

probabilities, and let $\alpha = (\alpha_1, \alpha_2)$. In the case of continuous probability ratio, and in the discrete case with suitable randomization, α_1 and α_2 are continuous functions of the stopping bounds. Let C be the non-increasing (and convex) curve of points α produced by coincident stopping bounds, and let A be the set in the α -plane bounded by C and the coordinate axes. Consider a point (α_1^*, α_2^*) on C , and separate the stopping bounds in a way which keeps α_1 constant. Since α_2 is a continuous function of the separation d between the bounds, with $\alpha_2(0) = \alpha_2^*$, $\alpha_2(\infty) = 0$, every value α_2 between 0 and α_2^* is assumed for some d . It follows that for every α in A there exist stopping bounds. In the continuous case it is known from Weiss' work that α_2 decreases monotonically from α_2^* to 0, as d increases from 0 to ∞ . In that case, for the existence of stopping bounds it is also necessary that $\alpha \in A$. (Received August 16, 1957; revised June 16, 1958.)

NEWS AND NOTICES

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

Personal Items

Gertrude Mary Cox, director of the Institute of Statistics, Consolidated University of North Carolina, was awarded an honorary Doctor of Science degree by Iowa State College during its Founder's Day centennial observance; she was cited as "teacher, researcher, leader and administrator in the field of statistics."

George Waddel Snedecor, who was primarily responsible for the development of the Iowa State College Statistical Laboratory, was awarded an honorary Doctor of Science degree by the college during its Founder's Day centennial observance and cited as "teacher, author, pioneer in experimental statistics." He has been a visiting professor at North Carolina State College, in the Institute of Statistics, since 1957.

Allan G. Anderson has resigned his position as Chief Statistician at the General Tire & Rubber Company, Akron, Ohio, to accept a position as Professor and Head of the Department of Mathematics at Western Kentucky State College, Bowling Green, Kentucky.

Dr. Ernst P. Billeter has been appointed Professor of Statistics and Automation at the University of Fribourg (Switzerland). He has also been elected Director of the Institute for Research in Automation, which has recently been founded at this University. The aim of this Institute is to do basic research work in application of automation in business and to introduce businessmen and their staff members, as well as students in economics, into the general methods of programming electronic data processing machines. Furthermore, this Institute will help businessmen in solving their problems in operations research, market research, and statistical quality control.

Dr. Uttam Chand has a new position as Officer on Special Duty (Training) in the Central Statistical Organisation (Cabinet Sectt.), New Delhi, India.

Dr. Frank A. Haight, formerly of Auckland University College, New Zealand, has returned to the United States to become Associate Mathematician at the Institute of Transportation and Traffic Engineering, U. C. L. A.

W. Robert Hydeman has accepted an appointment as Manager of Computer Systems at Touche, Niven, Bailey & Smart in their Executive Offices located at 1292 National Bank Building, Detroit 26, Michigan.

Richard C. Kao, formerly Research Associate, Operations Research Department, Engineering Research Institute, and Lecturer, Department of Mathematics, University of Michigan, Ann Arbor, is now Associate Mathematician, System Development Corporation, Santa Monica, California.

Mr. Frederick G. King recently took a position as Senior Scientist with the Armour Research Foundation and now lives in Evanston, Illinois. He was formerly with the Ballistic Research Laboratories at Aberdeen Proving Ground, Maryland.

1/Lt. Melville R. Klauber is now stationed with the 341st Air Refueling Squadron, Dow Air Force Base, Maine.

Richard A. Lamm, formerly at the Biological Warfare Laboratories, Fort Detrick, Maryland, is now a Statistician with the American Cyanamid Company at Pearl River, New York.

Dr. William G. Madow has been advanced to the position of Staff Scientist of Stanford Research Institute, Menlo Park, California.

William F. Taylor has left the School of Aviation Medicine, Randolph Air Force Base, Texas, to become Associate Professor of Public Health in the Division of Biostatistics of the School of Public Health, University of California at Berkeley.

H. Robert van der Vaart, who has been a visiting professor at the Department of Experimental Statistics of the Institute of Statistics at Raleigh, North Carolina, from January, 1957, until the end of January, 1958, will be a visiting associate professor (and hold a scholarship from the Netherlands Organization for Pure Research, Z.W.O.) at the Department of Statistics of the University of Chicago.

Ronald E. Walpole has completed the requirements for the Ph.D. degree in Statistics at Virginia Polytechnic Institute and has assumed the position of Head of the Department of Mathematics and Statistics at Roanoke College.

