistical study of the dependence for four chance variables." University of Michigan, 1930.

Walker, Helen M. "Studies in the history of statistical method." Columbia University, 1929.

Walsh, John E. "Some significance tests for the median which are valid under very general conditions." Princeton University, 1947.

Weida, Frank Mark. "The valuation of life annuities with refund of an arbitrarily assigned part of the purchase price." University of Iowa, 1923.

Welker, Everett L. "Correlation in heterogeneous populations." University of Illinois, 1938.

Wei, Dzung-shu. "Necessary and sufficient conditions that regression systems of sums with elements in common be linear." University of Iowa, 1941.

Whitney, D. Ransom. "A comparison of the power of nonparametric tests and tests based on the normal distribution under non-normal alternatives." Ohio State University, 1948.

Wilks, Samuel Stanley. "On the distribution of statistics in samples from a normal population of two variables with matched sampling of one variable." University of Iowa, 1931.

Wolfowitz, Jacob. "Additive partition functions and a class of statistical hypotheses." New York University, 1942.

Woodbury, Max Atkin. "Probability and expected values." University of Michigan, 1948.

Yuan, P. T. "On the logarithmic frequency distribution and the semi-logarithmic correlation surface." University of Michigan, 1932.

Zeigler, Royal K. "On the mean deviation from the median." University of Iowa, 1949.

REPORT OF THE CAMBRIDGE, MASSACHUSETTS MEETING OF THE INSTITUTE OF MATHEMATICAL STATISTICS

The ninety-fourth meeting of the Institute of Mathematical Statistics was held on the campus of Harvard University at Cambridge, May 5–7, 1963, in conjunction with meetings of the Biometric Society (Eastern North American Region) and the Section on Physical and Engineering Sciences of the American Statistical Association.

A Special Invited Paper was delivered by A. T. James of Yale University on "A Comparison of Univariate and Multivariate Distributions."

There were 217 persons attending the meetings, including 148 members of the IMS.

Program

Sunday, May 5, 1963

1:30 p.m.—Bayesian Methods (ENAR, SPES)

Chairman: H. RAIFFA, Harvard University

1. *Posterior Distributions for Multivariate Normal Parameters*, J. CORNFIELD and S. GEISSER, National Institutes of Health.
2. *A Bayesian Approach to the Analysis of Data from Clinical Trials*, M. NOVICK, University of North Carolina and Educational Testing Service.
3. *A Bayesian Approach to Best Population Problems*, I. GUTTMAN and G. TIAO, University of Wisconsin.

1:30 p.m.—Contributed Papers I

Chairman: J. H. KLOTZ, Harvard University

1. *Exact Moments and Percentage Points of Order Statistics from the Logistic Distribution and Applications to Estimation of Parameters of the Distribution*, S. S. GUPTA and B. K. SHAH, Purdue University.
2. *Estimation of the Three Weibull Parameters, Using an Overlooked Consequence of a Well-Known Property of the Weibull Distribution*, L. H. HERBACH, New York University.
3. *A Generalization on Distribution-Free Tolerance Limits*, L. DANZIGER and S. A. DAVIS, International Business Machines Corporation.
4. *Significance Probability Bounds for Rank Orderings*, P. SWITZER, Harvard University (Introduced by J. H. KLOTZ).
5. *On Random Variables Which Have the Same Distribution as Their Reciprocals*, V. SESHADRI, McGill University.
6. *On the Distribution of Sum of Identically Distributed Correlated Gamma Variables* (Preliminary Report), S. KOTZ and J. W. ADAMS, University of North Carolina.

3:30 p.m.—Probability and Stochastic Processes I (SPES)

Chairman: G. NOETHER, Boston University

1. *On Orthogonal Decompositions of Certain Stochastic Processes*, H. CRAMÉR, Columbia University.
2. *A Recurrent-Event Model of the Clustering of Errors on Telephone Circuits*, B. MANDELBROT, Harvard University and International Business Machines Research Center.

