ing a location had been very conservative; a location reported not accurate to within fifty yards was often accurate to within twenty-five yards. In general, the average of a half dozen locations of the same gun taken on different days under differing weather conditions was of a very high order of accuracy; often a matter of but five or ten yards.

In general a location either by sound or by flash which had been rated "fair" when reported to the artillery was found on survey to have been within the unavoidable errors in artillery fire.

An idea may be gained of the amount of artillery information supplied by the ranging sections from the following figures taken from the reports of the artillery information officer of one of the American corps. This officer had at the time the following sources of information: three American sound ranging sections, two American and three French flash ranging sections, aviation and observation balloons. During a period of three weeks of rapid advance when the sound sections were out of operation while moving for a considerable portion of the time 425 separate locations of enemy batteries were made. Of these the two American flash sections reported 64 per cent. the three French flash sections reported 16 per cent. and the three American sound sections reported 21 per cent. In a period of two weeks when the advance had been checked by the Germans the total number of locations were 392, and the percentages were: From the three American flash sections 38 per cent.; from the two French flash sections 8 per cent., and from the three American sound sections 56 per cent.

The following figures taken from another and very active sector are also instructive. For a period of three days preparation for an advance, the following locations were made: Sound, 22; flash, 22; balloons, 0; aviation, 0. For a period of sixteen days of rapid advance: Sound, 4; flash, 46; balloons, 30; aviation 77. For a period of four days of stabilization: Sound, 6; flash, 34; balloons, 13; aviation, 15. These figures are characteristic. During preparations for an advance, both the sound and flash sections are very useful and important sources of information. During rapid advance the sound ranging does not get into action as often or as soon as the flash. In this period the greater part of the information comes from the air observation.

Both sound and flash ranging have proved their value in the American Expeditionary Forces and are to be retained in the peace-time army; the sound because it is the one source of information when all others fail in foggy weather and because thus far no camouflage has been devised to prevent its working; the flash because of its relatively great mobility and consequent importance in open warfare.

AUGUSTUS TROWBRIDGE
PRINCETON UNIVERSITY

THE AMERICAN MATHEMATICAL SOCIETY

THE two hundred and third regular meeting of the society was held at Columbia University on Saturday, April 26, extending through the usual morning and afternoon sessions. This being the first eastern meeting since October, the attendance was large, including sixty-seven members, indicating, as it may be hoped, a revival of the conditions preceding the war.

President Morley occupied the chair, being relieved by Professor Kasner. The election of the following persons to membership in the society was announced: Mr. N. W. Akimoff, Philadelphia, Pa.; Dr. Tobias Dantzig, Columbia University; Mr. A. C. Maddox, Guthrie, Okla., High School; Mr. Montford Morrison, Chicago, Ill.; Professor Ganesh Prasad, Central Hindu College, Benares, India; Mr. F. M. Weida, State University of Iowa; Mr. C. L. E. Wolfe, University of California. Two applications for membership were received.

It was decided to hold the coming summer meeting of the society at the University of Michigan in the first week in September. Professors Beman, Bliss, Karpinski, Osgood and the secretary were appointed a committee on arrangements for this meeting. A committee was also provided to prepare nominations for officers to be elected at the annual meeting in December.

Professor E. W. Brown, L. E. Dickson and H. S. White were appointed as representatives of the society in the division of physical sciences of the national research council; and President R. S.

Woodward, and Professors Birkhoff and MacMillan as representatives of the society in the American section of the International Astronomical Union.

The committee on the publication of a mathematical year book presented a preliminary report and was continued and asked to make a further report at a future meeting.

A special feature of the meeting was the reports by Captain Jackson, Dr. Gronwall and Major Veblen on the work in ballistics at Aberdeen and Washington, which occupied the first part of the afternoon session. The titles of these reports are included in the list of papers below.

About fifty members and friends gathered at the midday luncheon; thirty-two attended the dinner at the Faculty Club in the evening. Much satisfaction was expressed at the revival of these pleasant occasions.

The Chicago Section held its regular spring meeting on March 28–29. The San Francisco Section met at the University of California on April 5.

The following papers were read at the New York meeting:

C. J. Keyser: "Concerning groups of dyadic relations in an arbitrary field."

J. K. Whittemore: "Certain functional equations connected with minimal surfaces."

W. B. Fite: "Linear functional differential equations."

L. B. Robinson: "Note on a theorem due to Wilczynski."

L. B. Robinson: "A curious system of polynomials, continued."

O. E. Glenn: "Covariants of binary modular groups."

O. E. Glenn: "Modular covariant theory of the binary quartic. Tables" (preliminary report).

O. E. Glenn: "Invariants of velocity and acceleration."

F. H. Safford: "Reduction of the elliptic element to the Weierstrass form."

Philip Franklin: "Computation of the complex roots of the function $P(z)$."

A. R. Schweitzer: "On the history of functional equations" (preliminary report).

E. D. Roe, Jr.: "The irreducible factors of $1 + x + \cdots + x^{n-1}$. Second paper."

E. D. Roe, Jr.: "The irreducible factors of a circulant."

Dunham Jackson: "Small arc computations and related questions."

T. H. Gronwall: "Qualitative properties of the ballistic trajectory."

Oswald Veblen: "Progress in design of artillery projectiles."

G. D. Birkhoff: "Boundary value and expansion problem for differential systems of the first order."

G. D. Birkhoff: "Note on the closed curves described by a particle moving on a surface in a gravitational field."

G. D. Birkhoff: "Note on the problem of three bodies."

Edward Kasner: "A characteristic property of central forces."

J. F. Ritt: "On weighting factor curves for low elevations."

A. C. Lunn: "Some functional equations in the theory of relativity."

J. R. Kline: "Concerning sense on closed curves in non-metrical plane analysis situs."

R. L. Moore: "On the most general class L of Fréchet in which the Heine-Borel-Lebesgue theorem holds true."

H. S. Vandiver: "On the class number of the field $\Omega(e^{2i\pi/p^n})$ and the second case of Fermat's last theorem."

F. W. Beal: "On certain points of congruences of circles."

L. L. Silverman: "Regular transformations of divergent series and integrals."

T. C. Fry: "The application of the modern theories of integration to the solution of differential equations."

C. A. Fischer: "Completely continuous transformations and Stieltjes integral equations."

Arnold Emch: "On closed curves described by a spherical pendulum."

H. S. White: "An explicit formula for two old problems."

L. P. Eisenhart: "Triply conjugate systems with equal point invariants."

F. N. Cole,
Secretary

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