

A. ORGANIZATION

The department faculty meets approximately twice a month, usually as the need arises rather than on a pre-determined schedule. A five-man advisory committee has been formed to assist the department head. In particular, this committee is charged with determining the agenda of faculty meetings and assists in recruiting new faculty. All new appointments to the faculty are voted upon by all members of the faculty. Recommendations on continuing contract and reappointment are made to the department head by the tenured faculty and recommendations for promotion to a given rank are made to the department head by those faculty members holding that rank or higher.

B. COLLOQUIA AND FACULTY SEMINARS

During the year 24 colloquia were given in the department. A number of these were given by members of the faculty and by prospective faculty members. Listed below are those which do not fall into this category:

- C. Edmond Burgess, University of Utah: "Surfaces in 3-dimensional Euclidean Space," "CUPM Recommendations on College Mathematics Curriculum," "CUPM Panel on Qualifications for College Teachers."  
 Austin Barron, Purdue University: "On Selection and Ranking Procedures."  
 Bernard Harris, University of Wisconsin: "Foundations of Statistical Decision Theory."  
 William J. Zimmer, Sandia Corporation: "Shorter Confidence Intervals Using Prior Observations."  
 M. Srivastava, University of Toronto: "On Fixed-Width Confidence Bounds."  
 Ralph DeMarr, University of New Mexico: "Partially Ordered Linear Algebras."  
 Willen Kuyk, McGill University: "Some New Results on Hilbert's Irreducibility Theorem and Applications."  
 Nagyoshi Iwahori, University of Tokyo: "On the Degrees of Irreducible Representations of Finite Chevalley Groups Appearing in  $1_B^G$ ."  
 Charles Bell, University of Michigan: "Some Tests of Symmetry."  
 E. Spitznagel, Northwestern University: "The Theory of Finite Simple Group Orders, 1967 to Present."  
 Samuel Eilenberg, Columbia University: "A New Proof of Peano's Theorem on Space-filling Curves."

Seminars involving faculty and students were held regularly during the year on the following topics:

1. Abelian Groups.
2. Mathematics of Speculation.

3. Harmonic Analysis.
4. Algebraic Topology.
5. Lie Groups and Lie Algebras.
6. Point Set Topology.

We were again fortunate to have the services of Mr. Murray Klamkin of the Research Division of Ford Motor Company, by the generosity of that company, during the month of January. He conducted problem seminars for both graduate and undergraduate students and consulted with faculty on various types of research problems.

The sixth annual Holiday Symposium in Mathematics was held during the period December 27 to December 30. The featured lecturer was Professor Irving Kaplansky from the University of Chicago. A total of 99 mathematicians registered for the symposium, some traveling from as far away as the University of Montreal and Queen's University in Ontario.

C. UNDERGRADUATE SCHOLARSHIPS

NSF Departmental Development Grant . . . . .	12
Department Funds . . . . .	12
Physical Science Laboratory. . . . .	4

G. PROFESSIONAL SERVICE

As in past years, the staff remains active in the area of professional service. Seven of the staff serve as reviewers to one or more of the various review journals in the mathematical sciences. Dr. Randolph is Associate Editor for the Operations Research Journal, Dr. McKean is Associate Editor for Technometrics, and Professor Wisner is a referee for the American Mathematical Monthly.

Professor Walker continues as a consultant for the Committee on the Undergraduate Program in Mathematics. Professor Wisner is still quite involved in various national professional organizations. In addition to those listed for last year, he is a member of the Steering Committee of the Center for Research in College Instruction of Science and Mathematics.

H. PROFESSIONAL MEETINGS ATTENDED BY FACULTY

Olin B. Ader  
 Holiday Mathematics Symposium (national).

David Arnold  
 75th Annual Meeting, American Mathematical Society (national).  
 Holiday Mathematics Symposium (national).

Richard Bagby

75th Annual Meeting, American Mathematical Society (national).  
Holiday Mathematics Symposium (national).

H. S. Bear

75th Annual Meeting, American Mathematical Society (national).  
661st Meeting, American Mathematical Society (regional).  
73rd Annual Meeting, American Mathematical Society (regional).

Eldon Boes

75th Annual Meeting, American Mathematical Society (national).  
Holiday Mathematics Symposium (national).

Mary Lou Butler

New Mexico Council of Teachers of Mathematics (regional).  
Coordinated Elementary-Secondary Mathematics Committee for the  
State Department of Education (regional).

John DePree

75th Annual Meeting, American Mathematical Society (national).

John B. Giever

75th Annual Meeting, American Mathematical Society (national).  
Holiday Mathematics Symposium (national).

Edward D. Gaughan

47th Annual Meeting, National Council of Teachers of Mathematics  
(national).  
75th Annual Meeting, American Mathematical Society (national).  
New Mexico Council of Teachers of Mathematics (regional).  
Holiday Mathematics Symposium (national).

