

NEWS AND NOTICES

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

Personal Items

Dr. Churchill Eisenhart has been granted a Rockefeller award "in recognition of outstanding public service," and will spend the coming academic year in England, engaged in research. Dr. Eisenhart, chief of the Statistical Engineering Laboratory, which he organized in 1946, will be based at the Research Techniques Unit of the London School of Economics and Political Science, where he will continue preparation of material for a unified treatment of the fundamentals of measurement theory and practices as related to the needs of the biological, physical, social and behavioral sciences.

Ira G. Spicer, formerly Project Leader of Technical Analysis at Minneapolis-Honeywell, has taken a position as Research Engineer with the Lockheed Missile Systems Division in Sunnyvale, California.

In August, Nelson M. Blachman will take a two-year leave of absence from his job at the Sylvania Electronic Defense Laboratory, Mountain View, California, to become a Scientific Liaison Officer at the Branch Office of the U. S. Office of Naval Research in London, England, where he will carry on liaison with European scientists in the field of electronics.

Alan T. James of the Division of Mathematical Statistics, Commonwealth Scientific and Industrial Research Organization, Australia, will be a Visiting Lecturer at Yale University for the academic year 1958-1959.

Alfred Lieberman, formerly with the Bureau of Ships, has now joined the staff of the Institute for Defense Analyses, Washington, D. C.

Herman Wold has accepted an invitation to serve as Visiting Professor during the academic year 1958-1959 at Columbia University, Economics Department, New York.

Margaret P. Martin has taken the position of Associate Professor of Preventive Medicine (Biostatistics) at the Upstate Medical Center of the State University of New York at Syracuse. She formerly held a similar position at Vanderbilt University.

Hian Liang Ang, Drs. Math. completed his work for his Master's degree in Statistics at the University of California at Berkeley in October, 1957, and continued his work toward a Ph.D. degree. He goes back to Indonesia in August, 1958, to resume his post as Lecturer of Mathematics at the University of Indonesia at Bandung.

Mr. Ulysses V. Ward was appointed Instructor of Mathematics at Howard University in September, 1957.

John E. Freund has recently been appointed Chairman of the Department of Mathematics of Arizona State College at Tempe (soon to be called Arizona State University.)

Patrick Billingsley has accepted a position as Assistant Professor in the Department of Statistics of the University of Chicago.

John W. Morse has resigned from position as Head of Economics at Keuka College, New York, to teach Statistics full-time as Assistant Professor, Economics at Hobart and William Smith Colleges, Geneva, New York, doing statistical consulting and developing inventions.

John W. Mayne, Director, Operational Research, Royal Canadian Navy has been posted by the Defense Research Board to the SHAPE Air Defense Technical Centre, The Hague, Netherlands, to be Chief of an Operational Research Section. He expects to be in Europe for about three years.

William E. Jaynes has accepted a position as an Assistant Professor of Industrial Psychology and Statistics, and Director of the Bureau of Industrial Testing and Institutional Research at the University of Omaha in Omaha, Nebraska.

Charles T. Lewis has recently accepted a position as operations analyst in the Operations Research Group at Convair in Fort Worth, Texas.

R. E. Beckwith has accepted a position as Senior Research Engineer with the California Institute of Technology Jet Propulsion Laboratory.

Frances Campbell Amemiya has resigned her position as Chairman of the Department and Professor of Mathematics at George Pepperdine College in Los Angeles. She is now Associate Professor of Mathematics at the California Western University.

Dr. John E. Walsh, formerly with the Military Operations Research Division of Lockheed Aircraft Corporation is now with the Operations Research Group of the System Development Corporation, 2400 Colorado Avenue, Santa Monica, California.

H. W. G. Deeks has been appointed Statistician in the War Office, Whitehall, London, S.W.1.

Dr. Om P. Aggarwal has returned to Purdue University as Associate Professor after spending a year at the University of Alberta (1956-57) as Visiting Associate Professor and another at the University of Saskatchewan. While in Canada, Professor Aggarwal was also a Fellow at the Summer Research Institute of the Canadian Mathematical Congress which is held every summer at Queen's University, Kingston, Ontario.

Ingram Olkin, on sabbatical leave from Michigan State University, will be at Stanford University for the academic year 1958-1959.

J. E. Morton is serving as Statistical Adviser to the UN Economic Commission for Asia and the Far East in Bangkok, Thailand; he is also giving a course at Chulalongkorn University in Bangkok on Linear Programming.

On July 2, 1958, Alan H. Gefpert became Director of Statistical Research of the Chicago and North Western Railway Company. The major present job is to develop economic models by which to forecast revenues. Also concerned with application of sampling and regression analyses to cost-finding and general corporate planning. Mr. Gefpert was formerly a member of operations research group and faculty of Case Institute of Technology.

The Data Processing Division of International Business Machines Corpora-

tion completed its move to Westchester during July. Its new address is International Business Machines Corporation, Data Processing Division, 112 East Post Road, White Plains, New York.

Professor Herbert Solomon, Teachers College, Columbia University, is spending a sabbatical year at Stanford at Berkeley. His mailing address is Statistics Dept., Stanford University, Stanford, California.

Fellowship and Research Opportunities, National Academy of Sciences— National Research Council, Division of Mathematics

The Division of Mathematics calls attention to the fact that several foundations and offices offer financial support for research in mathematics during the year 1959–60. A number of fellowships will be made available, as well as opportunities for mathematicians to engage in basic research. A partial list, with comments, is given below.

1. *National Science Foundation.* The National Science Foundation sponsors various fellowship programs in the sciences, including mathematics.

Predocctoral fellowships are awarded annually at the First Year, Intermediate, and Terminal Year levels of graduate study. Applications for 1959–1960 will be available in October 1958 from the National Academy of Sciences-National Research Council until the closing date in early January 1959; Award date—March 16, 1959.

