

THE ANNUAL MEETING IN CAMBRIDGE

The fortieth Annual Meeting of the American Mathematical Society was held at Harvard University and the Massachusetts Institute of Technology, Cambridge, Massachusetts, from Tuesday to Friday, December 26–29, 1933. The afternoon session on Thursday and the dinner were held at the Massachusetts Institute of Technology, the other sessions in the Alice Mary Longfellow Hall of Radcliffe College. In point of attendance of members and in number of papers offered, it was second only to the Annual Meeting of 1928 in New York City. The arrangements as made by the committee, of which Professor J. L. Walsh was chairman and Mrs. W. C. Graustein and Professors D. J. Struik and D. V. Widder the other local members, were carefully conceived and superbly executed, and the meeting proved to be one of the most interesting and pleasant in the annals of the Society. At the session on Friday morning on motion of Professor W. L. Hart the Society passed a hearty vote of thanks to the committee and the inviting institutions.

The Board of Trustees held a meeting in New York City on December 19; at the meeting called for 6:00 P.M. on December 26 there was no quorum present and adjournment was taken. The Council held a meeting at 8:00 P.M. on Wednesday and an adjourned session at the same hour on Friday.

The scientific meetings opened on Tuesday evening with a general session. On Wednesday morning one session was devoted to Analysis and one to a symposium of invited papers on the topic of Probability. At the latter the American Physical Society and Section B were guests; Professor D. J. Struik presided and four invited papers were presented as follows: *Remarks on causality and probability*, by Professor Eberhard Hopf, of the Massachusetts Institute of Technology; *Foundations of probability in the natural sciences*, by Professor Felix Bernstein, of Columbia University; *The probability of position in a canonical ensemble*, by Professor G. E. Uhlenbeck, of the University of Michigan; and *The Brownian motion*, by Professor Norbert Wiener, of the Massachusetts Institute of Technology. On account of illness, the fifth paper, on *Some analytical problems relating to probability*, which was to have been given by Dr.

Borge Jessen, of the Institute for Advanced Study at Princeton, was omitted. There was a lively discussion of these papers.

On Wednesday afternoon there were three sectional sessions. On Thursday morning there was scheduled the annual business meeting and election followed by a presentation of the Bôcher Memorial Prize. This prize was divided between Professors Marston Morse and Norbert Wiener and these gentlemen gave brief résumés of the papers on which the award was based. The memoir of the former, entitled *The foundations of a theory of the calculus of variations in the large in m -space*, was published in volume 32 of the Transactions of this Society, and that of the latter, entitled *Tauberian theorems*, was published in volume 33 of the Annals of Mathematics. Following this presentation and at the request of the Program Committee, Professor Georges Valiron, of the University of Paris, now exchange professor at Harvard University, delivered an address entitled *Schwarz's lemma; its extensions and applications*.

An important feature of the meetings was the symposium on General Analysis, held on Thursday afternoon, at which three papers were presented by invitation of the Program Committee: *On E. H. Moore's general analysis: the first theory*, by Professor T. H. Hildebrandt; *On E. H. Moore's general analysis: the second theory*, by Professor R. W. Barnard; and *A comparative survey of modern theories of functional analysis*, by Professor M. H. Stone.

On Friday morning, at the joint session with Section A of the A.A.A.S. and the Mathematical Association of America, Professor H. H. Mitchell, as retiring Vice-President of Section A, spoke on *Linear groups and finite geometries*, and Professor J. L. Coolidge, representing the Mathematical Association, spoke on *The rise and fall of projective geometry*. Friday afternoon and Saturday morning were devoted to the meetings of the Mathematical Association.

The annual dinner of the mathematical organizations, with more than three hundred in attendance, was held in the Walker Memorial Building of the Massachusetts Institute of Technology on Thursday evening, Professor J. L. Coolidge presiding and President K. T. Compton of the Institute giving a speech of welcome. In addition there were speeches by Presidents A. B. Coble of the Society and Arnold Dresden of the Association,

and Professors Archibald Henderson and Helen A. Merrill.

The Josiah Willard Gibbs Lecture was omitted this year.

