

THE MEETING OF THE AMERICAN ASSOCIATION.

THE forty-third annual meeting of the American Association for the Advancement of Science was held at Brooklyn, N. Y., August 15-24, Daniel G. Brinton, of Media, Pa., presiding. The attendance was large, the total registration being 477. The number of new members admitted was 213.

The members enjoyed excursions to Long Branch, to points of interest in New York Harbor, to Cold Spring Harbor, and to West Point on the Hudson.

Astronomy was much better represented by the papers presented to Section A than was pure mathematics. The officers of the section were: Edgar Frisby, Washington, D. C., Vice-President; Jefferson E. Kershner, Lancaster City, Pa., Secretary; R. S. Woodward, New York, N. Y., Councilor; C. A. Doolittle, South Bethlehem, Pa., C. A. Waldo, Greencastle, Ind., C. H. Rockwell, Tarrytown, N. Y., Ormond Stone, Charlottesville, Va., J. A. Brashear, Alleghany, Pa., together with the Vice-President and Secretary, Sectional Committee; George B. Halsted, Austin, Texas, Member of Nominating Committee; L. G. Weld, Iowa City, Iowa, J. Burkitt Webb, Hoboken, N. J., George D. Olds, Amherst, Mass., together with the Vice-President and Secretary, Sectional Nominating Committee; George B. Halsted, Austin, Texas, Press Secretary.

The following papers were presented:

1. Some attempts to photograph the solar corona without an eclipse. By George B. Hale, Chicago, Ill.
2. On the control of the equatorial clock. By G. W. Hough, Evanston, Ill.
3. Requisites for governing the motion of equatorial telescopes. By W. R. Warner, Cleveland, O.
4. Recent latitude determination at the Sayre Observatory. By C. A. Doolittle, South Bethlehem, Pa.
5. A simple proof of Radares symmetrical form of the differential equations of the relative motion of the planets. By Ormond Stone, Charlottesville, Va.
6. A configuration of 36 points, 27 lines, 36 planes, a special case of which leads to Klein's hyperelliptic configuration of 40 points, 90 lines, 40 planes. By E. Hastings Moore, Chicago, Ill.
7. Stellar photometry. By Henry M. Parkhurst, Brooklyn, N. Y.
8. An extension of the Gaussian-potential theory of terrestrial magnetism. By H. A. Bauer. Presented by R. S. Woodward, New York, N. Y.
9. Sketch of zone observations at the Naval Observatory. By Aaron N. Skinner, Washington, D. C.

10. Gilliss's catalogue of Southern stars. By Edgar Frisby, Washington, D. C.

No. 1 opened with a review of the experiments of Langley, Huggins, and others, made in the hope of observing the corona without an eclipse. The author's experiments were begun at the Kenwood Observatory, Chicago, in 1892, and have since been continued on Pike's Peak and Mount Etna. The instrument employed was the spectroheliograph, which allows the photographic plate to be protected from the direct light of the sky by shading it with the dark band K of the solar spectrum. The light of the corona being represented in large part by a continuous spectrum, the method employed permits the brightness of the sky to be cut down without appreciably impairing the brightness of the corona. The experiments on Pike's Peak and Mount Etna were rendered useless by smoke, in the first case from forest fires, and in the second from the volcano. Two new methods of observing the corona without an eclipse were also described.

No. 2 was a description of a method of controlling an equatorial clock as applied by the author to the instrument in the observatory at Evanston, Ill. It is one of many improvements devised by the author, the adaptation of which at Evanston has added greatly to the equipment of the observatory.

No. 3 stated that the prime requisites in the driving-clock are: first, that the pendulum shall be perfectly free to maintain its exact theoretical position, whether the resistance to its motion be much or little; second, that whatever its theoretical position may be it should be mounted isochronously, so that its time of revolution will be the same, whether much or little of the driving power is used to move the telescope itself. The mechanism to absorb the excess of power must be so arranged that the power not required elsewhere will be instantly transferred to it and absorbed, thus leaving the pendulum revolving at its normal rate.

Two methods for accomplishing these desiderata were given. One by Professor Young of Princeton in which the pendulum-rod is hung, so that its varying angle leaves its theoretical length practically constant, and another as applied by Repsold to the heliometer at Yale, by the use of the principle of the tuning-fork.

It was pointed out that the governing of the slow motion in right ascension has been well accomplished by use of the method usually applied to slow motion in declination.

No. 4 was a comparison of the results of observations of the variation of latitude at the Sayre Observatory with those deduced from the formula of Dr. S. C. Chandler. This formula for the Sayre Observatory is

$$\phi - \phi_0 = -0.156'' \cos(t - T_1') - 0.850'' \cos(\odot - 280^\circ),$$

where ϕ = value of the latitude at any time t ;
 ϕ_0 = mean value of the latitude;
 \odot = the sun's longitude;
 $T_1' = 2,412,125$ (Julian date).

The term $-0.156'' \cos(t - T_1')0.850^\circ$ is that part of the variation having a period of 424 days; the variation represented by $-0.153'' \cos(\odot - 280^\circ)$ has a period of one year. It was shown that the complete formula did not compare very favorably with the results of observation, but that when only the 424-day term was considered the agreement was very good. This is in accord with Chandler's latest investigations, which show that the annual movement is in a very excentric ellipse. The German observatories, being nearly on the direction of the major axis of this ellipse, experience nearly the full effect of the movement, while for the meridian of Bethlehem it nearly vanishes. The paper was accompanied by a chart.