Science Faculty fellowships for college science teachers (including mathematics) who plan to continue teaching and wish to increase their competence as teachers are at the present time offered semi-annually. Eligibility requirements include a baccalaureate degree and three (3) years of full-time experience in teaching natural science subjects at the collegiate level. Awarded annually. The program will be open from May to October. Awards will be announced in early December. Address all inquiries for information and applications to National Science Foundation, Division of Scientific Personnel and Education, Washington 25, D. C.

Postdoctoral fellowships (in making inquiry about postdoctoral awards specify program)

(1) *Regular* postdoctoral fellowships—primarily for recipients of the doctoral degree; awarded semi-annually. Program for 1959–60 concurrent with predocctoral program (see above) except that program closes in December. Information and applications will be available from the NAS-NRC. The program will also be open from July to early September 1959. Awards are announced in March and October.

(2) *Senior* postdoctoral fellowships—are open to persons who have held a doctoral degree in one of the basic fields of science for a minimum of five (5) years at time of application, or who have had equivalent training and experience. Awarded annually. Applications are available from the National Science Foundation, Division of Scientific Personnel and Education, Washington 25, D. C. The program will be open from May to October. Awards will be announced in early December.

Research Grants. The National Science Foundation also supports basic research in the mathematical sciences by means of grants. While proposals for such support are accepted at any time, individuals desiring support to begin in the summer or at the beginning of a fall semester should preferably submit their proposals in the mathematical sciences by November 1; persons desiring support to begin in the spring semester should preferably submit their proposals by May 1. Instructions for the preparation of proposals, contained in a booklet entitled *Grants for Scientific Research*, may be obtained upon request from the Program Director for Mathematical Sciences, National Science Foundation, Washington 25, D. C.

2. *Office of Naval Research.* The Office of Naval Research, through contracts with universities and other organizations, supports basic research in broadly selected fields of mathematics. Proposals should be directed to the Mathematics Branch, Office of Naval Research, Washington 25, D. C. In addition, postdoctoral research associateships in pure mathematics are being established under contracts with the ONR at selected universities. For details and application forms write to the above address.

3. *Air Force Office of Scientific Research.* The Air Force Office of Scientific Research supports research in mathematics directly through contracts with colleges, universities, foundations and industrial laboratories. Such organizations are encouraged to submit proposals for research in mathematical fields in which they specialize. Proposals should be mailed to the Commander, Air Force Office of Scientific Research, Attn: Mathematics Division, Washington, 25, D. C.

4. *Office of Ordnance Research, U. S. Army.* Among the functions of the Office of Ordnance Research is the support of basic research in mathematics. Proposals for projects are ordinarily made by individual scientists or groups of scientists in a form which leads to a contract between the Office of Ordnance Research and a university or research laboratory. For further information write to Commanding Officer, Office of Ordnance Research, Box CM, Duke Station, Durham, North Carolina.

5. *Fulbright Awards—Public Law 584 (79th Congress).* Approximately 400 awards are offered annually for university lecturing and postdoctoral research in all academic fields in Argentina, Australia, Brazil, Burma, Chile, Colombia, Ecuador, India, New Zealand, Pakistan, Paraguay, Peru, the Philippines and Thailand (competition for the preceding countries closes April 15, 1959); Austria, Belgium-Luxembourg, Republic of China, Denmark, Finland, France, Germany, Greece, Iceland, Iran, Ireland, Israel, Italy, Japan, the Netherlands, Norway, Turkey, and the United Kingdom including colonial dependencies (competition for the latter countries closes October 1, 1959). In both cases awards are for the academic year 1960-61 (the 1959-60 competition for Europe closes October 1, 1958), but in the former group of countries the academic year begins in the spring or summer instead of the autumn. Awards are payable in foreign currency and usually include travel for the grantee, but not for members of his family, and a maintenance allowance, which may be adjusted in relation to the number of accompanying dependents up to four. Requests for information should be addressed to the Committee on International Exchange of Persons, Conference Board of Associated Research Councils, 2101 Constitution Avenue, Washington 25, D. C.

6. *National Bureau of Standards. Naval Research Laboratory. Air Research and Development Command.* Postdoctoral resident research associateships are available in a variety of sciences including mathematics and are tenable at the Washington, D. C. and Boulder, Colorado laboratories of the National Bureau of Standards; at the Naval Research Laboratory in Washington, D. C.; and at selected development and research centers of the Air Research and Development Command. Necessary facilities and equipment incident to the research of the associate will be provided. For further information write to Fellowship Office, National Academy of Sciences-National Research Council, 2101 Constitution Avenue, Washington 25, D. C. Applications for the 1959-60 program must be filed on or before January 19, 1959.

7. *Atomic Energy Commission.* The Division of Research of the Atomic Energy Commission through contracts with universities and other organizations supports research in the fields of numerical analysis, digital computer design, programming research, and related topics. Proposals should be submitted to the Division of Research, Atomic Energy Commission, Washington 25, D. C.

Brookhaven National Laboratory. Brookhaven National Laboratory, operated by Associated Universities, Inc. under contract with the Atomic Energy Commission offers postdoctoral research appointments in mathematics. Appointments are for one year, and may be renewed for one additional year. U. S. citizenship is not required, although Atomic

Energy Commission approval is a prerequisite. The appointee may work in numerical analysis, digital computing, mathematical physics, differential equations, probability and statistics, and various specialized branches including reactor theory, hydrodynamics, and orbit theory. Computational facilities are available. Letters from candidates should give details of personal history, scientific background, and qualifications; two letters of recommendation, one from the applicant's research professor, are required. Applications should be directed to M. E. Rose, Head, Applied Mathematics Division, Brookhaven National Laboratory, Upton, Long Island, New York.

September 1, 1958

S. S. WILKS, *Chairman*
Division of Mathematics
M. H. MARTIN, *Executive Secretary*
Division of Mathematics

Committee on Statistics

A new committee, the Committee on Statistics, has been established in the Division of Mathematics, NAS-NRC. It has been established in the Division as the successor to the Committee on Applied Mathematical Statistics which was appointed in 1942 and placed directly under the Academy-Research Council Governing Board. The funds in the custody of the earlier committee, and amounting to approximately \$5,000, have been transferred to the custody of the new committee.