At the invitation of Professor and Mrs. J. L. Coolidge the mathematicians were entertained at tea in Lowell House on Wednesday afternoon. There were many other entertainments also, including a visit to the Isabella Stewart Gardner Museum on Thursday and a tea given by courtesy of President Ada L. Comstock of Radcliffe College at Agassiz House. On Wednesday afternoon a complimentary concert was given by the Boston Symphony Orchestra in honor of the visiting members of the American Association for the Advancement of Science. After the session on Thursday afternoon there was an exhibition of the important machines, charts, and electrical integraph owned by the Massachusetts Institute of Technology.

The headquarters of the mathematicians was at the Hotel Commander, the Hotel Continental being used for overflow.

The attendance included the following two hundred fifty-four members:

C. R. Adams, R. B. Adams, R. P. Agnew, E. B. Allen, R. C. Archibald, C. S. Atchison, R. W. Babcock, F. H. Bailey, N. H. Ball, R. W. Barnard, Ralph Beatley, A. A. Bennett, Felix Bernstein, Garrett Birkhoff, G. D. Birkhoff, A. H. Black, L. M. Blumenthal, H. F. Bohnenblust, J. W. Bower, H. W. Brinkmann, Leonard Bristow, A. B. Brown, B. H. Brown, E. P. Brown, R. E. Bruce, S. S. Cairns, W. D. Cairns, R. H. Cameron, B. H. Camp, A. D. Campbell, G. A. Campbell, M. E. Carlen, W. B. Carver, W. F. Cheney, Alonzo Church, J. A. Clarkson, J. M. Clarkson, A. B. Coble, L. W. Cohen, Nancy Cole, E. G. H. Comfort, J. L. Coolidge, A. H. Copeland, L. P. Copeland, C. H. Currier, H. B. Curry, D. R. Curtiss, E. H. Cutler, H. M. Dadourian, D. R. Davis, J. W. Davis, C. E. Dimick, L. L. Dines, J. L. Doob, H. L. Dorwart, Jesse Douglas, Arnold Dresden, J. C. Durand, W. H. Durfee, L. A. Dye, Paul Eberhart, W. E. Ekman, W. W. Elliott, F. J. Feinler, M. M. Flood, Tomlinson Fort, M. C. Foster, C. W. Franklin, Philip Franklin, T. C. Fry, H. G. Funkhouser, A. S. Galbraith, C. A. Garabedian, J. J. Gergen, F. J. Gerst, B. C. Getchell, B. P. Gill, D. C. Gillespie, R. E. Gilman, M. C. Graustein, W. C. Graustein, B. F. Groat, H. V. Gummere, Margaret Gurney, J. G. Hardy, W. L. Hart, Alan Hazeltine, G. A. Hedlund, E. R. Hedrick, C. H. Helliwell, Archibald Henderson, M. R. Hestenes, H. C. Hicks, T. H. Hildebrandt, Einar Hille, Eberhard Hopf, Charles Hopkins, Ralph Hull, E. V. Huntington, W. A. Hurwitz, M. H. Ingraham, Dunham Jackson, Nathan Jacobson, R. L. Jeffery, R. A. Johnson, F. E. Johnston, B. W. Jones, E. R. van Kampen, A. E. Kennelly, L. S. Kennison, S. H. Kimball, J. R. Kline, Morris Kline, P. A. Knedler, B. O. Koopman, R. L. Korgen, H. L. Krall, H. K. Kutman, K. W. Lamson, A. W. Landers, M. K. Landers, A. E. Landry, C. G. Latimer, V. V. Latshaw, Solomon Lefschetz, D. H. Lehmer, A. M. M. Lehr, D. D. Leib, D. C. Lewis,