Monday, May 6, 1963

9:00 a.m.—Probability and Stochastic Processes II

Chairman: M. H. DeGroot, Carnegie Institute of Technology

1. *The Semi-Group Property for the Birth and Death Processes*, J. H. B. Kemperman, University of Rochester.
2. *Extreme Values in Diffusion Processes*, S. M. Berman, Columbia University.

9:00 a.m.—Factorial Experimentation (ENAR)

Chairman: R. J. Monroe, North Carolina State College

1. *Applications of a Calculus for Factorials to Block and Direct Product Designs*, B. Kurkjian, Diamond Ordnance Fuze Laboratories and M. Zelen, Mathematics Research Center, U.S. Army, University of Wisconsin.
2. *Orthogonal Estimates for Irregular Fractional Replicates of Factorial Experiments*, K. S. Banerjee and W. Federer, Mathematics Research Center, U.S. Army, University of Wisconsin.

11:00 a.m.—Contributed Papers II

Chairman: W. J. Hall, University of North Carolina

1. *Identifiability of Finite Mixtures*, H. Teicher, Purdue University.
2. *On the Estimation of Mixing Distributions*, D. C. Boes, Bell Telephone Laboratories, Inc.
3. *Bayes Sequential Procedures for Some Binomial Problems*, S. N. Ray, University of North Carolina.
4. *Bounds on the Probability and Coverage of a Multivariate Tolerance Region* (Preliminary Report), E. M. Scheuer, The RAND Corporation.
5. *On the Probability of Large Deviations of Families of Sample Means*, J. Sethuraman, University of North Carolina.

11:00 a.m.—Discrete and Contagious Distributions (ENAR)

Chairman: S. K. Katti, Florida State University

1. *The Validity of Certain Contagious Models*, D. C. Martin, Florida State University.
2. *Some Problems of Specifications Arising in Entomological Data Analysis*, T. A. Bancroft, K. C. Chanda and T. A. Brindley, Iowa State University.
3. *The Chance Mechanism of Clustering in Certain Biological Phenomena*, J. Neyman and E. L. Scott, University of California, Berkeley.

2:00 p.m.—Special Invited Paper

Chairman: A. P. Dempster, Harvard University

A Comparison of Univariate and Multivariate Distributions, A. T. James, Yale University.

3:30 p.m.—Contributed Papers III

Chairman: B. Mandelbrot, Harvard University

1. *Asymptotic Joint Distribution of Quantiles from a Bivariate Distribution*, J. B. Bartoo, W. L. Harkness and O. P. Srivastava, Pennsylvania State University.
2. *On Certain Bounds Useful in the Theory of Factorial Experiments and Error-Correcting Codes*, R. C. Bose and J. N. Srivastava, University of North Carolina.
3. *On an Unbiased Ratio Estimator in Sampling with Replacement with Unequal and Varying Selection Probabilities*, J. C. Koop, North Carolina State College.

4. *The Robustness of ANOVA for a Class of 2-Associate PBIB Designs*, P. V. RAO, University of Georgia.
5. *Unbiased Ratio and Regression Estimators in Multi-Stage Sampling*, J. N. K. RAO, Iowa State University.

3:30 p.m.—Nonparametric Inference

Chairman: F. WILCOXON, Florida State University

1. *Early Decision in the Wilcoxon Two-Sample Test*, D. W. ALLING, National Institutes of Health.
2. *The Power of Rank Tests for the Equality of Two Distribution Functions*, J. D. GIBBONS, University of Cincinnati.
3. *Several Applications of a Computer to Nonparametric Problems*, J. H. KLOTZ, Harvard University.

Tuesday, May 7, 1963

9:00 a.m.—Time Series Analysis (SPES)

Chairman: R. L. ANDERSON, North Carolina State College

1. *Tests for Periodic Variances*, L. J. HERBST, North Carolina State College.
2. *The Practical Realization of a Hilbert Transform and Its Application to the Analysis of Economic Time Series*, D. R. BRILLINGER, Princeton University and Bell Telephone Laboratories.