Cost-Free Digital Computer Time

As announced in the March, 1958, *Annals*, pp. 343-347, the Committee on Mathematical Tables of the Institute of Mathematical Statistics has made a survey of cost-free time on digital computers in the United States. The survey, in which 171 digital computer installations were queried, is now complete. Cost-free time is available at approximately 40 installations in at least 18 states in all parts of the United States. Members of the Institute of Mathematical Statistics who wish to avail themselves of some of this cost-free time to compute on a problem of general interest, i.e., a problem which might lead to publication of results in a professional journal, are invited to get in touch with the Chairman of the Subcommittee on Cost-Free Machine Time, Professor Fred C. Leone, Statistical Laboratory, Case Institute of Technology, Cleveland 6, Ohio. Advice on the preparation of specific tables (but *not* advice on programming or numerical analysis) is available from the other subcommittees and the reader is referred to the March, 1958, *Annals* for a complete listing of them.

D. B. OWEN, *Chairman*
Committee on Mathematical Tables

Preliminary Actuarial Examinations Prize Awards

The winners of the prize awards offered by the Society of Actuaries to the nine undergraduates ranking highest on the score of Part 2 of the 1958 Preliminary Actuarial Examination are as follows:

First Prize of \$200: Daniel G. Quillen, Harvard University.

Additional Prizes of \$100 each: Edward J. Barbeau, Jr., Toronto University; William H. Blake, Jr., George Washington University; Theodore M. Jungreis, Rensselaer Polytechnic Institute; David H. Krantz, Yale University; Joe Lipman, Toronto University; Dennis W. Moore, Harvard University; Theodore S. Rosky, State University of Iowa; Lawrence A. Shepp, Brooklyn Polytechnic Institute.

The Society of Actuaries has authorized a similar set of nine prizes for the 1959 examinations on Part 2.

The Preliminary Actuarial Examinations consist of the following three examinations: Part 1. Language Aptitude Examination. (Reading comprehension, meaning of words and word relationships, antonyms, and verbal reasoning.) Part 2. General Mathematics Examination. (Algebra, trigonometry, coordinate geometry, differential and integral calculus.) Part 3. Special Mathematics Examination. (Probability and statistics.)

The 1959 Preliminary Actuarial Examinations will be prepared by the Educational Testing Service under the direction of a committee of actuaries and mathematicians and will be administered by the Society of Actuaries at centers throughout the United States and Canada on May 13, 1959. The closing date for applications is April 1, 1959.

Postdoctoral Study in Statistics

Awards for study in statistics by persons whose primary field is not statistics but one of the physical, biological, or social sciences to which statistics can be applied are offered by the Department of Statistics of the University of Chicago. The awards range from \$3,600 to \$5,000 on the basis of an eleven month residence. The closing date for application for the academic year 1959-60 is February 16, 1959. Further information may be obtained from the Department of Statistics, Eckhart Hall, University of Chicago, Chicago 37, Illinois.

Nonparametric Statistics

A revision is being made of "Bibliography of Nonparametric Statistics and Related Topics," *Journal of the American Statistical Association* 48 (1953) pp. 844-906. Material through 1959 is to be included with more emphasis, it is

hoped, on applications than previously. References (particularly to the non-English literature), reprints, and technical reports on the theory or applications of nonparametric statistics would be greatly appreciated. Also, corrections and additions to the original bibliography are desired.

University of Michigan Summer Program in Health Statistics

The School of Public Health, University of Michigan, will have a summer program in health statistics, June 18 through August 1, 1959. The faculty will be assembled from many of the schools of public health, and from the ranks of leading workers in the field of statistics in the health sciences. Tentative course titles are: Statistical Methods in Public Health, Management of Health Agency Records, Registration and Vital Statistics, Biostatistics in the Health Sciences, Demographic Methods in Public Health, Statistical Methods in Epidemiology, Sampling Techniques in the Health Sciences, Advanced Biostatistics in the Health Sciences, Statistical Methods in Biological Assay.

Further information can be obtained from F. D. Hemphill, School of Public Health, University of Michigan, Ann Arbor, Michigan.

Additional Doctoral Dissertations

The following doctorates, conferred in 1957, should be added to the list published in the June, 1958 issue of these *Annals*.

Kupperman, Morton, The George Washington University, major in mathematical statistics, "Further Applications of Information Theory to Multivariate Analysis and Statistical Inference."

McCall, Chester H., Jr., The George Washington University, major in mathematical statistics, "The Linear Hypothesis, Information, and the Analysis of Variance."

NaNagara, Prasert, Cornell, major in statistics, "Lattice Rectangle Designs."

New Members

The following persons have been elected to membership in The Institute

May 14, 1958, to June 23, 1958

Allen, (Rev.) Raymond W., Ph.D. (St. Louis University), Chairman, *Department of Mathematics, Xavier University, Cincinnati 7, Ohio.*

Amster, Sigmund J., M.S. (Columbia University), Student, University of North Carolina, *119 Harvey Street, Philadelphia, Pa.*

Burton, Ellison Stanley, B.A. (Amherst College), Systems Engineer (Statistician) Consultant, Harper Engineering Company, Santa Monica, California, *4650 East 19th Street, Tucson, Arizona.*

