TWENTY-EIGHTH ANNUAL LIST OF PAPERS.

READ BEFORE THE AMERICAN MATHEMATICAL SOCIETY AND
SUBSEQUENTLY PUBLISHED, INCLUDING REFERENCES TO
THE PLACES OF THEIR PUBLICATION.

ALGER, P. L.   Practical exterior ballistics.   Read Dec. 27, 1918. *American Mathematical Monthly*, vol. 26, No. 3, pp. 101–102; March, 1919.

ALTSHILLER, N.   On the I-centers of a triangle.   Read (Southwestern Section) Dec. 1, 1917. *American Mathematical Monthly*, vol. 25, No. 6, pp. 241–246; June, 1918.

—— On the Teixeira construction of the unicursal cubic.   Read (Southwestern Section) Dec. 1, 1917. *Annals of Mathematics*, ser. 2, vol. 20, No. 1, pp. 9–12; Sept., 1918.

BAUER, G. N., and SLOBIN, H. L.   A system of algebraic and transcendental equations.   Read Dec. 22, 1916. *American Mathematical Monthly*, vol. 25, No. 10, pp. 435–440; Dec., 1918.

BELL, E. T.   A partial isomorph of trigonometry.   Read (San Francisco) Dec. 14, 1918. *Bulletin of the American Mathematical Society*, vol. 25, No. 7, pp. 311–321; April, 1919.

BENNETT, A. A.   Some mathematical features of ballistics.   Read Dec. 27, 1918. *American Mathematical Monthly*, vol. 26, No. 3, p. 98; March, 1919.

BLICHFELDT, H. F.   On low velocity high angle fire.   Read Dec. 27, 1918. *American Mathematical Monthly*, vol. 26, No. 3, p. 103; March, 1919.

—— Report on the theory of the geometry of numbers.   Read March 28, 1919. *Bulletin of the American Mathematical Society*, vol. 25, No. 10, pp. 449–453; July, 1919.

BLISS, G. A.   The problem of Mayer with variable end points.   Read Dec. 22, 1916. *Transactions of the American Mathematical Society*, vol. 19, No. 3, pp. 305–314; July, 1918.

—— Solutions of differential equations as functions of the constants of integration.   Read Dec. 29, 1917. *Bulletin of the American Mathematical Society*, vol. 25, No. 1, pp. 15–26; Oct., 1918.

—— A method of computing differential corrections for a trajectory.   Read March 29, 1919. *Journal of the United States Artillery*, vol. 50, No. 4, pp. 455–460; June, 1919.

BLUMBERG, H.   A theorem on exhaustible sets connected with developments of positive real numbers.   Read Dec. 27, 1913. *Annals of Mathematics*, ser. 2, vol. 20, No. 2, pp. 136–141; Dec., 1918.

—— On convex functions.   Read (Southwestern Section) Dec. 2, 1916. *Transactions of the American Mathematical Society*, vol. 20, No. 1, pp. 40–44; Jan., 1919.

—— A theorem on linear point sets.   Read Dec. 28, 1918. *Bulletin of the American Mathematical Society*, vol. 25, No. 8, pp. 350–353; May, 1919.

BUCHANAN, D.   Orbits asymptotic to an isosceles-triangle solution of the problem of three bodies.   Read Dec. 27, 1916.   *Proceedings of the London Mathematical Society,* ser. 2, vol. 17, No. 1, pp. 54–74; June, 1918.

—— Asymptotic satellites near the straight-line equilibrium points in the problem of three bodies.   Read Dec. 27, 1916.   *American Journal of Mathematics,* vol. 41, No. 2, pp. 79–110; April, 1919.

CAJORI, F.   On the history of "Playfair's parallel-postulate."   Read (San Francisco) Dec. 14, 1918.   *School Science and Mathematics,* vol. 18, No. 9, pp. 778–779; Dec., 1918.

—— A Greek tract on indivisible lines.   Read (San Francisco) Dec. 14, 1918.   *Science,* new ser., vol. 48, No. 1249, pp. 577–578; Dec. 6, 1918.