F. P. Lewis, Hans Lewy, R. B. Lindsay, G. H. Ling, L. L. Locke, W. R. Longley, E. R. Lorch, L. L. Lowenstein, J. J. Luck, N. H. McCoy, W. H. McEwen, James McGiffert, C. C. MacDuffee, Saunders MacLane, H. M. MacNeille, H. F. MacNeish, Wilhelm Maier, H. A. Merrill, Norman Miller, H. H. Mitchell, E. B. Mode, E. C. Molina, Deane Montgomery, C. N. Moore, R. K. Morley, Marston Morse, E. J. Moulton, S. B. Myers, M. M. Ness, E. P. Northrop, C. O. Oakley, E. G. Olds, Oystein Ore, F. W. Owens, F. W. Perkins, H. A. Perkins, H. B. Phillips, V. C. Poor, Hillel Poritsky, G. B. Price, S. M. Rambo, W. C. Randels, J. F. Randolph, W. R. Ransom, H. W. Raudenbush, C. J. Rees, M. S. Rees, R. G. D. Richardson, C. A. Richmond, D. E. Richmond, H. L. Rietz, David Rines, W. C. Risselman, H. P. Robertson, Robin Robinson, S. L. Robinson, M. F. Roszkopf, H. G. Russell, W. M. Rust, George Rutledge, M. F. Schmeiser, I. J. Schoenberg, H. E. Schoonmaker, C. H. W. Sedgewick, R. W. Sedgewick, Wladimir Seidel, Harlow Shapley, H. M. Sheffer, I. M. Sheffer, L. L. Silverman, James Singer, H. L. Slobin, A. H. Smith, C. E. Smith, I. W. Smith, T. L. Smith, Virgil Snyder, Joseph Spear, A. A. Stafford, M. E. Stark, M. H. Stone, R. E. Street, D. J. Struik, M. M. Sullivan, J. L. Synge, Otto Szasz, J. D. Tamarkin, J. H. Taylor, J. S. Taylor, J. M. Thomas, H. S. Thurston, Arthur Tilley, C. C. Torrance, M. M. Torrey, J. I. Tracey, W. J. Trjitzinsky, C. B. Tucker, A. W. Turner, F. E. Ulrich, J. L. Vanderslice, H. E. Wahlert, Warren Weaver, F. M. Weida, M. J. Weiss, M. E. Wells, V. H. Wells, Hermann Weyl, A. P. Wheeler, Hassler Whitney, J. K. Whittemore, D. V. Widder, Norbert Wiener, E. P. Wiggin, R. L. Wilder, S. S. Wilks, W. L. G. Williams, A. H. Wilson, E. B. Wilson, E. W. Wilson, W. A. Wilson, F. S. Woods, F. M. Wright, M. M. Young, S. D. Zeldin, Leo Zippin.

It was announced that the following persons had been elected to membership in the Society:

Mr. Vernon B. Bagnall, American Telephone and Telegraph Company, New York;
 Professor Felix Bernstein, Columbia University;
 Professor W. S. Claytor, West Virginia State College;
 Major Chester Lawrence Fordney, United States Marine Corps, Chicago;
 Dr. Hans Lewy, Brown University;
 Mr. Everett Richard Matthews, University of California;
 Professor Joseph P. Merrick, S. J., Baghdad College, Baghdad, Iraq;
 Mr. Moses Richardson, Brooklyn College.

It was also announced that the following persons had been admitted to membership in the Society in accordance with reciprocity agreements:

Professor Leopold Fejér, University of Budapest;
 Dr. Borge Jessen, Institute for Advanced Study, Princeton;
 Professor Giovanni Ricci, Reale Scuola Normale Superiore, Pisa.

The ordinary membership in the Society is now 1783, including 50 nominees of sustaining members and 83 life members.

There are also 15 sustaining members. The total attendance of members at all meetings in 1933 was 1010; the number of papers read was 415; the number of members attending at least one meeting was 485.

At the annual election, which closed on December 28, and at which 208 votes were cast, the following officers were elected:

Vice-Presidents, Professors Marston Morse and H. S. Vandiver.

Secretary, Dean R. G. D. Richardson.

Treasurer, Professor G. W. Mullins.

Associate Secretaries, Professor M. H. Ingraham and Dean T. M. Putnam.

Member of the Editorial Committee of the Bulletin, Professor E. R. Hedrick.

Member of the Editorial Committee of the Transactions, Professor R. D. Carmichael.

Member of the Editorial Board of the American Journal of Mathematics, Professor E. T. Bell.

Member of the Editorial Committee of the Colloquium Publications, Professor E. T. Bell.

Members of the Council, Mr. J. R. Carson, Professors L. R. Ford, R. L. Jeffery, and Oystein Ore, and Dr. Warren Weaver, to serve three years; Professor L. E. Dickson, to serve one year.