- Cook, William H.**, A.B. (Hofstra College), Mathematical Statistician, *U. S. Bureau of the Census, Statistical Research Division, Washington 25, D. C.*
- Edwards, Bernard**, B.Sc. (London), Lecturer in Statistics, *Municipal College of Commerce, College Street, Newcastle Upon Tyne, Northumberland, England.*
- Friedman, Morton Philbert**, M.A. (Ohio State University), Student, Ohio State University, Columbus, Ohio, *865 Northwest Blvd., Columbus 12, Ohio.*
- Goodman, Arnold F.**, B.S. (N. C. State College), Graduate Assistant, Stanford University, Stanford, California, *621 Harvard Avenue, Menlo Park, California.*
- Hakim, Muhammad A.**, M.Sc. (Univ. of Calcutta) Graduate Student, *University of California, Department of Statistics, Berkeley 4, California.*
- Harkness, William L.**, M.A. (Michigan State University) Special Graduate Research Assistant, *Department of Statistics, Michigan State University, East Lansing, Michigan.*
- Higa, Seiko**, B.A., (Pacific University) Statistician, *Finance Department, U. S. Civil Administration of the Ryukyu Islands, Naha, Okinawa, Ryukyu Islands.*
- Hill, Bruce M.**, M.S. (Stanford University), Assistant in Statistics, Graduate Student, *Stanford Statistics Department, Stanford University, Stanford, California.*
- Johnson, Whitney Larsen**, M.S. (University of Minnesota), Instructor, Dept. of Math. Institute of Technology, University of Minnesota, Minneapolis 14, Minn. *2175A Folwell, St. Paul 8, Minn.*
- Kaller, Cecil**, M.A. (Saskatchewan), Research Fellow, Purdue University, Lafayette, Indiana, *Statistical Laboratory, Purdue University, Lafayette, Indiana.*
- Masuyama, Motosaburo**, (Doctor of Science), Chief of the Laboratory of Environmental Hygiene, Meteorological Research Institute, Tokyo, *Institute of Physical Therapy & Internal Medicine, Faculty of Medicine, Tokyo University, Bunkyo-ku, Tokyo, Japan.*
- Middleton, David**, Ph.D. (Howard University), Consulting Physicist, *23 Park Lane, Concord, Mass.*
- Mills, Harlan Duncan**, Ph.D. (Iowa State) Research Associate, Princeton University, Princeton, New Jersey, *186 Elm Road, Princeton, New Jersey.*
- Nemenyi, Peter B.**, M.A. (Princeton University), Assistant Statistical Analyst, *Metro-politan Life Insurance Company, Madison Avenue, New York 10, N. Y.*; also Lecturer, Hunter College, Pk. Ave. and 68th Street, New York.
- Niedzielski, Edmund L.**, Ph.D. (Fordham University), Research Chemist, *E. I. DuPont De Nemours and Co., Petroleum Laboratory, P. O. Box 1671, Wilmington 99, Del.*
- Okamoto, Masashi**, M.S. (Tokyo University), Lecturer in Mathematical Statistics, Osaka University, Japan, *Nakanoshim, Kita-ku, Osaka, Japan.*
- Pincus, Louis**, B.S., (The City College of New York), Senior Statistician, New York City Department of Health, 125 Worth Street, New York 12, N. Y., *451 Kingston Avenue B-7, Brooklyn 25, New York.*
- Randels, Robert B.**, Ph.D. (University of Michigan) Physicist, *Corning Glass Works, Houghton Park, Corning, New York.*
- Robinson, Enders A.**, Ph.D., (Massachusetts Institute of Technology), Assistant Professor of Statistics, Michigan State University, *Department of Statistics Michigan State University, East Lansing, Michigan.*
- Sato, Sokuro**, (Tokyo Technical College) Assistant Professor, Faculty of Education, Saga University, Saga City, Saga Prefecture, Japan, *Dokkoo-koji, Mizugaemachi, Saga City, Saga City, Japan.*
- Slud, Maurice H.**, M.A. (Columbia University), Mathematical Analyst, *General Electric Company, Missile and Ordnance Systems Department, 3198 Chestnut Street, Philadelphia 4, Pennsylvania.*
- Smith, William Roger**, M.S. (University of Wisconsin), Student, University of California, *5345 Zara Avenue, Richmond, California.*
- Tsutakawa, Robert K.**, M.S. (University of Chicago), Quality Analyst A, Quality Control

Department, Pilotless Aircraft Div., Boeing Airplane Co., Seattle, Washington, 1103½ 3rd Avenue, Seattle, Washington.

Welch, Peter D., M.S. (University of Wisconsin), Staff Engineer, *IBM Research Center, Yorktown Heights, New York.*

Zacks, Shelemiyahu, B.A. (Hebrew University), *Statistician of the Building Research Station, Technion, The Technion Research Institute, Haifa, Israel.*

Zehna, Peter W., M.A. (University of Kansas) Research Assistant, Stanford University, *Applied Mathematics and Statistics Laboratory, Stanford University, Stanford, California.*

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

The seventy-eighth meeting of The Institute of Mathematical Statistics and the twenty-first annual meeting was held at the Massachusetts Institute of Technology, Cambridge, Massachusetts, on August 25–28, 1958, in conjunction with the meetings of the American Mathematical Society, the Mathematical Association of America, the Society for Industrial and Applied Mathematics, and the Econometric Society.

The program of the meeting was as follows:

MONDAY, AUGUST 25, 1958

9:00 A.M. Invited Papers on Regression and Analysis of Variance

Chairman: FRANKLIN A. GRAYBILL, Oklahoma State University

1. *Variance Component Analysis in Models Where Effects Are Time Variables*, A. W. WORTHAM, (presented by LEROY FOLKS) Texas Instruments Inc., Dallas
2. *Industrial Experience with 2^{p-q} Fractional Factorial Experiments*, CUTHBERT DANIEL, New York City
3. *Confidence and Significance Procedures for Non-linear Models*, M. B. WILK, Bell Telephone Laboratories, Murray Hill

11:15 A.M. Wald Lecture I

Chairman: J. L. HODGES, JR., University of California, Berkeley

The Mathematical Basis of Fiducial Inference, JOHN W. TUKEY, Princeton University