CARMICHAEL, R. D.   Repeated solutions of a certain class of linear functional equations.   Read Dec. 29, 1917.   *Tôhoku Mathematical Journal,* vol. 13, No. 4, pp. 304–313; June, 1918.

—— General aspects of the theory of summable series.   Read April 12, 1918.   *Bulletin of the American Mathematical Society,* vol. 25, No. 3, pp. 97–131; Dec., 1918.

—— Fermat numbers $F_n = 2^{2^n} + 1$.   Read (Southwestern Section) Dec. 1, 1917.   *American Mathematical Monthly,* vol. 26, No. 4, pp. 137–146; April, 1919.

CHITTENDEN, E. W.   On the Heine-Borel property in the theory of abstract sets.   Read Oct. 26, 1918.   *Bulletin of the American Mathematical Society,* vol. 25, No. 2, pp. 60–65; Nov., 1918.

—— On the limit functions of sequences of continuous functions converging relatively uniformly.   Read Dec. 28, 1917.   *Transactions of the American Mathematical Society,* vol. 20, No. 2, pp. 179–184; April, 1919.

COBLE, A. B.   Theta modular groups determined by point sets.   Read Sept. 4, 1917.   *American Journal of Mathematics,* vol. 40, No. 4, pp. 317–340; Oct., 1918.

COLE, F. N.   See WHITE, H. S.

COOLIDGE, J. L.   The characteristic numbers of a real algebraic plane curve.   Read Sept. 4, 1916.   *Rendiconti del Circolo Matematico di Palermo,* vol. 42, Nos. 2–3, pp. 260–266; May–Dec., 1917.

CUMMINGS, L. D.   The trains for the 36 groupless triad systems on 15 elements.   Read Sept. 5, 1918.   *Bulletin of the American Mathematical Society,* vol. 25, No. 7, pp. 321–324; April, 1919.

—— See WHITE, H. S.

CURTIS, M. F.   The existence of the functions of the elliptic cylinder.   Read Sept. 5, 1917.   *Annals of Mathematics,* ser. 2, vol. 20, No. 1, pp. 23–34; Sept., 1918.

—— On the rectifiability of a twisted cubic.   Read April 27, 1918.   *Bulletin of the American Mathematical Society,* vol. 25, No. 2, pp. 87–88; Nov., 1918.

DANIELL, P. J.   A general form of integral.   Read (Southwestern Section) Dec. 2, 1916.   *Annals of Mathematics,* ser. 2, vol. 19, No. 4, pp. 279–294; June, 1918.

—— Differentiation with respect to a function of limited variation.   Read (Southwestern Section) Dec. 2, 1916 and Sept. 4, 1918.   *Transactions of the American Mathematical Society,* vol. 19, No. 4, pp. 353–362; Oct., 1918.

—— A general form of Green's theorem. Read (Southwestern Section) Dec. 2, 1916. *Bulletin of the American Mathematical Society*, vol. 25, No. 8, pp. 353–357; May, 1919.

DICKSON, L. E.   Mathematics in war perspective.   Read Dec. 27, 1918. *Bulletin of the American Mathematical Society*, vol. 25, No. 7, pp. 289–311; April, 1919.

—— History of the theory of numbers. Volume 1: Divisibility and primality. Read April 3, 1915, Dec. 22, 1916 and (San Francisco) Oct. 27, 1917. Washington, Carnegie Institution, 1919.   12 + 486 pp.

—— Applications of the geometry of numbers to algebraic numbers. Read March 28, 1919.   *Bulletin of the American Mathematical Society*, vol. 25, No. 10, pp. 453–455; July, 1919.

DINES, L. L.   Projective transformations in function space.   Read Dec. 27, 1916 and Sept. 4, 1917.   *Transactions of the American Mathematical Society*, vol. 20, No. 1, pp. 45–65; Jan., 1919.

—— Systems of linear inequalities. Read March 29, 1919. *Annals of Mathematics*, ser. 2, vol. 20, No. 3, pp. 191–199; March, 1919.