Donald G. Johnson

664th Meeting, American Mathematical Society (regional).  
75th Annual Meeting, American Mathematical Society (national).  
73rd Annual Meeting, American Mathematical Society (national).

Joseph E. Kist

664th Meeting, American Mathematical Society (regional).  
75th Annual Meeting, American Mathematical Society (national).  
73rd Annual Meeting, American Mathematical Society (national).

R. Arthur Knoebel

664th Meeting, American Mathematical Society (regional).  
Holiday Mathematics Symposium (national).

Edward T. Kobayashi

Holiday Mathematics Symposium (national).

Arthur Kruse

Holiday Mathematics Symposium (national).

Wolfgang Liebert

75th Annual Meeting, American Mathematical Society (national).

Thomas McCullough

75th Annual Meeting, American Mathematical Society (national).

Holiday Mathematics Symposium (national).

Harley E. McKean

American Statistical Association (national).

73rd Annual Meeting, American Mathematical Society (national).

Holiday Mathematics Symposium (national).

Ray Mines

75th Annual Meeting, American Mathematical Society (national).

Holiday Mathematics Symposium (national).

Keith Phillips

75th Annual Meeting, American Mathematical Society (national).

Holiday Mathematics Symposium (national).

Paul Randolph

Holiday Mathematics Symposium (national).

Fred Richman

75th Annual Meeting, American Mathematical Society (national).

Holiday Mathematics Symposium (national).

Gerald S. Rogers

75th Annual Meeting, American Mathematical Society (national).

Louis Solomon

Conference on Finite Groups (national).

Holiday Mathematics Symposium (national).

Charles Swartz

75th Annual Meeting, American Mathematical Society (national).

Vidya S. Taneja

121st Central Regional Meeting, Institute of Mathematical  
Statistics (regional).

Institute of Mathematical Statistics (regional).

John D. Thomas

Project Directors of NSF Summer Institutes Meeting (national).

Holiday Mathematics Symposium (national).

Carol Walker

75th Annual Meeting, American Mathematical Society (national).  
 Holiday Mathematics Symposium (national).

Elbert Walker

75th Annual Meeting, American Mathematical Society (national).  
 Holiday Mathematics Symposium (national).

John Werth

75th Annual Meeting, American Mathematical Society (national).  
 Holiday Mathematics Symposium (national).

Francis D. Williams

73rd Annual Meeting, American Mathematical Society (national).

Robert J. Wisner

New Mexico Council of Teachers of Mathematics (regional).  
 47th Annual Meeting, Nat'l Council of Teachers of Mathematics  
 (national).  
 75th Annual Meeting, American Mathematical Society (national).  
 73rd Annual Meeting, American Mathematical Society (national).  
 Representative of the Mathematical Association of America (as Past  
 President of the Southwestern Section) at the inauguration of  
 the incoming President of the University of New Mexico  
 (regional).  
 Center for Research in College Instruction in Science and  
 Mathematics (regional).  
 Holiday Mathematics Symposium (national).

I. RESEARCH PAPERS PUBLISHED BY FACULTY

- Bradley, James V., "Desirable Dimensions for Concentric Controls,"  
Human Factors, (June, 1969).  
 Bradley, James V., "Optimum Knob Crowding," Human Factors, (June, 1969).  
 Bradley, James V., "Effect of Gloves on Control Operation Time,"  
Human Factors, (February, 1969).  
 Bradley, James V., "Glove Characteristics Influencing Control  
 Manipulability," Human Factors, (February, 1969).  
 Bradley, James V., "Studies in Research Methodology, Parts A, B,  
 and C," Dissertation Abstracts B (Monograph Section), Vol. 20,  
 (1968) 4815B-4816B.  
 Bradley, James V., "A Survey of Sign Tests Based on the Binomial  
 Distributions," Journal of Quality Technology, Vol. 1, (1969)  
 89-101.  
 DePree, John D., "Transformation of Linear Integral Equations Into  
 Nonlinear Integral Equations," Journal of the Mathematical  
 Association of America (June, 1969).  
 Liebert, Wolfgang, "Endomorphism Rings of Abelian p-groups,"  
Proceedings of the Montpellier Conference on Abelian Groups,  
 1968.