2:00 P.M. Invited Papers on Estimation and Testing

Chairman: DONALD L. BURKHOLDER, University of Illinois

1. *Power of the Chi-square Test*, J. L. HODGES, JR., University of California, Berkeley
2. *On Solutions of Dorfman's Mass-Testing Problem*, MILTON SOBEL, Bell Telephone Laboratories, Allentown
3. *Linear Regression in the Multivariate Normal Case*, CHARLES STEIN, University of California, Berkeley

4:00 P.M. Invited Papers on Testing

Chairman: D. B. OWEN, Sandia Corporation

1. *Partial Orderings of Probabilities of Rank Orders*, I. RICHARD SAVAGE, University of Minnesota
2. *Simple Methods for Analysis of Two-Action Problems with Linear Costs*, ROBERT SCHLAIFER, Harvard University

8:00 P.M. 1958 Council Meeting

TUESDAY, AUGUST 26, 1958**9:00 A.M. Contributed Papers, I. (Simultaneous with Contributed Papers II)**

Chairman: CHARLES STEIN, University of California, Berkeley

1. *Truncation and Tests of Hypotheses*, OM P. AGGARWAL, Purdue University AND IRWIN GUTTMAN, Princeton University (by title)
2. *Admissible Estimates and Maximum Likelihood Estimates (A Sketch of a Unified Theory of Estimation)*, ALLAN BIRNBAUM, Columbia University
3. *A Note on Estimating Translation and Scalar Parameters*, JOSEPH A. DUBAY, University of Oregon
4. *A Convolution Class of Monotone Likelihood Ratio Families*, S. G. GHURYE AND DAVID L. WALLACE, University of Chicago
5. *Power and Control of Size of Some Optimal Welch-type Statistics*, ROGER S. McCULLOUGH AND JOHN GURLAND, Iowa State College
6. *Some Population Estimation Models and Related Limit Distributions*, RONALD PYKE AND N. DONALD YLVISAKER, Stanford University
7. *On the Choice of Sample Size in the Kolmogorov-Smirnov Tests*, JUDAH ROSENBLATT, Purdue University
8. *Theory of Successive Two-Stage Sampling*, (preliminary report) B. D. TIKKIWAL, Karnatak University, Dharwar, India (by title)
9. *On the Existence of Wald's Sequential Test*, ROBERT A. WIJSMAN, University of Illinois (by title)
10. *Functions of Markov Chains*, (preliminary report) MURRAY ROSENBLATT, Indiana University (by title)

9:00 A.M. Contributed Papers, II

Chairman: JACK NADLER

1. *Confidence Bounds Associated with a Test for Symmetry*, R. GNANADESIKAN, The Procter & Gamble Company (by title)
2. *Determining Bounds on Integrals with Applications to Cataloging Problems*, BERNARD HARRIS, George Washington University (by title)
3. *On the Exact Joint Distribution of the First Two Serial Correlation Coefficients*, V. K. MURTHY, University of North Carolina
4. *A Classification Problem Involving Multinomials*, OSCAR WESLER, University of Michigan
5. *Applications of a Certain Representation of the Wishart Matrix*, ROBERT A. WIJSMAN, University of Illinois
6. *On the Problem of Incomplete Data*, JUNJIRO OGAWA AND BERNARD S. PASTERNAK, University of North Carolina
7. *Unbiased Estimation for Functions of Location and Scale Parameters*, R. F. TATE, University of Washington (by title)
8. *Uniqueness of the L_2 Association Scheme*, S. S. SHRIKHANDE, University of North Carolina
9. *On the Asymptotic Minimax Character of the Sample d.f. of Vector Chance Variables*, J. KIEFER AND J. WOLFOWITZ, Cornell University, (by title)

11:15 A.M. Wald Lecture II

Chairman: WILLIAM H. KRUSKAL, University of Chicago

The Mathematical Basis of Fiducial Inference, (continued) JOHN W. TUKEY, Princeton University

2:00 P.M. Invited Papers on Probability and Stochastic Processes, I

Chairman: J. R. BLUM, University of Indiana

1. *A Moment-Problem with Restriction on Smoothness*, C. L. MALLOWS, Princeton University
2. *About the Central Limit Problem*, MICHEL LOËVE, University of California, Berkeley
3. *Hausdorff Dimension and Information Theory*, PATRICK BILLINGSLEY, Princeton University and University of Chicago
4. *A Geometry of Binary Sequences Associated with a Class of Error-Correcting Codes*, ROY R. KUEBLER, JR., University of North Carolina

4:00 P.M. Special Invited Address

Chairman: SHANTI S. GUPTA, University of Alberta

Multiple Decision Selection Procedures, MILTON SOBEL, Bell Telephone Laboratories, Allentown

WEDNESDAY, AUGUST 27, 1958

9:00 A.M. Invited Papers on Sequential Analysis

Chairman: KENNETH J. ARNOLD, Michigan State University

1. *A Modification of Sequential Analysis to Reduce the Sample Size*, T. W. ANDERSON, Center for Advanced Study in Behavioral Sciences and Columbia University
2. *Binomial Sequential Testing*, COLIN R. BLYTH, Stanford University
3. *Unbiased Sequential Estimation for Binomial Populations*, MORRIS H. DEGROOT, Carnegie Institute of Technology

11:15 A.M. Wald Lecture III

Chairman: MARVIN ZELEN, National Bureau of Standards

The Interpretation of Fiducial Inference, JOHN W. TUKEY, Princeton University

2:00 P.M. Invited Papers on Probability and Stochastic Processes II. (Simultaneous with Invited Papers on Random Balance.)