EMCH, A.   Proof of Pohlke's theorem and its generalizations by affinity. Read April 13, 1918.   *American Journal of Mathematics*, vol. 40, No. 4, pp. 366–374; Oct., 1918.

—— On plane algebraic curves with a given system of foci. Read April 27, 1918.   *Bulletin of the American Mathematical Society*, vol. 25, No. 4, pp. 157–161; Jan., 1919.

—— On closed curves described by a spherical pendulum. Read April 26, 1919.   *Proceedings of the National Academy of Sciences*, vol. 4, No. 8, pp. 218–221; Aug., 1918.   *Tôhoku Mathematical Journal*, vol. 15, Nos. 1–2, pp. 146–165; March, 1919.

—— On a certain generation of rational circular and isotropic curves. Read Dec. 29, 1917.   *Bulletin of the American Mathematical Society*, vol. 25, No. 9, pp. 397–404; June, 1919.

EVANS, G. C.   Functionals and their applications.   Selected topics, including integral equations.   Read Dec. 28, 1915, April 29, 1916, Sept. 6–8, 1916 and (Southwestern Section) Dec. 2, 1916.   The Cambridge Colloquium, 1916, Part I, 12 + 136 pp.; New York, 1918.

FITE, W. B.   Concerning the zeros of the solutions of certain differential equations.   Read April 28, 1917, Oct. 27, 1917 and Dec. 27, 1917. *Transactions of the American Mathematical Society*, vol. 19, No. 4, pp. 341–352; Oct., 1918.

FORD, W. B.   A conspectus of the modern theory of divergent series. Read Dec. 28, 1917.   *Bulletin of the American Mathematical Society*, vol. 25, No. 1, pp. 1–15; Oct., 1918.

GARRETSON, W. V. N.   On the asymptotic solution of the non-homogeneous linear differential equation of the nth order.   A particular solution. Read Sept. 5, 1916.   *American Journal of Mathematics*, vol. 40, No. 4, pp. 341–350; Oct., 1918.

GILLESPIE, D. C.   Repeated integrals.   Read Sept. 5, 1917.   *Annals of Mathematics*, ser. 2, vol. 20, No. 3, pp. 224–228; March, 1919.

GLENN, O. E.   Invariants which are functions of parameters of the transformation.   Read Oct. 27, 1917.   *Annals of Mathematics*, ser. 2, vol. 20, No. 2, pp. 125–135; Dec., 1918.

—— Modular concomitant scales, with a fundamental system of formal covariants, modulo 3, of the binary quadratic. Read April 27, 1918. *Transactions of the American Mathematical Society*, vol. 20, No. 2, pp. 154–168; April, 1919.

—— Covariants of binary modular groups. Read April 26, 1919. *Proceedings of the National Academy of Sciences*, vol. 5, No. 4, pp. 107–110; April, 1919.

GOULD, A. B. Notes concerning recent books on navigation. Read Dec. 27, 1918. *American Mathematical Monthly*, vol. 26, No. 3, p. 99; March, 1919.

GREEN, G. M. Memoir on the general theory of surfaces and rectilinear congruences. Read Sept. 5, 1816 and Dec. 27, 1917. *Transactions of the American Mathematical Society*, vol. 20, No. 2, pp. 79–153; April, 1919.

GROAT, B. F. Ice diversion, hydraulic models, and hydraulic similarity. Read Sept. 4, 1918. *Transactions of the American Society of Civil Engineers*, vol. 82, pp. 1138–1190; Dec., 1918.

GRONWALL, T. H. A theorem on power series, with an application to conformal mapping. Read Dec. 28, 1918. *Proceedings of the National Academy of Sciences*, vol. 5, No. 1, pp. 22–24; Jan., 1919.

HALLETT, G. H., JR. Concerning the definition of a simple continuous arc. Read Oct. 26, 1918. *Bulletin of the American Mathematical Society*, vol. 25, No. 7, pp. 325–326; April, 1919.