The reports of the Treasurer and of the auditors (Professor H. W. Reddick and Mr. J. J. Tanzola) showed a balance of \$2723.21, exclusive of the balances in the Bulletin, Transactions, Colloquium, Journal, Library, Sinking Fund, and special funds. The Society's Endowment Fund, invested in securities of par value \$77,000, yielded in 1933 a net income of \$3269.80; sustaining memberships for the year amounted to \$1800. The amount received from sales of the Society's publications was \$8781.58. During the year special contributions from members were received to the amount of \$505.76. The trustees adopted a budget for 1934 showing estimated expenditures and receipts as \$35,872.07 and \$35,652.07, respectively. The Librarian reported that the Library of the Society now contains 8267 volumes, and that 50 volumes were received from the library of a New York engineer, Mr. E. U. Frey.

The following appointments were reported: as tellers for the election at the annual meeting, Professor C. O. Oakley and Dr.

H. W. Raudenbush; as representative on the National Research Council for the period beginning July 1, 1934, and to succeed Professor E. R. Hedrick, Professor Marston Morse; as representative on the Council of the American Association for the Advancement of Science to replace Professor Louis Ingold for 1933, Professor Tomlinson Fort; as representatives on the Council of the American Association for the Advancement of Science for 1934, Professors M. H. Ingraham and C. N. Moore; as the nominating committee, Professors G. D. Birkhoff (chairman), H. F. Blichfeldt, E. P. Lane, C. N. Moore, and J. H. M. Wedderburn; as committee on arrangements for the Pittsburgh meeting, Professors J. S. Taylor (chairman), C. S. Atchison, L. L. Dines, and J. R. Kline, Dr. W. I. Miller, and Professor E. G. Olds; as committee on the award of the Frank Nelson Cole Prize in Algebra in 1934, Professors L. E. Dickson (Chairman), E. T. Bell, and H. H. Mitchell.

An invitation from the University of Kentucky to hold a meeting of the Society at Lexington was received with thanks to the inviting institution.

Titles and cross references to the abstracts of papers read at the regular session follow below. Dr. Estes was introduced by Professor Franklin, Mr. Hammond by Professor Walsh, Mr. Steenrod by Professor Wilder, Professor Brauer by Professor Richardson, and Mr. Hummel by Professor MacDuffee. The joint paper by Professor Wall and Mr. Leighton was read by Mr. Leighton, that of Dr. Bochner and Professor Bohnenblust by Dr. Bochner, that of Professor Adams and Mr. Clarkson by Professor Adams, that of Dr. Doob and Professor Koopman by Dr. Doob, that of Professors Hille and Tamarkin by Professor Hille, and that of Professor Barnett and Dr. Nathan by Dr. Nathan.

The following is a list of presiding officers: Professor Marston Morse at the evening session on Tuesday; Professor E. R. Hedrick at the Wednesday morning session on Analysis, and Professor D. J. Struik at the session on Probability; on Wednesday afternoon at the session on Analysis, Professor Norbert Wiener, at that on Geometry, Topology, and Point Sets, Professors J. L. Coolidge and T. H. Hildebrandt, and at that on Algebra, Vice-President H. H. Mitchell; at the Thursday morning session, President A. B. Coble; at the afternoon session,

Professor Arnold Dresden; at the joint session on Friday, Vice-President C. N. Moore of Section A.

General Session, Tuesday Evening.