Chairman: MAX WOODBURY, New York University

1. *Semigroups of Operators and Stochastic Processes*, A. V. BALAKRISHNAN, University of California, Los Angeles
2. *Independent Polynomials in Normal Variates*, R. G. LAHA, Catholic University of America and Columbia University
3. *On Multi-event Renewal Processes*, RONALD PYKE, Stanford University

2:00 P.M. Invited Papers on Random Balance

Chairman: FRANK J. ANSCOMBE, Princeton University

1. *Introductory Remarks*, FRANK J. ANSCOMBE, Princeton University
2. *On the Analysis of Screening Experiments*, E. M. L. BEALE, Princeton University, AND C. L. MALLOWS, Princeton University
3. *Analysis Methods for Randomly Balanced Factorial Designs*, A. P. DEMPSTER, Bell Telephone Laboratories and Harvard University
4. *Mathematical Outline of Polyvariable Analysis (including Random Balance)*, F. E. SATTERTHWAITHE, Statistical Engineering Institute, Wellesley Hills

4:00 P.M. Wald Lecture IV

Chairman: M. B. WILK, Bell Telephone Laboratories

What Importance Should We Place on Fiducial Inference? JOHN W. TUKEY, Princeton University

5:30 P.M. Business Meeting

8:00 P.M. 1959 Council Meeting

THURSDAY, AUGUST 28, 1958**9:00 A.M. Contributed Papers III (Simultaneous with Contributed Papers IV)**

Chairman: ROBERT A. WIJSMAN, University of Illinois

1. *On a Limiting Distribution Due to Renyi*, D. G. CHAPMAN, University of Washington
2. *Stochastic Models for the Electron Multiplier Tube*, EDWARD K. DALTON, WILLARD D. JAMES, AND HOWARD G. TUCKER, University of California at Riverside
3. *On Stochastic Approximation*, C. DERMAN AND J. SACKS, Columbia University
4. *Single Server Queuing Processes with a Finite Number of Sources*, GERALD HARRISON, The Teleregister Corporation
5. *A Model for Failure Data and its Applications*, ANDRE G. LAURENT, Wayne State University
6. *Generalization of Palm's Loss Formula for Telephone Traffic*, V. E. BENES, Bell Telephone Laboratories, Murray Hill
7. *The Moments of the Maximum of Partial Sums of Independent Random Variables*, JOHN S. WHITE, Minneapolis-Honeywell Regulator Co.
8. *Stochastic Models for Length of Life*, BENJAMIN EPSTEIN, Wayne State University and Stanford University (By title)
9. *Tests for the Validity of an Exponential Distribution of Life*, BENJAMIN EPSTEIN, Wayne State and Stanford Universities, (by title)

9:00 A.M. Contributed Papers IV

Chairman: M. V. JOHNS, JR., Stanford University

1. *Estimation of the Medians for Dependent Variables*, OLIVE JEAN DUNN, University of California, Los Angeles
2. *The Use of Sample Quasi-Ranges in Estimating Population Standard Deviation*, H. LEON HARTER, Wright Air Development Center
3. *Order Statistics and Estimation*, M. M. RAO, University of Minnesota (by title)
4. *A Note on Order Statistics and Stochastic Independence*, GERALD S. ROGERS, University of Arizona
5. *Aids for Fitting the Pearson Type III Curve by Maximum Likelihood*, J. ARTHUR GREENWOOD, Iowa State College AND DAVID DURAND, Massachusetts Institute of Technology
6. *On the Relationship Algebra and the Association Algebra of the Partially Balanced Incomplete Block Design*, JUNIRO OGAWA, University of North Carolina (by title)
7. *Factorial Analysis of Life-Tests*, MARVIN ZELEN, National Bureau of Standards
8. *On the Analysis of Factorial Experiments without Replication*, ALLAN BIRNBAUM, Columbia University (by title)
9. *On Logistic Order Statistics*, ALLAN BIRNBAUM, Columbia University (by title)
10. *Statistical Theory of Some Quantal Response Models*, ALLAN BIRNBAUM, Columbia University (by title)
11. *Optimum Designs in Regression Problems*, J. KIEFER AND J. WOLFOWITZ, Cornell University, (by title)
12. *On the Bounds for the Variance of Mann-Whitney Statistic*, JAGDISH SHARAN RUSTAGI, Michigan State University, (by title)
13. *A Characterization of Triangular Association Scheme*, S. S. SHRIKHANDE, University of North Carolina (by title)
14. *A Problem in Two-Stage Experimentation*, DONALD L. RICHTER, University of North Carolina (by title)

11:15 A.M. Special Invited Address

Chairman: SAMUEL W. GREENHOUSE, National Institutes of Health

Estimation Methods in Multivariate Analysis, EVAN J. WILLIAMS, North Carolina State College

2:00 P.M. Special Invited Address

Chairman: MORRIS H. HANSEN, Bureau of the Census

On a Formal Structure of Professional Practice in Sampling, W. EDWARDS DEMING,
New York University

3:15 P.M. Invited Papers on Mixed Topics

Chairman: H. A. DAVID, Virginia Polytechnic Institute

1. *The Number of Occupied Cells of a Particular Subclass (When Objects are Assigned to Cells at Random)*, HOWARD L. JONES, Illinois Bell Telephone Company, Chicago
2. *Statistical Theory of Tests of a Mental Ability*, ALLAN BIRNBAUM, Columbia University
3. *Properties of Some Control Chart Tests for Detecting Shifts in a Process Average*, S. W. ROBERTS, Bell Telephone Laboratories, New York.

REPORT OF THE PRESIDENT FOR 1958

To the membership of the IMS

Dear Friends:

I am writing to you shortly before my departure from the country, because I shall unfortunately not be here to address you personally at the annual meeting.

The presidency of the Institute is an honor greater than I had expected to receive in my whole life. I thank you all for your expression of recognition and confidence. I also thank for myself, and for all of us, the many officers, committee members, and representatives who have so loyally and competently handled the Institute's increasingly complex and serious business.

The president's job is not among the harder ones in the Institute, but I have found it interesting and instructive. The office entails some decisions and offers opportunities to make suggestions throughout the Institute from a central vantage point. It also offers opportunities to make mistakes, and I have made some. Those that have thus far come to light are mostly small and rectifiable.

Since the meeting at Atlantic City a year ago there have been regional meetings at Los Angeles, Gatlinburg, and Ames.