New Members

The following persons have been elected to membership in The Institute

February 3, 1958, to May 13, 1958

Agan, Miss Martha L., B.S. (Univ. of California, Los Angeles), Medical Record Librarian, V. A. Center, Los Angeles, California; 1814 Holmby Avenue, Los Angeles 25, California.

Alling, David W., M.D. (Univ. of Rochester), Student, Cornell University, Ithaca, New York; 1124 Ellis Hollow Road, Ithaca, New York.

Baker, Laurence H., B.S. (Iowa State College), Research Assistant, Department of Animal Husbandry, University of Minnesota, St. Paul, Minnesota.

Barnard, George A., M.A. (Cambridge), Professor of Mathematical Statistics, Imperial College, Mathematics Department, University of London, Exhibition Road, London S.W. 7, England.

- Berliner, Paul, M.B.A. (City College of New York), Engineer, *Radio Corporation of America*, *Depart. 660, 18-3, 415 South 5th St., Harrison, New Jersey.*
- Blair, Charles R., B.S. (George Washington Univ.), Mathematician, National Security Agency, Ft. George G. Meade, Maryland, and student, George Washington Univ., Washington, D. C.; *536 Beacon Road, Silver Spring, Maryland.*
- Cohen, F. A., M.A. (U.C.L.A.), Teaching Assistant, University of California at Los Angeles, Los Angeles 24, California; *11651 Gorham Ave., #4, Los Angeles 49, California.*
- Cunia, Tiberius, M.S. (McGill Univ.), Forest Engineer, Canadian International Paper Co., 1461 Sunlife Building, Montreal, Quebec, Canada; *5562 Basile Patenaude Pl., Montreal, Quebec, Canada.*
- Dutt, John E., M.A. (Columbia Univ.), Mathematician, MIT Lincoln Laboratory, Lexington, Massachusetts; *55 Arlington Street, Newton, Massachusetts.*
- Elashoff, Robert M., A.M. (Boston Univ.), Student and Laboratory Teacher in Biostatistics, *Harvard School of Public Health, 55 Shattuck Street, Boston, Massachusetts.*
- Ferrin, Kenneth M., M.A. (U.C.L.A.), student, U.C.L.A.; *1412 Midvale Avenue, West Los Angeles 24, California.*
- Federowicz, Alexander J., B.S. (Carnegie Inst. of Tech.), Graduate Student, Carnegie Institute of Technology, Pittsburgh 13, Pa.; *5876 Solway Street, Pittsburgh 17, Pa.*
- Fimple, Melvin D., M.B.A. (Univ. of Buffalo), Components Engineer, Stromberg-Carlson Company, Rochester, New York; *21 Carthage Drive, Rochester 21, New York.*
- Fink, Lester H., B.S. in E.E. (Univ. of Pennsylvania), Engineer, Electrical Research Section, Philadelphia Electric Co., Philadelphia, Pa.; *Ferry and Iron Hill Roads, Doyletown R. D. 1, Pa.*
- Freimer, Marshall Leonard, A.M. (Harvard Univ.), Student, Harvard University, Dept. of Statistics, Cambridge 38, Massachusetts; *Lincoln Laboratory, P. O. Box 73, Lexington 73, Massachusetts.*
- Grossling, Bernardo F., Ph.D. (London Univ.), Senior Research Geophysicist, *California Research Corporation, P. O. Box 446, La Habra, California.*
- Howell, John Robert, M.S. (Univ. of Florida), graduate student, University of Florida, Gainesville, Florida; *Mathematics Department, University of Florida, Gainesville, Florida.*
- Johnson, Jerome R., M.S. (Purdue Univ.), Chief, Rocket, Mortar & Recoilless Ammunition Section, Surveillance Branch, Weapon Systems Lab., Ballistic Research Lab., Aberdeen Proving Ground, Maryland; *860 Ontario Street, Havre de Grace, Maryland.*
- Kaula, William M., M.S. (Ohio State Univ.), Geodesist, U. S. Army Map Service, Washington 25, D. C.; *5202 Baltimore Avenue, Washington 16, D. C.*
- Lerner, Gary B., B.S. (Michigan State Univ.), Actuarial Student, Metropolitan Life Insurance Company, 1 Madison Ave., New York, N. Y.; *731 Scranton Ave., East Rockaway, New York.*
- Lewis, John S., B.S. (Carnegie Inst. of Tech.), Research Assistant, *Department of Mathematics, Carnegie Institute of Technology, Pittsburgh 13, Pennsylvania.*
- Meagher, Jack R., A.M. (Univ. of Michigan), Associate Professor, *Mathematics Department, Western Michigan University, Kalamazoo, Michigan.*
- Posener, Ludwig N., Ph.D. (Univ. of Berlin), Lecturer of Statistics and Applied Mathematics, University of Tel Aviv, 155 Herzl Street, Tel Aviv, Israel; *22 Pinsker Street, Rehovot, Israel.*
- Raj, Des, Ph.D. (Calcutta Univ.), Associate Professor, *American University of Beirut, Beirut, Lebanon.*
- Sawits, Murray B., B.S. (City College of New York), Senior Statistician, Rayco Mfg. Co., 22 Straight St., Paterson, New Jersey; *1420 Grand Concourse, Box 56, New York, N. Y.*
- Suzuki, Yukio, Member of *the Institute of Statistical Mathematics, No. 1, Azabu-Fujimi-Cho, Minato-Ku, Tokyo, Japan*
- Thompson, Robert J., B.S. (Drake Univ.), Senior Research Engineer, Convair Pomona, Pomona, California; *447 Celia Avenue, Pomona, Calif.*
- Zadoff, Solomon A., A.M. (Columbia Univ.), Research Engineer, Sperry Gyroscope Co.,