1. *On the dynamical theory of electrical commutator machines*, by Mr. W. H. Ingram. (Abstract No. 40-1-23-t.)
2. *The lift and the moment of an arbitrary aerofoil Joukovsky potential*, by Dr. G. G. Estes. (Abstract No. 40-1-24.)
3. *A new method for the evaluation of double integrals*, by Mr. W. L. Morris. (Abstract No. 40-1-25-t.)
4. *An extension of Cauchy's theorem*, by Dr. Wladimir Seidel. (Abstract No. 40-1-26.)
5. *Linear almost periodic transformations*, by Dr. R. H. Cameron (National Research Fellow). (Abstract No. 40-1-27.)
6. *On capacity in potential theory* (preliminary communication), by Mr. Jacques Hammond. (Abstract No. 40-1-28.)
7. *A numerical equivalent of the four-color problem*, by Dr. Hassler Whitney. (Abstract No. 40-1-29.)
8. *On double Riemann-Stieltjes integrals*, by Mr. J. A. Clarkson. (Abstract No. 39-9-247.)
9. *Derived numbers and approximate derivatives of non-measurable functions*, by Professor R. L. Jeffery. (Abstract No. 40-1-30-t.)
10. *The Dirichlet problem for domains with multiple boundary points*, by Dr. F. W. Perkins. (Abstract No. 40-1-31.)
11. *Some properties of arbitrary functions*, by Dr. Mabel Schmeiser. (Abstract No. 40-1-32.)
12. *The order of groups of automorphisms*, by Mr. Garrett Birkhoff (Junior Prize Fellow, Harvard University). (Abstract No. 39-11-305.)
13. *Abbreviated proofs in logic calculus*, by Mr. Saunders MacLane (Sterling Research Fellow). (Abstract No. 40-1-33.)
14. *The independence of estimates of variance in samples from Latin square lay-outs*, by Dr. S. S. Wilks. (Abstract No. 40-1-34-t.)
15. *Concerning certain reducible polynomials*, by Dr. H. L. Dorwart. (Abstract No. 40-1-35.)
16. *Note on a singular integral*, by Mr. E. P. Northrop. (Abstract No. 40-1-94.)

Section for Analysis, Wednesday Morning.

17. *On the transformation and convergence of continued fractions*, by Professor H. S. Wall and Mr. Walter Leighton. (Abstract No. 39-11-310.)

18. *On approximation to the solution of a normal system of ordinary linear differential equations*, by Professor W. C. Risselman. (Abstract No. 39-11-313.)

19. *Concerning some methods of "best approximation,"* by Professor I. M. Sheffer. (Abstract No. 40-1-36.)

20. *Polynomials of best approximation associated with certain problems in two dimensions*, by Professor W. H. McEwen. (Abstract No. 40-1-37.)

21. *On the periodic motions of dynamical systems with n degrees of freedom*, by Dr. D. C. Lewis, Jr. (National Research Fellow). (Abstract No. 40-1-38.)

22. *Semi-linear equations. Part III: Convex polygons*, by Professor C. O. Oakley. (Abstract No. 40-1-39.)

23. *Lagrange multipliers for functions of infinitely many variables*, by Professor L. W. Cohen. (Abstract No. 40-1-40.)

24. *On criteria for Fourier constants of L -integrable functions of two variables*, by Professor C. N. Moore. (Abstract No. 40-1-41.)

25. *Analytic functions with almost periodic coefficients*, by Dr. Salomon Bochner and Professor H. F. Bohnenblust. (Abstract No. 40-1-42.)

26. *Analytic theory of linear differential equations*, by Dr. W. J. Trjitzinsky. (Abstract No. 39-11-314.)

27. *Concerning measure and linear density properties of point sets* (preliminary communication), by Mr. J. F. Randolph. (Abstract No. 39-11-312.)

28. *Properties of functions $f(x, y)$ of bounded variation*, by Professor C. R. Adams and Mr. J. A. Clarkson. (Abstract No. 40-1-43.)

29. *The asymptotic solutions of certain linear ordinary differential equations of the second order*, by Professor R. E. Langer. (Abstract No. 40-1-93-t.)

30. *Note on the orthogonality of Tchebycheff polynomials on confocal ellipses*, by Professor J. L. Walsh. (Abstract No. 40-1-95-t.)

31. *On convergence in variation*, by Professor C. R. Adams and Mr. J. A. Clarkson. (Abstract No. 40-1-44-t.)
32. *Derivatives of higher order as single limits*, by Professor Philip Franklin. (Abstract No. 40-1-45-t.)
33. *On H -functions and the distribution functions associated with them*, by Dr. E. K. Haviland. (Abstract No. 40-1-46-t.)
34. *Polygenic functional solutions of certain types of integral equations*, by Professor V. C. Poor. (Abstract No. 40-1-47-t.)
35. *On the tetradite Ψ -function with application to apportionment theory*, by Dr. W. R. Thompson. (Abstract No. 40-1-48-t.)
36. *Recursion formulas for the tetradite Ψ and the incomplete I -function*, by Dr. W. R. Thompson. (Abstract No. 40-1-49-t.)
37. *The general case of linear integro-differential equations*, by Dr. W. J. Trjitzinsky. (Abstract No. 39-11-315-t.)
38. *Functions differentiable on the boundaries of regions*, by Dr. Hassler Whitney. (Abstract No. 39-11-316-t.)
39. *Derivatives, difference quotients, and Taylor's formula. II*, by Dr. Hassler Whitney. (Abstract No. 39-11-317-t.)
40. *An auxiliary theorem associated with the calculus of variations*, by Dr. W. T. Reid. (Abstract No. 40-1-50-t.)