HANCOCK, H. Problèmes de géométrie arithmétique. Read Jan. 2, 1913 and Feb. 22, 1913. *Journal de Mathématiques pures et appliquées*, ser. 7, vol. 3, No. 3, pp. 217–245; 1917.

HARDING, A. M. Rational plane anharmonic cubics. Read (Southwestern Section) Dec. 1, 1917. *Transactions of the Royal Society of Canada*, section III, ser. 3, vol. 12, No. 2, pp. 185–195; Dec., 1918–March, 1919.

HAZLETT, O. C. On scalar and vector covariants of linear algebras. Read Dec. 27, 1917 and Feb. 23, 1918. *Transactions of the American Mathematical Society*, vol. 19, No. 4, pp. 408–420; Oct., 1918.

HEDRICK, E. R. In memoriam: Ellery William Davis. Read April 12, 1918. *Bulletin of the American Mathematical Society*, vol. 25, No. 1, pp. 36–38; Oct., 1918.

HOLLCROFT, T. R. A classification of general (2, 3) point correspondences between two planes. Read Dec. 28, 1917. *American Journal of Mathematics*, vol. 41, No. 1, pp. 5–24; Jan., 1919.

HU, M. T. Linear integro-differential equations with a boundary condition. Read Dec. 28, 1917. *Transactions of the American Mathematical Society*, vol. 19, No. 4, pp. 363–407; Oct., 1918.

JAMES, G. Some theorems on the summation of divergent series. Read April 29, 1916. Author's dissertation. New York, 1917. 28 pp.

KELLOGG, O. D. Interpolation properties of orthogonal sets of solutions of differential equations. Read (Southwestern Section) Dec. 1, 1917. *American Journal of Mathematics*, vol. 40, No. 3, pp. 225–234; July, 1918.

KEMPNER, A. J. On irreducible equations admitting roots of the form $\alpha + \rho \cdot e^{i\theta}$, α and ρ both rational. Read April 7, 1917. *Tôhoku Mathematical Journal*, vol. 13, No. 4, pp. 253–265; June, 1918.

KLINE, J. R. See MOORE, R. L.

LAREW, G. A. Necessary conditions in the problems of Mayer in the calculus of variations. Read Oct. 26, 1918. *Transactions of the American Mathematical Society*, vol. 20, No. 1, pp. 1–22; Jan., 1919.

LAVES, K. How the map problem was met in the war. Read Dec. 27, 1918. *American Mathematical Monthly*, vol. 26, No. 3, pp. 98–99, and No. 5, pp. 181–187; March, and May, 1919.

LEFSCHETZ, S. On the real folds of abelian varieties. Read Dec. 28, 1918. *Proceedings of the National Academy of Sciences*, vol. 5, No. 4, pp. 103–106; April, 1919.

LEHMER, D. N. Arithmetical theory of certain Hurwitzian continued fractions. Read (San Francisco) April 7, 1917 and (San Francisco) April 6, 1918. *Proceedings of the National Academy of Sciences*, vol. 4, No. 8, pp. 214–218; Aug., 1918. *American Journal of Mathematics*, vol. 40, No. 4, pp. 375–390; Oct., 1918.

—— On Jacobi's extension of the continued fraction algorithm. Read (San Francisco) April 6, 1918. *Proceedings of the National Academy of Sciences*, vol. 4, No. 12, pp. 360–364; Dec., 1918.

—— The general solution of the indeterminate equation $Ax + By + Cz + \ldots = r$. Read (San Francisco) Dec. 14, 1918. *Proceedings of the National Academy of Sciences*, vol. 5, No. 4, pp. 111–114; April, 1919.

MCATEE, J. E. The transformation of a regular group into its conjoint. Read Oct. 26, 1918. *Bulletin of the American Mathematical Society*, vol. 25, No. 7, pp. 326–329; April, 1919.

MACMILLAN, W. D. Ordnance problems. Read Dec. 27, 1918. *American Mathematical Monthly*, vol. 26, No. 3, p. 101; March, 1919.