- Mines, Ray, "Torsion and Cotorsion Completions," Proceedings of the Montpellier Conference on Abelian Groups, 1968.
- Mines, Ray, "A Family of Functors Defined on Generalized Primary Groups," Pacific Journal of Mathematics, Vol. 26, No. 2 (1968).
- Phillips, Keith, "Maximal Functions for a Class of Locally Compact Non-Compact Groups," Bulletin of the American Mathematical Society, Vol. 75, No. 2 (March, 1969), p. 384.
- Randolph, Paul H., "Nonlinear Programming Through Optimal Stopping Rules," Statistical Laboratory, NMSU, Tech. Report Series No. 5 (1968).
- Randolph, Paul H., "The Case of the Careless Tailor, or a New Probability Function," NMSU, Statistical Laboratory, Tech. Report Series No. 9 (1968).
- Randolph, Paul H., "A Model for Interceptors with Overlapping Batteries: A Method of Nonlinear Programming," Tech. Report, BDM-241-68-T, Braddock, Dunn and McDonald, (1968).
- Randolph, Paul H., "A Class of Max-Min Problems," Tech. Report, Braddock, Dunn and McDonald, (1969).
- Richman, Fred, "Thin Abelian p-groups," Pacific Journal of Mathematics, Vol. 27, No. 3 (1968) pp. 599-606.
- Richman, Fred, Walker, Carol, & Walker, E. A., "A Class of Rank-2 Torsion Free Groups," Studies on Abelian Groups, Dunod, 1968.
- Richman, Fred, Walker, Carol, & Walker, E. A., "Projective Classes of Abelian Groups," Studies on Abelian Groups, Dunod, 1968.
- Richman, Fred, and Walker, E. A., "Extending Ulm's Theorem without Group Theory," Proceedings of the American Mathematical Society, Vol. 21, (1969), pp. 194-196.
- Rogers, Gerald S., and Chuma, M. S., "Best Approximations," Statistical Laboratory, NMSU, Tech. Report Series No. 8, (October, 1968).
- Rogers, Gerald S., "Mean of a Gaussian Random Variable," Statistical Laboratory, NMSU, Tech. Report Series No. 15 (January, 1969).
- Thomas, John D., "A Dissection Problem," Mathematics Magazine, Vol. 41, No. 4 (1968).
- Thomas, John D., and Porter, J. R., "On H-closed and Minimal Hausdorff Spaces," Transactions of the American Mathematical Society, (April, 1969).
- Thomas, John D., and Lewis, H. R., "An Efficient Method for Computing a Class of Definite Integrals," Tech. Report, LA-DC-9864.
- Walker, E. A., and Parker, Larry, "An Extension of the Ulm-Klottis Theorems," Studies on Abelian Groups, Dunod, Paris (1968).
- Williams, Francis D., "On Spaces with Vanishing Higher Whitehead Products," Bulletin of the American Mathematical Society, No. 74 (1968), p. 497.
- Williams, Francis D., "Higher Homotopy-Commutativity," Transactions of the American Mathematical Society, Vol. 139 (May, 1969), pp. 191-205.

- Wisner, Robert J., Stenberg, Warren, et. al., Calculus, A Computer Oriented Presentation, Part 1, Center for Research in College Instruction in Science and Mathematics, vii + 205 pp., (September, 1968).
- Wisner, Robert J., Stenberg, Warren, et. al., Calculus, A Computer Oriented Presentation, Part 2, Center for Research in College Instruction in Science and Mathematics, ix + 217 pp. (November, 1968).
- Wisner, Robert J., and Kemeny, John, et. al., The Mathematical Sciences; Undergraduate Education, National Academy of Sciences, Washington, D. C., ix + 113 pp., ( December, 1968).

J. RESEARCH PAPERS PRESENTED BY FACULTY

- Arnold, David M., "A Duality for Quasi-Isomorphism Classes of Torsion Free Modules with Finite Rank Over a Discrete Valuation Ring," American Mathematical Society (national).
- Bear, H. S., "The Part Metric in a Convex Set," American Mathematical Society (national).
- Bear, H. S., "The Part Metric in a Cone," American Mathematical Society (national).
- Boes, Eldon C., "The Wang Sequences and Some Calculations in K-Theory," American Mathematical Society (national).
- Liebert, Wolfgang, "Endomorphism Rings of Modules Over Complete Discrete Valuation Rings," American Mathematical Society (national).
- Mines, Ray, "Radicals and Torsion Free Groups," American Mathematical Society (national).
- Williams, Francis D., " $C_n$ -Commutativity of Algebras," American Mathematical Society (national).

K. PUBLICATIONS OF FORMER GRADUATE STUDENTS

- Ball, Ralph W., "Indices of Maximal Subgroups of Infinite Symmetric Groups," Proceedings of the American Mathematical Society, 19 (1968).
- Deming, Robert W., "Some Point-Set Properties and the Edge Path Group of a Generalized Uniform Space," Transactions of the American Mathematical Society, 134 (1968).
- Dickson, S. E., and Alin, J. S., "Goldie's Torsion Theory and Its Derived Functor," Pacific Journal of Mathematics, 24 (1968).
- Dickson, S. E., "On Algebras on Finite Representation Type," Transactions of the American Mathematical Society, 135 (1969).
- Lacey, H. E., and Hardy, J., "Extensions of Regular Borel Measures," Pacific Journal of Mathematics, 24 (1968).
- Lacey, H. E., and Hebert, D. J., "On Supports of Regular Borel Measures," Pacific Journal of Mathematics, 27 (1968).
- Lacey, H. E., and Hardy, J., "Notes on Perfectness and Total Disconnectedness," American Mathematical Monthly, 75 (1968).