Section I, Analysis, Wednesday Afternoon.

41. *Integral equations and elliptic functions*, by Professor Wilhelm Maier. (Abstract No. 40-1-51.)
42. *Certain fundamental notions and theorems in polygenic function theory*, by Professor V. C. Poor. (Abstract No. 40-1-52.)
43. *Note on relations connecting certain cases of convergence in the mean*, by Professor Dunham Jackson. (Abstract No. 40-1-53.)
44. *Instability and transitivity*, by Professor Marston Morse. (Abstract No. 40-1-54.)
45. *A necessary and sufficient condition for a regular point*, by Professor G. C. Evans. (Abstract No. 40-1-55-t.)
46. *The resolvent of a self-adjoint transformation*, by Dr. J. L. Doob (National Research Fellow) and Professor B. O. Koopman. (Abstract No. 39-11-307.)
47. *On the theory of Laplace integrals. II*, by Professors Einar Hille and J. D. Tamarkin. (Abstract No. 40-1-56.)
48. *Necessary and sufficient conditions for the representation of a function by a doubly infinite Laplace integral*, by Professor D. V. Widder. (Abstract No. 40-1-57.)

49. *On the summability of the conjugate series*, by Mr. W. C. Randels. (Abstract No. 40-1-58.)

50. *Some inequalities for non-uniformly bounded ortho-normal polynomials* (preliminary communication), by Mr. M. F. Rosskopf. (Abstract No. 40-1-59.)

51. *On some asymptotic relations for the characteristic values of elliptic differential equations*, by Dr. H. L. Krall. (Abstract No. 40-1-92.)

52. *Linear transformations in function space*, by Professor I. A. Barnett and Dr. D. S. Nathan (National Research Fellow). (Abstract No. 40-1-96.)

Section II, Geometry, Topology, and Point Sets, Wednesday Afternoon.

53. *On the ordered quadrilaterals in- and circumscribed to the plane rational quartic curve (R_2^4) with triangular symmetry* (preliminary communication), by Professor A. E. Landry. (Abstract No. 40-1-60.)

54. *Equiareal maps with conic meridians and parallels*, by Professor B. H. Brown. (Abstract No. 39-11-296.)

55. *Transitive geodesics on closed orientable surfaces of genus greater than one*, by Dr. G. A. Hedlund (National Research Fellow). (Abstract No. 40-1-61.)

56. *On n -dimensional differential geometry in the small and in the large*, by Dr. S. B. Myers. (Abstract No. 39-11-311.)

57. *Geodesics on polyhedral surfaces*, by Professor Philip Franklin. (Abstract No. 40-1-62.)

58. *On the deviation of geodesics and null-geodesics particularly in relation to the properties of spaces of constant curvature and indefinite line-element*, by Professor J. L. Synge. (Abstract No. 40-1-63.)

59. *A characterization and generalization, by internal properties alone, of those open subsets of E_3 whose boundaries are manifolds*, by Professor R. L. Wilder. (Abstract No. 39-11-319-t.)

60. *Cyclic elements of higher orders*, by Dr. G. T. Whyburn. (Abstract No. 39-11-318-t.)

61. *The intersection of chains on a topological manifold*, by Dr. W. W. Flexner. (Abstract No. 40-1-64-t.)

62. *Operations on plane sets*, by Dr. Deane Montgomery (National Research Fellow). (Abstract No. 40-1-65.)

63. *Characterizations of certain finite curve-sums*, by Mr. N. E. Steenrod. (Abstract No. 40-1-66.)

64. *Completely regular approximations to regular manifolds*, by Professor S. S. Cairns. (Abstract No. 40-1-67.)

65. *Further non-involutorial Cremona space transformations contained in a special linear complex*, by Dr. A. H. Black. (Abstract No. 40-1-68.)