MANNING, W. A. On the order of primitive groups (IV). Read (San Francisco) Oct. 27, 1917. *Transactions of the American Mathematical Society*, vol. 20, No. 1, pp. 66–78; Jan., 1919.

MATHEWSON, L. C. On the group of isomorphisms of a certain extension of an abelian group. Read Sept. 5, 1917. *Transactions of the American Mathematical Society*, vol. 19, No. 4, pp. 331–340; Oct., 1918.

MILLER, G. A. Group-theory proof of two elementary theorems in number theory. Read April 13, 1918. *Tôhoku Mathematical Journal*, vol. 13, No. 4, pp. 314–315; June, 1918.

—— Sets of independent generators of a substitution group. Read Dec. 29, 1917. *Transactions of the American Mathematical Society*, vol. 19, No. 3, pp. 299–304; July, 1918.

—— Determinant groups. Read April 13, 1918. *Bulletin of the American Mathematical Society*, vol. 25, No. 2, pp. 69–75; Nov., 1918.

—— Groups generated by two operators whose relative transforms are equal to each other. Read Sept. 4, 1918. *American Journal of Mathematics*, vol. 41, No. 1, pp. 1–4; Jan., 1919.

—— Groups containing a relatively large number of operators of order two. Read March 29, 1919. *Bulletin of the American Mathematical Society*, vol. 25, No. 9, pp. 408–413; June, 1919.

MOORE, C. L. E. Rotations in hyperspace. Read Dec. 27, 1917. *Proceedings of the American Academy of Arts and Sciences*, vol. 53, No. 8, pp. 649–694; July, 1918.

—— Translation surfaces in hyperspace. Read April 27, 1918. *Bulletin of the American Mathematical Society*, vol. 25, No. 2, pp. 75–85; Nov., 1918.

MOORE, C. N. Applications of the theory of summability to developments in orthogonal functions. Read April 12, 1918. *Bulletin of the American Mathematical Society*, vol. 25, No. 6, pp. 258–276; March, 1919.

MOORE, R. L. A characterization of Jordan regions by properties having no reference to their boundaries. Read Oct. 26, 1918. *Proceedings of the National Academy of Sciences*, vol. 4, No. 12, pp. 364–370; Dec., 1918.

—— Continuous sets that have no continuous sets of condensation. Read Oct. 27, 1917. *Bulletin of the American Mathematical Society*, vol. 25, No. 4, pp. 174–176; Jan., 1919.

—— Concerning a set of postulates for plane analysis situs. Read Dec. 27, 1917. *Transactions of the American Mathematical Society*, vol. 20, No. 2, pp. 169–178; April, 1919.

MOORE, R. L. and KLINE, J. R. On the most general plane closed point-set through which it is possible to pass a simple continuous arc. Read Feb. 24, 1917. *Annals of Mathematics*, ser. 2, vol. 20, No. 3, pp. 218–223; March, 1919.

NELSON, A. L. Note on seminvariants of systems of partial differential equations. Read Dec. 29, 1917. *American Journal of Mathematics*, vol. 41, No. 2, pp. 123–132; April, 1919.

OSGOOD, W. F. Singular points of analytic transformations. Read Dec. 28, 1917. *Transactions of the American Mathematical Society*, vol. 19, No. 3, pp. 251–274; July, 1918.

PELL, A. Solution of the differential equation $dx^2 + dy^2 + dz^2 = ds^2$ and its application to some geometrical problems. Read April 28, 1917. *Annals of Mathematics*, ser. 2, vol. 20, No. 2, pp. 142–148; Dec., 1918.

PELL, A. J. Linear equations with unsymmetric systems of coefficients. Read Sept. 7, 1910. *Transactions of the American Mathematical Society*, vol. 20, No. 1, pp. 23–39; Jan., 1919.

PFEIFFER, G. A. The functional equation $f[f(x)] = g(x)$. Read April 29, 1916. *Annals of Mathematics*, vol. 20, No. 1, pp. 13–22; Sept., 1918.