No. 5 was a shortening and simplification of what has been heretofore a long and laborious proof. The abridgment of demonstrations is an important labor, as it seems to offer the only solution of the problem of acquiring, with the rapidly-extending domain of mathematical science, a fair proportion of its content in a lifetime.

No. 6 was the discussion of a configuration which is determined by an arbitrary fundamental tetrahedron and an arbitrary transversal (not lying in a face or passing through a vertex of the tetrahedron). These elements determine a Reye's tetrahedral complex whose lines cut the faces [are joined to the vertices] of the tetrahedron in ranges of four points [axial pencils of four planes] having the same anharmonic ratio. The 27 Cf.-lines belong to the complex, the transversal being a Cf.-line. The 36 Cf.-points lie [Cf.-planes pass] by fours on [through] the 27 Cf.-lines and by nines on [through] the four faces [vertices] of the fundamental tetrahedron.

If in particular the transversal cuts the four faces in a range of four points having an *equianharmonic* ratio, then by adjoining certain elements to our configuration we obtain Klein's hyperelliptic configuration* of 40 points, 90 lines, 40 planes.

* WITTING: Über eine der Hesse'schen Configuration der ebenen Curve dritter Ordnung analoge Configuration im Raume auf welche die Transformationstheorie der hyperelliptischen Functionen führt. Inauguraldissertation, Dresden, 1887.

MASCHKE: Aufstellung des vollen Formensystems einer quaternären Gruppe von 51840 linearen Substitutionen: *Mathematische Annalen*, vol. 33, pp. 317-344, 1888.

No. 7 was a reply to the criticisms in the *Astronomische Nachrichten* of the results obtained by the Harvard Observatory with the meridian photometer. The necessity was shown of photometric methods as a basis for the division of the stars into magnitudes, especially for the reason that errors of judgment in the estimation of brightness will inevitably be perpetuated, while errors in photometric observation will be gradually eliminated. From the author's independent photometric observations with a different instrument, he had verified the general accuracy of the observations with the meridian photometer, and attributed the errors which had been detected chiefly to the misidentification of stars, a source of error to which he considered the meridian photometer peculiarly liable in the observation of variable stars. This confined the main objection to less than a dozen pages contained in a supplement to one of two large volumes of meridian photometer observations. A defence was made of what had been styled "excessive haste" in the Harvard observations, upon the ground that at the time when they were made, when there were no determinations for faint stars, it was important to obtain observations of as many stars as possible, in order that they might be easily accessible, even at the risk of errors and inaccuracies which could be easily sifted out. This work stands in the same relation to later and more accurate observations that the "Durchmusterung" bears to meridian-circle observations with regard to stellar positions.

No. 8 showed how to utilize observations with a view to determining the time-variation of the earth's magnetic potential. The idea of the paper is to derive values for the potential at different epochs, separated by intervals of a century or more, and thus discover its law of change. A difficulty met in the application of the idea arises from the paucity of data in the earlier observations, these consisting generally of a single one of the elements, namely, declination, dip, or horizontal force. The paper shows, nevertheless, how to use such incomplete data, and the author hopes by an application of his method to throw additional light on the obscure question of the secular variation of the elements of the earth's magnetism.

No. 9 opened with an account of Argelander's "Northern Durchmusterung" and the organization by the German Astronomical Society of the work of accurately determining the positions of all stars there given to the 9th magnitude inclusive. The German Astronomical Society in undertaking the same task for the stars in Schönfeld's "Southern Durchmusterung" assigned to the Naval Observatory at Washington the zone $-13^{\circ} 50'$ to $-18^{\circ} 10'$ containing 8689 of these stars.

Since January 13, 1894, when the work commenced, 5105

zone and about 600 zero and azimuth stars have been observed.

For a working list the card system has been used with great satisfaction. A card is devoted to each star, with a space for the results of observation. In arranging the cards for an evening's work, slips are inserted to indicate the time for reading meteorological instruments and for lunch.

Fifty to sixty stars are observed per hour. The programme requires two accordant observations of each zone star. The observations are entirely differential and are founded upon a list of 303 zero stars.

No. 10 was an account of the work of reduction of the data of Gilliss upon the positions of stars in the southern hemisphere. The author described the difficulties encountered by the observer from poor equipment and insufficient support.

Among the errors of observation were the recording of one cross wire for another, and use of the telescope when its cross wires were oblique, the error thus arising being attributed to refraction.

Mr. J. A. Brashear of Allegheny, Pa., exhibited a concave grating with 15,000 lines to the inch, ruled on Professor Rowland's new ruling-machine.

The place of the next annual meeting will probably be San Francisco, although no final decision was reached, followed by a meeting at Buffalo in 1896. The President of the next meeting will be E. W. Morley, Cleveland, Ohio.

The officers of section A chosen for 1895 are: E. S. Holden, Mt. Hamilton, Cal., Vice-President, and E. H. Moore, Chicago, Ill., Secretary.

COLUMBIA COLLEGE.

E. M. BLAKE.

NOTES.

THE meeting of the British Association for the Advancement of Science was held this year at Oxford, beginning on August 8 with the presidential address by Lord Salisbury. The attendance was exceptionally large, many eminent foreign scientists being present, and a number of papers of high importance was read. The University expressed its appreciation of the presence of so many distinguished foreigners by conferring the honorary degree of D.C.L. upon some twelve of them, among whom was Professor Gosta Mittag-Leffler. On Thursday, August 9, a soirée and exhibition of scientific apparatus was held in the University Museum. Among the exhibits was a series of linkage models by Professor Henrici. On Friday the section of mathematics and physics held a joint session with the section of mechanics, and several discussions