T. E. Harris announced a year ago that he wanted to relinquish the Editorship at the expiration of his term on July 1, 1958. An ad hoc committee consisting of William Cochran (Chairman), T. W. Anderson, M. S. Bartlett, T. E. Harris, W. A. Wallis, and S. S. Wilks recommended to the Council that W. H. Kruskal be appointed to the Editorship. The Council has accepted this recommendation and Kruskal has accepted the appointment. The *Annals* continues to grow and improve by leaps and bounds, as I expect you will hear in detail from the retiring Editor.

The Council decided in Atlantic City that, to meet the rising costs of printing a larger *Annals* at higher rates for printing, we ought to apply to the National Science Foundation for a grant of money for a three-year period. I hope

that it will be possible to announce along with the reading of this letter that the grant has been made.

The Council has before it a plan, submitted by an ad hoc committee, to approach the National Science Foundation for aid in preparing translations of Russian statistical and probabilistic literature.

A summer institute on nonparametric methods will be held at Minneapolis before this letter is read, and an advisory committee will report to the Council at this meeting on what plans, if any, should be made for a summer institute in 1959.

The final duty of the president is to appoint a new nominating committee, and I herewith appoint: T. E. Harris, Chairman, Herman Chernoff, David Cox, J. C. Kiefer, and W. J. Youden.

Deeply regretting having to take my leave thus, in absentia, I am

Most sincerely yours,
L. J. SAVAGE
President

IMS OFFICERS, COMMITTEES, AND REPRESENTATIVES FOR 1957-1958.

Council Members and Officers

<i>Terms Expire 1958</i>	<i>Terms Expire 1959</i>	<i>Terms Expire 1960</i>
R. C. Bose	T. W. Anderson	David Blackwell
Churchill Eisenhart	M. S. Bartlett	Harold Hotelling
Oscar Kempthorne	J. Berkson	Jerzy Neyman
W. J. Youden	E. L. Lehmann	I. R. Savage

President: L. J. Savage

Secretary: G. E. Nicholson

President-elect: J. Wolfowitz

Treasurer: A. H. Bowker

Editor: T. E. Harris

Fellows elected in 1958: Julius R. Blum, James Durbin, Benjamin Epstein, J. Hemelrijk, Leo Katz, Tatsuo Kawata, George E. Nicholson, Jr., Howard Raiffa, Sixto Rios, Stefan Vajda, Geoffrey S. Watson, Lionel Weiss.

Committees

(The first person named is the chairman)

IMS COMMITTEE ON EXCHANGES: P. S. Dwyer.

IMS COMMITTEE ON FELLOWS: Frank J. Anscombe, Z. W. Birnbaum, L. A. Goodman, W. Hoeffding, E. S. Pearson, E. L. Scott.

IMS FINANCE COMMITTEE: Mel Peisakoff, A. H. Bowker, Cuthbert Hurd, Theodore Yntema.

IMS MEMBERSHIP COMMITTEE: Benjamin Epstein, H. E. Daniels, Meyer Dwass, Solomon Kulback, Sigeiti Moriguti, G. R. Seth, Rosedith Sitgreaves, Milton Terry.

IMS COMMITTEE FOR INSTITUTIONAL MEMBERS: Mervin Muller, Z. W. Birnbaum, R. Bradford Murphy, Frank Akutowicz, K. J. Arnold, S. S. Wilks.

IMS COMMITTEE ON PROFESSIONAL STANDARDS: Joseph Lev.

IMS PROGRAM COMMITTEE FOR 1958 ANNUAL MEETING: W. Kruskal, F. J. Ans-

combe, R. J. Bose, D. L. Burkholder, D. G. Chapman, Cuthbert Daniel, T. S. Ferguson, Evelyn Fix, F. A. Graybill, H. O. Hartley, P. J. McCarthy, Howard Raiffa.

IMS PROGRAM COMMITTEE OF THE CENTRAL REGION: Jack Silber, Virgil Anderson, Charles Bell, H. T. David, F. A. Graybill, E. R. Immel, Bernard Ostle, M. B. Wilk (ex officio), W. Kruskal (ex officio), R. N. Bradt, Frank Graybill, Irving Burr, John Gurland, Howard Jones, Fred Leone, Boyard Rankin, Paul Rider, Jack Silbert (ex officio), Martin Wilk (ex officio).

IMS EASTERN REGION PROGRAM COMMITTEE: Boyd Harshbarger, Ralph Bradley, B. G. Greenberg, D. G. Horvitz, Carl Kossack, Herbert A. Meyer, John Pratt, Dorothy Gilford (ex officio), Martin Wilk (ex officio), W. H. Horton, J. D. Hromi.

IMS WESTERN REGION COMMITTEE: Richard Link, Fred Andrews, Charles Bell, Tom Ferguson, John Gilbert, John Hofmann, Marion Sandomire, David Stoller, Robert Tate, J. R. Vatnsdal, Frank Massey.

IMS COMMITTEE FOR SPECIAL INVITED PAPERS: W. S. Connor, G. E. P. Box, Kai-Lai Chung, W. Kruskal, G. E. Noether, M. B. Wilk, T. E. Harris member ex officio (as Editor).

IMS AD HOC COMMITTEE ON HIGH SPEED COMPUTING: A. S. Householder, G. S. Acton, R. L. Anderson, K. J. Arnold, C. F. Kossack, W. H. Kruskal, W. J. Merrill, H. A. Meyer, J. Moshman, H. W. Norton, G. J. Resnikoff, R. Slimak, Z. Szatrowski, D. Teichroew.

IMS SUBSCRIPTIONS COMMITTEE: Edward Coleman, Joe Adams, K. A. Bush, Lila Elveback, Harry Harman.