PHILLIPS, H. B. Directed integration. Read Jan. 1, 1913. *American Journal of Mathematics*, vol. 40, No. 3, pp. 235–241; July, 1918.

PORTER, M. B. Derivativeless continuous functions. Read Oct. 26, 1918. *Bulletin of the American Mathematical Society*, vol. 25, No. 4, pp. 176–180; Jan., 1919.

RICE, L. H. *P*-way determinants, with an application to transvectants. Read Sept. 4, 1916. *American Journal of Mathematics*, vol. 40, No. 3, pp. 242–262; July, 1918.

RICHARDSON, R. G. D. Contributions to the study of oscillation properties of the solutions of linear differential equations of the second order. Read Sept. 4, 1917. *American Journal of Mathematics*, vol. 40, No. 3, pp. 283–316; July, 1918.

RIDER, P. R. On the F_1-function of the calculus of variations. Read April 13, 1918. *Washington University Studies*, vol. 5, (scientific series) No. 2, pp. 97–100; Jan., 1918.

—— On the problem of the calculus of variations in n dimensions. Read Feb. 23, 1918. *Tôhoku Mathematical Journal*, vol. 13, No. 3, pp. 165–171; April, 1918.

RIETZ, H. L. Statistical methods in preparation for service in statistical sections of the war department Read Dec. 27, 1918. *American Mathematical Monthly*, vol. 26, No. 3, pp. 99–100; March, 1919.

ROE, E. D., JR. A geometric representation. Read Oct. 28, 1916 and Sept. 5, 1917. *Mathematics Teacher*, vol. 10, No. 4, pp. 205–210 and vol. 11, No. 1, pp. 9–25; June and Sept., 1918.

ROEVER, R. H. The effect of the earth's rotation and curvature on the path of a projectile. Read Dec. 27, 1918. *American Mathematical Monthly*, vol. 26, No. 3, pp. 102–103; March, 1919.

—— Geometric explanation of a certain optical phenomenon. Read (Southwestern Section) Dec. 1, 1917. *American Mathematical Monthly*, vol. 26, No. 3, pp. 111–112; March, 1919.

ROUSE, L. J. A contribution to the question of linear dependence in linear integral equations. Read April 13, 1918. *Tôhoku Mathematical Journal*, vol. 15, Nos. 1–2, pp. 184–216; March, 1919.

ROWE, J. E. Related invariants of two rational sextics. Read Sept. 4, 1918. *Bulletin of the American Mathematical Society*, vol. 25, No. 1, pp. 34–35; Oct., 1918.

SEELY, C. E. On non-symmetric kernels of positive type. Read April 27, 1918. *Annals of Mathematics*, ser. 2, vol. 20, No. 3, pp. 172–176; March, 1919.

SENSENIG, W. Concerning the invariant theory of involutions of conics. Read December 28, 1918. *American Journal of Mathematics*, vol. 41, No. 2, pp. 111–122; April, 1919.

SHARPE, F. R. See SNYDER, V.

SISAM, C. H. On surfaces containing a system of cubics that do not constitute a pencil. Read April 12, 1918. *American Journal of Mathematics*, vol. 41, No. 1, pp. 49–59; Jan., 1919.

SLOBIN, H. L. See BAUER, G. N.

SLOCUM, S. E. The romantic aspect of numbers. Read Feb. 23, 1918. *Scientific Monthly*, vol. 7, No. 1, pp. 68–79; July, 1918.

SMAIL, L. L. A general method for the summation of divergent series. Read (San Francisco) May 22, 1914. *Annals of Mathematics*, ser. 2, vol. 20, No. 2, pp. 149–154; Dec., 1918.

SMITH, G. W. Nilpotent algebras generated by two units, i and j, such that i^2 is not an independent unit. Read April 7, 1917. *American Journal of Mathematics*, vol. 41, No. 2, pp. 143–164; April, 1919.

SNYDER, V. and SHARPE, F. R. Space involutions defined by a web of quadrics. Read Sept. 4, 1917. *Transactions of the American Mathematical Society*, vol. 19, No. 3, pp. 275–290; July, 1918.