Great Neck, New York, and student, Columbia University, New York, New York; 193-18 37th Ave., Flushing 59, New York.

Zayachkowski, Walter, M.A. (Univ. of Saskatchewan), Graduate Student, *Dept. of Mathematics, University of Alberta, Edmonton, Alberta, Canada.*

Zimmer, William J., M.S. (Purdue Univ.), Research Fellow, *Statistical Laboratory, Purdue University, Lafayette, Indiana.*

EXPANDED TRAINING PROGRAM IN BIOMETRICS TO BE OFFERED AT IOWA STATE COLLEGE STATISTICAL CENTER

The Department of Statistics and the Statistical Laboratory of Iowa State College will substantially expand their present graduate training program in biostatistics with the aid of a five-year grant from the National Institutes of Health. This award will provide support for several graduate students in statistics per year as candidates for the M.S. or Ph.D. degree, with a view to stimulating their interest in biometry, medical statistics or public health as a career. It will also give partial support to one staff member so that he can devote more time to those areas of statistical application.

One feature of the expanded program is that biostatistics trainees, while working toward masters' or doctors' degrees in statistics, will spend up to three months each year at some selected medical school or public health center to round out their experience through contact with biometric data in the field or laboratory. So far, three new traineeships have been established for the 1958-59 year. Further details about the expanded biostatistics program and application forms for traineeships for the 1959-60 year may be obtained from the Department of Statistics, Iowa State College.

NATIONAL REGISTER OF SCIENTIFIC AND TECHNICAL PERSONNEL

The American Mathematical Society at the request of the National Science Foundation is assembling and maintaining a register of mathematicians and mathematical scientists. The Mathematics Register is a section of the National Register of Scientific and Technical Personnel, which is an official responsibility of the NSF. The purpose of the Register is to provide up-to-date information on the scientific manpower resources of the United States.

As a result of the splendid cooperation accorded to the project by most of the mathematicians and mathematical scientists who have received questionnaires to fill in, the mathematical section of the Register is now remarkably complete. However, there are still a few gaps to be filled in. If you have received a National Register questionnaire from the Society, please fill it in now and send it to the Headquarters Offices of the Society at 190 Hope Street, Providence 6, Rhode Island. If you have never received a questionnaire and feel that you are qualified for inclusion in the Register, please drop a note to that effect to the Society at this address.

EDUCATIONAL TESTING SERVICE FELLOWSHIPS

The Educational Testing Service is offering for 1959-60 its twelfth series of research fellowships in psychometrics leading to the Ph.D. degree at Princeton University. Open to men who are acceptable to the Graduate School of the University, the two fellowships each carry a stipend of \$2,650 a year and are normally renewable. Fellows will be engaged in part-time research in the general area of psychological measurement at the offices of the Educational Testing Service and will, in addition, carry a normal program of studies in the Graduate School.

Suitable undergraduate preparation may consist either of a major in psychology with supporting work in mathematics, or a major in mathematics together with some work in psychology. However, in choosing fellows, primary emphasis is given to superior scholastic attainment and research interests rather than to specific course preparation.

The closing date for completing applications is January 2, 1959. Information and application blanks will be available about September 15 and may be obtained from: Director of Psychometric Fellowship Program, Educational Testing Service, 20 Nassau Street, Princeton, New Jersey.