IMS COMMITTEE ON MATHEMATICAL TABLES: D. B. Owen, G. P. Steck, Paul Cox, Fred C. Leone, John W. Tukey, Marvin Zelen, R. L. Anderson, A. H. Bowker, E. E. Cureton, W. J. Dixon, C. W. Dunnnett, Churchill Eisenhart, J. A. Greenwood, H. O. Hartley, William Kruskal, Daniel Teichroew, M. A. Woodbury, L. J. Savage (ex officio), J. Wolfowitz (ex officio).

IMS AD HOC COMMITTEE ON ANNUAL MEETING POLICY: Leo Katz, Cecil Craig, Churchill Eisenhart, Robert Hooke, Henry Scheffe, Martin Wilk.

AD HOC COMMITTEE TO INVESTIGATE THE POSSIBILITY OF BILLING FOR PUBLICATION IN THE *ANNALS*: A. M. Mood, A. H. Bowker, John Curtiss, Dorothy Gilford, W. Kruskal.

IMS BLACKBOARD COMMITTEE: Irving W. Burr, Herbert Robbins, Martin Wilk.

IMS EDITOR HUNT COMMITTEE: W. G. Cochran, T. W. Anderson, M. S. Bartlett, T. E. Harris, W. A. Wallis, S. S. Wilks.

IMS COMMITTEE ON RUSSIAN TRANSLATIONS: Ingram Olkin, Eugene Lukacs.

COMMITTEE TO ADVISE ON A POSSIBLE SUMMER INSTITUTE FOR 1959: David Blackwell, H. O. Hartley, Richard Savage, David Wallace, Max Woodbury.

IMS REPRESENTATIVE TO AAAS: Harold Hotelling.

AMERICAN STANDARDS ASSOCIATION COMMITTEE ON STATISTICAL NOMENCLATURE IMS REPRESENTATIVE FOR 1957-58: Max Halperin.

IMS REPRESENTATIVE IN DIVISION OF MATHEMATICS NATIONAL RESEARCH COUNCIL: W. Allen Wallis.

REPRESENTATIVES TO CONFERENCE ORGANIZATION OF THE MATHEMATICAL SCIENCES: Joseph F. Daly for 1957-58, H. B. Mann for 1957-59.

REPORT OF THE SECRETARY FOR 1958

During the past year The Institute has held its 75th through 78th meetings. A business meeting was held during the 78th (21st Annual) meeting. The Program Committees are to be congratulated on the excellent programs which

have been arranged under the immediate direction of David S. Stoller, Jack Silber, Herbert A. Meyer, and W. H. Kruskal with the overall guidance of our Program Coordinator, M. B. Wilk. The Assistant Secretaries, John F. Hoffmann, Herbert T. David, Marvin Kastenbaum, and John W. Pratt, are to be congratulated on the physical arrangements, and the Associate Secretaries, Evelyn Fix, Jack Silber, and Dorothy M. Gilford, on their performance of the duties of the Secretary with respect to meetings.

MINUTES OF THE ANNUAL BUSINESS MEETING AUGUST 27, 1958

The annual business meeting of the Institute of Mathematical Statistics was called to order at 5:30 p.m. August 27, 1958, in Kresge Auditorium in Cambridge, Massachusetts by George E. Nicholson, Jr., Secretary, in the absence of the President and President-Elect. Approximately 45 members were present.

Minutes of the September 11, 1957 business meeting held in Atlantic City were approved.

Reports of the Secretary, Treasurer, Editor, Program Coordinator and President were presented and accepted.

Ballots were distributed to those members who had not voted by mail.

A resolution expressing appreciation of the work of the local arrangement committee and the staff of M.I.T. for arrangements for the meeting was read and passed.

G. E. Nicholson, Jr. announced that unless there were objections, W. H. Kruskal as an ex officio member of the Council would be ruled ineligible for election and that the four highest candidates after eliminating Kruskal would be ruled elected. It was moved, seconded and passed that the ruling be accepted.

The results of the election are as follows: J. W. Tukey, President-Elect; William Kruskal, Editor; T. E. Harris, Council Member, 1959-61; S. S. Wilks, Council Member, 1959-61; F. J. Anscombe, Council Member, 1959-61; Leo Katz, Council Member, 1959-61.

The meeting was adjourned about 6:30 P.M.

REPORT OF THE EDITOR FOR 1958

During the year ending July 31, the *Annals* received a larger number of new manuscripts than in any previous year (the total number of pages was slightly smaller than in the preceding year). The size of the printed volume for 1958 will be about 1300 pages, and this has been adequate to maintain the backlog of accepted, unprinted papers at substantially less than one issue. The Council has taken notice of the financial problems posed by a larger *Annals*, and plans are now being discussed for raising the required funds.

I take this opportunity to thank the many people whose hard work has been so valuable to the *Annals* during my editorial term, now ending. A list of persons who refereed papers during 1958 will be printed in an early issue. I thank particularly Ann Greene, Jeanette Hiebert, Dorothy Stewart, Helena Williams, and Margaret Wray, who have carried on the work of the editorial office, and I want to express my appreciation to The RAND Corporation for making possible my work on the *Annals*.

T. E. HARRIS
Editor

PUBLICATIONS RECEIVED

Introduccion a La Investigacion Operativa, Instituto de Investigaciones Estadisticas, Serrano 123, Madrid, Spain.

Anuario Estadistico de Espana, Presidencia del Gobierno, Instituto Nacional de Estadistica, Ferraz 41, Madrid, Spain.

Integrals of Airy Functions, National Bureau of Standards Applied Mathematics Series 52, issued May 15, 1958, 28 pp., 25 cents. (Order from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C.)

Table of Natural Logarithms for Arguments Between Five and Ten to Sixteen Decimal Places, National Bureau of Standards Applied Mathematics Series 53, issued March 29, 1958, \$4.00. Supersedes Mathematical Table 12. (Order from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.)

Feinstein, Amiel, *Foundations of Information Theory*, McGraw-Hill Book Company, 330 West 42nd Street, New York 36, New York. 137 pages, \$6.50.