SOMMERVILLE, D. M. Y. Quadratic systems of circles in non-euclidean geometry. Read Oct. 26, 1918. *Bulletin of the American Mathematical Society*, vol. 25, No. 4, pp. 161–173; Jan., 1919.

STOUFFER, E. B. On invariants and covariants of linear homogeneous differential equations. Read (Southwestern Section) Dec. 2, 1916, and April 7, 1917. *Proceedings of the London Mathematical Society*, ser. 2, vol. 17, No. 5, pp. 337–352; March, 1919.

VANDIVER, H. S.   Proof of a property of the norm of a cyclotomic integer. Read April 27, 1918.   *Bulletin of the American Mathematical Society,* vol. 25, No. 5, pp. 221–223; Feb., 1919.

—— On the first factor of the class number of a cyclotomic field.   Read April 27, 1918.   *Bulletin of the American Mathematical Society,* vol. 25, No. 10, pp. 458–461; July, 1919.

VEBLEN, O.   Doubly oriented lines.   Veblen, O. and Young, J. W., Projective geometry, vol. 2, pp. 447–451; Boston, 1918.

WALSH, J. L.   On the location of the roots of the jacobian of two binary forms, and of the derivative of a rational function.   Read Feb. 23, 1918.   *Transactions of the American Mathematical Society,* vol. 19, No. 3, pp. 291–298; July, 1918.

WEAVER, J. H.   Some algebraic curves.   Read April 28, 1917.   *Bulletin of the American Mathematical Society,* vol. 25, No. 2, pp. 85–87, and No. 7, p. 329; Nov., 1918 and April, 1919.

WHITE, H. S., COLE, F. N. and CUMMINGS, L. D.   Complete classification of the triad systems on fifteen elements.   Read Sept. 9, 1914, Oct. 31, 1914, Aug. 4, 1915 and Oct. 28, 1916.   *Memoirs of the National Academy of Sciences,* vol. 14, No. 2, 89 pp.; 1919.

WHITTEMORE, J. K.   Spiral minimal surfaces.   Read Dec. 27, 1916.   *Transactions of the American Mathematical Society,* vol. 19, No. 4, pp. 315–330; Oct., 1918.

—— Trajectories and flat points on ruled surfaces.   Read April 28, 1917 and Oct. 27, 1917.   *Bulletin of the American Mathematical Society,* vol. 25, No. 5, pp. 223–229; Feb., 1919.

—— A kinematical property of ruled surfaces.   Read April 28, 1917.   *Annals of Mathematics,* ser. 2, vol. 20, No. 3, pp. 187–190; March, 1919.

WILCZYNSKI, E. J.   Integral invariants in projective geometry.   Read Jan. 1, 1916.   *Rendiconti del Circolo Matematico di Palermo,* vol. 42, Nos. 2–3, pp. 128–137; May–Dec., 1917.

WILSON, E. B.   Note on multiple algebra: The reduction of real dyadics and the classification of real homogeneous strains.   Read Dec. 28, 1906 and April 28, 1917.   *Journal of the Washington Academy of Sciences,* vol. 7, No. 7, pp. 173–177; April 4, 1917.

—— Note on rotations in hyperspace.   Read Dec. 29, 1906.   *Journal of the Washington Academy of Sciences,* vol. 9, No. 2, pp. 25–28; Jan. 19, 1919.

WILSON, W. H.   On a certain general class of functional equations.   Read April 6, 1917.   *American Journal of Mathematics,* vol. 40, No. 3, pp. 263–282; July, 1918.

WINGER, R. M.   Involutions on the rational plane cubic.   Read (San Francisco) Oct. 27, 1917.   *Bulletin of the American Mathematical Society,* vol. 25, No. 1, pp. 27–34; Oct., 1918.

WRIGHT, H. N.   The nine-point circle obtained by methods of projective geometry.   Read (San Francisco) April 7, 1917.   *American Mathematical Monthly,* vol. 25, No. 6, pp. 250–252; June, 1918.