REPORT OF THE AMES, IOWA, MEETING OF THE INSTITUTE OF MATHEMATICAL STATISTICS

The seventy-sixth meeting of The Institute of Mathematical Statistics, a Central Region Meeting, was held in the Gallery of the Memorial Union on the campus of Iowa State College at Ames, Iowa, on April 3-5, 1958. These dates were within the period during which Iowa State College was observing its Centennial Celebration.

A Special Invited Address, "Subjective Judgements and Statistical Practice," was delivered by Professor L. J. Savage of the University of Chicago.

On Friday evening, April 4, a banquet was held in the Great Hall of the Memorial Union with Professor T. A. Bancroft presiding. After dinner Dean Richard S. Bear of the Division of Science at Iowa State College addressed the assembled guests on the history of statistics at Ames. This was followed by entertainment by graduate students at Ames.

The Chairman of the Program Committee for the meeting was Jack Silber, Roosevelt University. The Assistant Secretary for the meeting was Herbert T. David, Iowa State College.

Ninety-six people registered for the meetings, including the following 52 members of The Institute:

D. Huntsberger, Meyer Dwass, Preston C. Hammer, Emil H. Jebe, Howard L. Taylor, H. O. Hartley, W. M. Gilbert, Paul G. Homeyer, Franklin A. Graybill, W. H. Horton, Oscar Kempthorne, Russell N. Bradt, D. R. Truax, Stanley Isaacson, I. R. Savage, Lorraine Schwartz, George Zyskind, Helen Bozovich, Robert V. Hogg, Leo Katz, Leonard J. Savage, Roger S. McCullough, Howard L. Jones, Scott Krane, F. E. Satterthwaite, Bernard Ostle, Virgil S. Anderson, R. W. Kennard, Herbert T. David, Robert F. White, A. W.

Wortham, J. D. Hromi, Jack Silber, John F. Pauls, Timon A. Walther, Edward C. Bryant, Richard L. Beatty, Richard L. Carter, Byron Brown, S. N. Roy, Betty K. Stewart, Z. Govindarajulu, M. B. Wilk, H. Robert van der Vaart, William H. Williams, T. A. Bancroft, William J. Zimmer, R. A. Wijsman, G. Tintner, John Gurland, Sidney Addelman, David L. Wallace.

The program for the meeting was as follows:

THURSDAY, APRIL 3, 1958

9:00 a.m. Invited Papers on the Design of Experiments

Chairman: VIRGIL L. ANDERSON, Purdue University

1. *A Comparison of Designs for Exploration of Response Surfaces*, LE ROY FOLKS, Iowa State College.
2. *The Staircase Design*, F. A. GRAYBILL, Oklahoma State University.

10:30 a.m. Invited Papers on the Problem of Nuisance Parameters

Chairman: T. A. BANCROFT, Iowa State College.

1. *Testing the Equality of the Means of Two Normal Populations*, JOHN GURLAND, Iowa State College.
2. *The Behrens—Fisher Problem: A Critical Review and a Subjective Approach*, DAVID L. WALLACE, The University of Chicago.

2:00 p.m. Special Invited Address

Chairman: OSCAR KEMPTHORNE, Iowa State College

- Subjective Judgements and Statistical Practice*, L. J. SAVAGE, The University of Chicago.

4:00 p.m. Invited Paper on the Analysis of Variance

Chairman: R. V. HOGG, University of Iowa.

1. *Multivariate Analysis of Variance under Models I and II and Mixed Models*, S. N. ROY, University of North Carolina and University of Minnesota.

FRIDAY, APRIL 4, 1958

9:00 a.m. Invited Papers on Statistical Problems in Econometric Theory

Chairman: J. SILBER, Roosevelt University.

1. *A New Method for Fitting the Logistic Function*, GERHARD TINTNER, Iowa State College.
2. *The Effects of Incomplete Specification on the Results of Estimating Procedures*, LEONID HURWICZ, University of Minnesota.

10:30 a.m. Contributed Papers I

Chairman: ALBERT WORTHAM, Texas Instruments.

