the valency of the ion in that molecule and not upon the chemical nature of the ion. Under the influence of electric force, the ions in any molecule may be made to take up a new position while their center of mass remains fixed. If the force varies periodically, a part of the energy of the field is used in keeping up the oscillations of the ions about this center of gravity in the face of heat losses. Helmholtz applies Hamilton's Principle to the equation of energy and arrives at results which correspond fairly well to observed facts.

The whole book is written in delightfully simple language and seems to be quite free from typographical errors. We merely note, in passing, that George Green held a fellowship in Cambridge from 1839 until his death in 1841, but never a professorship there. These lectures form one of a projected set of six volumes of Helmholtz's Vorlesungen über Theoretische Physik which will be extremely useful to students of physics all over the world.

HARVARD UNIVERSITY. B. O. PEIRCE.

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

GENERAL PROGRAM.

THE regular meeting of the Council will be at the Hotel Cadillac (hotel headquarters) at noon on August 7th.

On Monday, August 9th, at 9 a. m., the Council will meet in the Council Room, Central High School.

The first General Session of the Association will be held at 10 a. m., in the Auditorium of the Central High School. Owing to the death of Professor Edward D. Cope, the President of the Association, Professor Theodore Gill, of Washington, D. C., as Senior Vice-President, will call the meeting to order and introduce the President-elect, Professor Wolcott Gibbs, of Newport, R. I. Addresses of welcome will be made by his Honor Mayor William C. Maybury and Hon. Thomas W. Palmer, and President Gibbs will reply. Announcements by the General, Permanent and Local Secretaries will then be made.

The Addresses of the Vice-Presidents will be given in the afternoon as recorded below. In the evening Professor Theodore Gill, of Washington, D. C., will give a memorial address on the life and work of the late President, Professor Edward D. Cope. Following this address there will be a reception given by the citizens of Detroit.

On Tuesday, Wednesday, Thursday and Friday the regular meetings of the Council will be held at 9 a. m. and of the general session at 10 a. m., followed in the mornings and afternoons by the meetings of the sections.

On Friday morning officers will be elected and an agreement reached on the place of meeting for 1898, the fiftieth anniversary of the Association. The concluding exercises and adjournment of the sections of the Association and a social reunion and reception by the Ladies' Reception Committee will take place in the evening.

On Saturday there will be an excursion to Ste. Claire Flats.

It is expected that the members of the Association at Detroit will go in a body to Toronto to join in welcoming the members of the British Association to America. For this purpose special rates will probably be secured by steamer and train from Detroit to Toronto.

The programs of the sections are given below. These are as complete as possible up to the time of issue of this number of SCIENCE, but other papers will be presented at the meeting and entered on the daily programs.

SECTION A.—MATHEMATICS AND ASTRONOMY.

Address of the Vice-President: A Chapter in the History of Mathematics. By Professor W. W. Beman, University of Michigan, Ann Arbor, Mich.

1. A Problem in Substitution-groups. By Dr. G. A. Miller, Ann Arbor, Mich.

2. Continuous Groups of Spherical Transformations in Space. By Professor H. B. Newson, Lawrence, Kans.

3. The Treatment of Differential Equations by Approximate Methods. By Professor W. F. Durand, Ithaca, N. Y.

4. Commutative Matrices. By Professor J. B. Shaw, Jacksonville, Ill.

5. On the Theory of the Quadratic Equation. By Professor A. Macfarlane, Lehigh Univ., South Bethlehem, Pa.

6. A New Principle in solving certain Linear

Differential Equations that occur in Mathematical Physics. By Professor A. Macfarlane, Lehigh Univ., South Bethlehem, Pa.

7. Condition that the Line common to *n-1* planes in an *n*-space may lie on a given Quadric Surface in the same space. By Dr. Virgil Snyder, Ithaca, N. Y.