Lacey, H. E., and Morris, P. D., "On Universal Spaces of Type  $C(X)$ ," Proceedings of the American Mathematical Society, 19 (1968).  
 Mader, Adolf, "Extensions of Abelian Groups," Studies on Abelian Groups, Dunod, Parris, (1968).  
 Porter, J., "Matrix Characterizations of Topological Properties," Canadian Mathematical Bulletin, 11 (1968).  
 Porter, J., and Thomas, J. D., "On H-closed and Minimal Hausdorff Spaces," Transactions of the American Mathematical Society, 135 (1969).  
 Whitley, R., "The Size of the Unit Sphere," Canadian Journal of Mathematics, 20, (1968).  
 Whitley, R., "The Spectral Theorem for a Normal Operator," American Mathematical Monthly, 75 (1968)  
 Whitley, R., "Extreme Points in Algebras of Functions Vanishing at Infinity," Studia Mathematica, 32 (1969).

M. GRANTS RECEIVED

H. S. Bear . . . . .	\$ 21,300
J. D. DePree . . . . .	12,600
J. D. Thomas . . . . .	46,200
L. Solomon and E. Kobayashi. . . . .	29,700
E. Walker, C. Walker, F. Richman, R. Mines, and W. Liebert . . . . .	28,500
R. Wisner. . . . .	7,500

Grants Pending

M. Mandelker . . . . .	10,250
H. McKean and F. Newman. . . . .	86,418
H. McKean. . . . .	104,048

N. CRITICAL ANALYSIS

As with most every year, this one seemed to be at once productive and satisfying, yet somehow disappointing.

Counting our blessings, we witnessed a renewed activity in faculty seminars at the local level. The rather frenetic efforts toward recruitment over the past few years made it seem at times that the mathematical stimulation came from without, the department being host to so very many prospective faculty. Now, with the NSF Departmental Development Grant funds tapering off, there has been more time and energy left for purely local participation in the ongoing program. Next year this local activity will surely increase.

There has also been new emphasis on research, new approaches to teaching, an enlarged interest in the mathematics undergraduates.



In terms of new staff, some very promising people have been appointed:

Dr. Rudolph Borges, Justus Liebig University.  
Dr. William Julian, California Institute of Technology.  
Dr. Mark Mandelker, The University of Kansas.  
Dr. Mitsu Sugiura, University of Osaka.

This list may not be complete, inasmuch as some additions may be made after the deadline for this report.

Of special interest is the case of Dr. Sugiura. He comes from the University of Osaka as National Science Foundation Senior Foreign Scientist. This is a national honor to the university and a local honor to the department.

The Conference Board of the Mathematical Sciences also honored the department by convincing the National Science Foundation to imitate the annual New Mexico State University Holiday Symposium on a regional basis in other parts of the country. Our proposal this year, then, was not a singular local event; but we were again granted support (vastly increased over past years), and our honored guest will be Professor George Whitehead of Massachusetts Institute of Technology. Moverover, the new funds will provide expenses for an additional 25 visitors to the campus during the holiday event.

The department lost the following people, listed with their new affiliation:

H. S. Bear, Department Chairman, University of Hawaii.  
Louis Solomon, Professor, University of Wisconsin.  
Thomas McCullough, Assistant Professor, California State College at Long Beach.

There is the continuing, and now clearly growing, need to establish something along the lines of a divisional concept for the mathematical sciences.

This past year the department suffered unusual setbacks in promotions, despite the fact that the personnel involved are regarded highly by their peers, both locally and nationally. It is to be hoped that a meaningful new approach to these problems can be devised during the coming year. In terms of salaries, the department fared better in terms of increases than has been possible in the past few years, thanks to the efforts of the administration in developing new funds for faculty and staff throughout the university. However, the salaries are still not up to the level of comparable departments elsewhere. The national shortage of active and productive university-level mathematicians maintains a vigilant pressure

on salaries, and we must be constantly alert and sensitive to this need. For its part, the department will continue through many of its members to develop new sources of funding its new research and teaching activities.

All in all, this has proved to be a year of increased (though sometimes not very productive) introspection. Consolidating one's gains can often be a burden, but it does seem clear that we have the energy and ability to accomplish long-range goals of mathematical excellence, provided we enjoy administrative and financial participation in our efforts.