11:00 a.m.—Statistical Theory

Chairman: J. W. PRATT, Harvard University

1. *Some Sequential Analogs of Stein's Two-Stage Tests,* W. J. HALL, University of North Carolina.
2. *Optimum Allocation of Measurements*, M. H. DEGROOT, Carnegie Institute of Technology.
3. *Higher Moments of Maximum Likelihood Estimates in the Single Parameter Case*, L. R. SHENTON, Virginia Polytechnic Institute.

2:00 p.m.—Contributed Papers IV

Chairman: J. R. ROSENBLATT, National Bureau of Standards

1. *An Analysis for Modified Triangle Tests in Sensory Difference Experimentation*, R. E· BRADLEY and T. J. HARMON, Florida State University.
2. *On the Pessimum Interference with Random Signals* (Preliminary Report), N. M. BLACHMAN, Sylvania Electronic Defense Laboratories.
3. *The Present Value of a Renewal Process* (Preliminary Report), G. DALL'AGLIO, University of North Carolina (Introduced by G. E. Nicholson, Jr.).
4. *Note on a Coin Tossing Game*, S. G. MOHANTY, State University of New York, Buffalo.
5. *Bayes Solutions Involving a Dummy Parameter*, F. GEBHARDT, University of Connecticut.
6. *A Characterization of the Exponential-Type Distribution*, G. P. PATIL, McGill University.

2:00 p.m.—Sampling Theory for Bioassay (ENAR)

Chairman: W. G. COCHRAN, Harvard University

1. *Alternative Probit Estimates*, W. S. MALLIOS, Booz-Allen Applied Research, Inc.
2. *Sequential Estimation of Quantal Response Curves*, G. B. WETHERILL, Bell Telephone Laboratories.

3. *Comparison of Sequential Experiments for Estimating the Median Lethal Dose*, M. DAVIS, The John Hopkins University.

Contributed Papers by Title

1. *Some Estimators in Sampling With or Without Replacement With Unequal Probabilities* (Preliminary Report), J. C. KOOP, North Carolina State College.
2. *Dependence in Three Dimensions*, H. O. LANCASTER, University of Sydney.
3. *Multivariate Linear Hypothesis With Unknown Covariance Matrix*, A. G. LAURENT, Wayne State University.
4. *Generalization of Thompson's Distribution IV*, A. G. LAURENT, Wayne State University.
5. *On Multitreatment Rank-Order Tests for Paired-Comparisons*, K. L. MEHRA, Michigan State University.
6. *On the Non-Existence of Balanced Incomplete Block Designs, BIBD With Parameters (46, 69, 9, 6, 1) and (51, 85, 10, 6, 1)*, E. SEIDEN, Michigan State University.
7. *On a Construction of a Class of Resolvable BIBD*, E. SEIDEN, Michigan State University.
8. *Asymptotic Efficiencies of the Moment Estimators for the Parameters of the Weibull Laws* (Preliminary Report), S. D. DUBEY, Procter & Gamble Co.
9. *An Asymptotically Optimal Sequential Design for Comparing Several Experimental Categories With a Control* (Preliminary Report), C. D. ROBERTS, University of North Carolina.

SAMUEL W. GREENHOUSE
Associate Secretary

PUBLICATIONS RECEIVED

ABT, KLAUS (1963). *Table of Expectations of Mean Squares in the Analysis of Variance for Crossed Classifications*. U. S. Naval Weapons Laboratory, Dahlgren, Virginia. 67 pp. + app.

FREEMAN, HAROLD (1963). *Introduction to Statistical Inference*. Addison-Wesley Publishing Company, Reading, Massachusetts. xiv + 445 pp. $7.75.

MOOD, ALEXANDER M. and GRAYBILL, FRANKLIN A. (1963). *Introduction to the Theory of Statistics*. McGraw-Hill Book Company, Inc., New York. 444 pp. $8.95.

ROSENBLATT, MURRAY, ed. (1963). *Proceedings of the Symposium on Time Series Analysis*. John Wiley and Sons, New York. 497 pp. $16.50.

The Uses of Economic Research, Forty-Third Annual Report (1963). National Bureau of Economic Research, New York. 113 pp.