8. The Psychology of the Personal Equation. By Professor T. H. Safford, Williamstown, Mass.

9. Compound Determinants. (Preliminary Communication.) By Professor W. H. Metzler, Syracuse, N. Y.

10. Waters within the Earth. By W. S. Auchincloss, C.E., Philadelphia, Pa.

11. On the Secular Motion of the Earth's Magnetic Axis. By Dr. L. A. Bauer, Univ. of Cincinnati, Cincinnati, O.

12. Simple Expressions for the Diurnal Range of the Magnetic Declination and of the Magnetic Inclination. By Dr. L. A. Bauer, Univ. of Cincinnati, Cincinnati, O.

13. The Theory of Perturbations and Lie's Theory of Contact-transformations. By Dr. E. O. Lovett, Baltimore, Md.

14. On Rational Right Triangles. No. I. By Dr. Artemas Martin, U. S. Coast Survey, Washington, D. C.

15. Some Results in Integration expressed by the Elliptic Integrals. By Professor James McMahon, Cornell Univ., Ithaca, N. Y.

16. Modification of the Eulerian Cycle due to Inequality of the Equatorial Moments of Inertia of the Earth. By Professor R. S. Woodward, Columbia Univ., New York.

17. Integration of the Equations of Rotation of a Non-rigid Mass for the case of Equal Principal Moments of Inertia. By Professor R. S. Woodward, Columbia Univ., New York.

18. General Theorems concerning a certain class of Functions deduced from the properties of the Newtonian Potential Function. By Dr. J. W. Glover, Ann Arbor, Mich.

19. The Importance of Adopting Standard Systems of Notation and Coordinates in Mathematics and Physics. By Professor Frank H. Bigelow, U. S. Weather Bureau, Washington, D. C.

20. A Remarkable Complete Quadrilateral among the Pascal Lines of an Inscribed Six-point of a Conic. By Professor R. D. Bohannan, Columbus, Ohio.

James McMahon,
Secretary of the Section.

Cornell University.

SECTION B.—PHYSICS.

Address of the Vice-President: Long Range Temperature and Pressure Variables in Physics. By Dr. Carl Barus, Brown University, Providence, R. I.

1. Screening Effects of Induced Currents in Solid Magnetic Bodies in an Alternating Field. By Mr. Charles P. Steinmetz, General Electric Company, Schenectady, N. Y.

2. The Design, Construction and Test of a 1250 Watts Transformer. By Professor Henry S. Carhart, Univ. of Mich., Ann Arbor, Mich.

3. Electrolytic Action in a Condenser. By Dr. K. E. Guthe, Instructor in Physics, Univ. of Mich., Ann Arbor, Mich.

4. On the Velocity of Light in a Magnetic Field. By Professor E. W. Morley, Cleveland, Ohio; Professor H. T. Eddy, Minneapolis, Minn., and Professor D. C. Miller, Cleveland, Ohio.

5. The Magnetic Survey of Maryland. By Dr. L. A. Bauer, Univ. of Cincinnati, Cincinnati, Ohio.

6. The Transmission of Radiant Heat by Gases at Varying Pressures. By Mr. Charles F. Brush, Cleveland, Ohio.

7. On the Rate at which Hot Glass absorbs Superheated Water. By Professor Carl Barus, Brown Univ., Providence, R. I.

8. A New Method of determining the Specific Heats of Liquids. By Robert L. Litch, A.M., Bethlehem, Pa.

9. On the Coefficient of Expansion of Certain Gases. By Professor Edward W. Morley, Cleveland, Ohio, and Professor Dayton C. Miller, Cleveland, Ohio.

10. The Effect of Heat on the Elastic Limit and Ultimate Strength of Copper Wire. By Professor Frank P. Whitman, Adelbert College, Cleveland, Ohio, and Mary C. Noyes, Ph.D., Lake Erie Seminary, Painesville, Ohio.

11. A Method of obtaining Capillary Canals of Specified Diameter. By Professor Carl Barus, Brown Univ., Providence, R. I.

12. Kites and their Use by the Weather