1. *Bias and Confidence in Not-Quite Large Samples* (Preliminary Report), JOHN W. TUKEY, Princeton University (By title).
2. *On a Multivariate Gamma Distribution*, P. R. KRISHNAIAH and M. M. RAO, University of Minnesota.
3. *On the Fitting of Some Contagious Distributions*, S. K. KATTI and JOHN GURLAND, Iowa State College.
4. *Minimal Complete Classes of Tests*, D. L. BURKHOLDER, University of Illinois

5. *An Identity of Use in Non-Linear Least Squares*, M. B. WILK, Bell Telephone Laboratories.
6. *Contributions to the Theory of Rank Order Statistics—The One Sample Case*, I. RICHARD SAVAGE, University of Minnesota.
7. *A Rule for Action Based on Percentage Changes in the Sample Mean*, D. B. OWEN, Sandia Corporation (By title).
8. *An Expression for the Cumulative Distribution Function of the Non-Central t -Distribution*, D. B. OWEN, Sandia Corporation (By title).
9. *Some Formulae for the Exact Computation of Probabilities in Wilcoxon's Two Sample Test*, H. ROBERT VAN DER VAART, University of Chicago.

2:00 p.m. Invited Papers on Non-Parametric Statistics

Chairman: B. OSTLE, Sandia Corporation.

1. *Some Null Rank Distributions Derivable by Reflection*, H. T. DAVID, Iowa State College.
2. *Order Statistics in the Poisson Process*, MEYER DWASS, Northwestern University.

3:30 p.m. Invited Papers on the Use of Electronic Computers in Statistics

Chairman: M. B. WILK, Bell Telephone Laboratories.

1. *Theoretical Possibilities of Computers*, P. C. HAMMER, University of Wisconsin.
2. *Linear Programming on the IBM-650*, H. O. HARTLEY, Iowa State College.

SATURDAY, APRIL 5, 1958

9:00 a.m. Contributed Papers II

Chairman: W. H. HORTON, Westinghouse Electric Company.

1. *Biases in Prediction by Regression for Certain Incompletely Specified Models*, HAROLD LARSON, Iowa State College.
2. *Notes on the Spearman-Kärber Procedures in Bioassay* (Preliminary Report), BYRON W. BROWN, JR., Louisiana State University.
3. *Approximate Solutions for the Probability Density of Zero-Crossing Intervals in a Gaussian Process*, J. A. MCFADDEN, Naval Ordnance Laboratory and Purdue University (introduced by JUDAH ROSENBLATT).
4. *The Fourth Product-Moment of a Binary Random Process*, J. A. MCFADDEN, Purdue University (introduced by JUDAH ROSENBLATT). (By title)
5. *Limiting Distributions of k -Sample Test Criteria of Kolmogorov-Smirnov- v . Mises Type*, J. KIEFER, Cornell University. (By title)
6. *Independence of Statistics and Characterization of the Multivariate Normal Distribution*, S. G. GHURYE, University of Chicago, and INGRAM OLKIN, Michigan State University.
7. *Unbiased Regression Estimators*, WILLIAM H. WILLIAMS, Iowa State College.
8. *Maximum Likelihood Estimation from Incomplete Data for Continuous Distribution*, SCOTT KRANE, Iowa State College.
9. *Unbiased Ratio Estimators in Stratified Sampling*, JOSE NIETO, Iowa State College.
10. *Similar Tests of Hypothesis Concerning the Ratio of Mean to Standard Deviation in a Normal Population*, ROBERT A. WIJSMAN, University of Illinois.
11. *Births and Deaths in Parallel*, J. SILBER, Roosevelt University.

10:30 a.m. Invited Papers on the Theory of Estimation

Chairman: R. N. BRADT, University of Kansas.

1. *Some Interval Estimation Problems*, ROBERT J. BUEHLER, Iowa State College.

2. *Inadmissible Samples and Confidence Limits*, HOWARD L. JONES, Illinois Bell Telephone Company.

On Saturday, April 5, at 2:00 p.m. Dr. S. N. Roy of the University of North Carolina and the University of Minnesota presented a special seminar for members of the Statistical Laboratory at Iowa State College on "Some Recent Work on Univariate and Multivariate Components Analysis." The people attending the meetings of The Institute were invited to this seminar.

PUBLICATIONS RECEIVED

- ARROW, KENNETH J., SAMUEL KARLIN, AND HERBERT SCARF, *Studies in the Mathematical Theory of Inventory and Production*, Stanford University Press, Stanford, California. x + 340 pp.
- A Comparative Study of Statistical Analysis and Other Methods of Computing Ore Reserves*, United States Department of the Interior Bureau of Mines, Washington 25, D. C.
- Supplementary List of Publications of the National Bureau of Standards, July 1, 1947, to June 30, 1957*. Supplement to National Bureau of Standards Circular 460. (Supersedes Supplement to Circular 460, December 30, 1952.) Issued May 14, 1958, 373 pages, \$1.50. (Order from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.)