66. *Semi-Peanian spaces*, by Dr. Leo Zippin. (Abstract No. 40-1-97-t.)

67. *Topological characterizations of 2-dimensional manifolds*, by Dr. E. R. van Kampen. (Abstract No. 40-1-98.)

68. *A theorem on fixed points*, by Professor P. A. Smith. (Abstract No. 40-1-99-t.)

69. *The topology of transformation-sets*, by Mr. Garrett Birkhoff (Junior Prize Fellow, Harvard University). (Abstract No. 40-1-69-t.)

70. *Hausdorff groupoids*, by Mr. Garrett Birkhoff (Junior Prize Fellow, Harvard University). (Abstract No. 40-1-70 t.)

71. *Linearly connected manifolds and ennuples of curves*, by Professor Harry Levy. (Abstract No. 40-1-71-t.)

72. *Curvatures in Riemannian space*, by Professor Harry Levy. (Abstract No. 40-1-72-t.)

73. *The Bertini transformations of space*, by Professor F. R. Sharpe and Dr. L. A. Dye. (Abstract No. 40-1-73-t.)

74. *Mechanical models of spaces with positive-definite line-element*, by Professor J. L. Synge. (Abstract No. 40-1-74-t.)

Section III, Algebra, Foundations, and Statistics, Wednesday Afternoon.

75. *A determination of all cyclotomic quintic fields*, by Dr. Ralph Hull (National Research Fellow). (Abstract No. 39-11-308.)

76. *A test for equivalence of positive quaternary quadratic forms*, by Professor B. W. Jones. (Abstract No. 40-1-75.)

77. *Independent postulates for an "informal Principia system with equality,"* by Professor E. V. Huntington. (Abstract No. 40-1-76.)

78. *Klein's theory of algebraic equations and its connection with the theory of algebras*, by Professor Richard Brauer. (Abstract No. 40-1-77.)

79. *Note on the class number in a rational semi-simple algebra*, by Professor C. G. Latimer. (Abstract No. 40-1-78.)
80. *Ideal theory and partial differential equations*, by Dr. H. W. Raudenbush. (Abstract No. 40-1-79.)
81. *Lacunary recurrences for Bernoulli numbers*, by Dr. D. H. Lehmer. (Abstract No. 40-1-80.)
82. *On simply transitive primitive groups*, by Professor Marie J. Weiss. (Abstract No. 40-1-81.)
83. *On continued fractions of order n* , by Mr. P. M. Hummel. (Abstract No. 39-11-309.)
84. *Division by non-singular matrix polynomials*, by Mr. M. M. Flood. (Abstract No. 40-1-82.)
85. *On the theory of invariants of n -planes*, by Professor Lennie P. Copeland. (Abstract No. 39-11-306.)
86. *A determinant theorem obtained from the characterization of pseudo r -spheric sets*, by Dr. L. M. Blumenthal (National Research Fellow). (Abstract No. 40-1-83.)
87. *Metabelian groups of order p^m* , by Dr. Charles Hopkins. (Abstract No. 40-1-100.)
88. *Correlation of indices*, by Dr. A. T. Craig. (Abstract No. 40-1-84-*t*.)
89. *Note on the moments of a Bernoulli distribution*, by Dr. A. T. Craig. (Abstract No. 40-1-85-*t*.)
90. *Problems of structure-theoretic type in mathematical logic*, by Mr. Saunders MacLane (Sterling Research Fellow). (Abstract No. 40-1-86-*t*.)
91. *General properties of algebraic systems*, by Mr. Saunders MacLane (Sterling Research Fellow). (Abstract No. 40-1-87-*t*.)
92. *On a certain algebra of quantum mechanics*, by Professor A. A. Albert. (Abstract No. 40-1-88-*t*.)
93. *On cyclic equations of prime degree*, by Professor A. A. Albert. (Abstract No. 40-1-89-*t*.)
94. *The value of the constants in Waring's problem*, by Dr. R. D. James (National Research Fellow). (Abstract No. 40-1-90-*t*.)
95. *An interpolation formula which when adjusted for rational centering of data proves to be osculatory*, by Professor C. H. Forsyth. (Abstract No. 40-1-91-*t*.)

R. G. D. RICHARDSON,
Secretary