suggesting modifications and substitutions which will give the students some work for investigation in place of continuous verification.

The greater part of the descriptive sections of the 'Practical Zoology' is from the pen of the late T. Jeffrey Parker, and we note all the characteristics which made his 'Elementary Biology' so popular. It is an interesting and excellent book; and, in the reviewer's opinion, a better single volume offering a year's course in general zoology has not yet appeared.

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SOCIETIES AND ACADEMIES.

NEW YORK ACADEMY OF SCIENCES.
SECTION OF ASTRONOMY, PHYSICS AND CHEMISTRY.

AT the May meeting of the Section, Professor R. W. Wood, of the Johns Hopkins University, read a very interesting paper on 'Anomalous Dispersion and its Bearing on Astrophysical Problems,' making special reference to the explanation of the flash spectrum in this way.

Dr. William S. Day, Columbia University, read a paper on 'An Experiment Relating to the Application of Lagrange's Equations of Motion to Electric Currents.'

The experiment described was analogous to one mentioned by Maxwell in his 'Treatise on Electricity and Magnetism,' Section 574, Volume II. Maxwell's experiment was made for the purpose of discovering whether or not in the expression for the kinetic energy of an electric current there was a term depending on the product of the current and the velocity of the conductor. In a single linear circuit having only one degree of mechanical freedom, the expression for the kinetic energy of the system in the most general case would be of the form

$$T = \tfrac{1}{2} I \dot{x}^2 + K \dot{x} \dot{y} + \tfrac{1}{2} L \dot{y}^2$$

in which $\dot{x}$ is the velocity of the mechanical coordinate, $\dot{y}$ is the current, I is a quantity of the nature of mass, L is the self-induction of the circuit, and K is the coefficient of the term consisting of products. Just what mechanical coordinate is to be represented by x is partly a matter of choice. Maxwell chose one whose

velocity means a motion of the wire in the direction of its length. There is one other coordinate which seems to be geometrically possible, although it is not one that is naturally suggested by the most satisfactory hypotheses now in vogue as to the nature of an electric current. This other coordinate is one such that its velocity means a rotation of the wire carrying the current around its axis of figure. If x has this meaning, then if the coefficient K is not zero, Lagrange's equations of motion show that if a current is suddenly started or stopped in a wire there would be an impulsive torque acting on the wire. The experiment was performed to look for such an effect if it existed. A straight piece of aluminium wire 30 cm. long and 0.25 cm. in diameter was suspended by a quartz fiber in such a way that it was free to rotate, and by means of mercury cups a current could be passed through it at pleasure. No effect of the kind considered was detected. If the value of K expressed in C.G.S. electromagnetic units, and referred to a centimeter length of the wire, had been as great as 0.00002, it could have been detected.

S. A. MITCHELL.

SCIENTIFIC JOURNALS AND ARTICLES.

THE May number (Vol. VIII., No. 8) of the *Bulletin of the American Mathematical Society* contains the following articles: 'The March Meeting of the Chicago Section,' by T. F. Holgate; 'Concerning Angles and the Angular Determination of Planes in 4-Space,' by C. J. Keyser; 'Note on the Sufficient Conditions for an Analytic Function,' by D. R. Curtiss; review of Scheffers's 'Theory of Surfaces,' by J. M. Page; review of 'Recent Books on Mechanics,' by E. B. Wilson; 'The Galois Theory in Burnside and Panton's Theory of Equations,' by B. S. Easton; 'Shorter Notices'; 'Notes'; 'New Publications.' The June number (Vol. VIII., No. 9) contains: 'The April Meeting of the American Mathematical Society,' by F. N. Cole; 'The Infinitesimal Generators of Parameter Groups,' by T. J. I'a. Bromwich; 'On the Parabolas (or Paraboloids) through the Points Common to two Conics (or Quadrics),' by T. J. I'a. Bromwich; 'A Second Definition of a Group,' by E. V. Hun-

tington; 'Determination of All the Groups of Order p^m, p being any Prime, which Contains the Abelian Group of Order p^{m-1} and of Type (1, 1, 1, . . .),' by G. A. Miller; 'A Class of Simply Transitive Linear Groups,' by L. E. Dickson; 'Errors in Legendre's Tables of Linear Divisors,' by D. N. Lehmer; review of 'Recent Books on Mechanics,' by E. B. Wilson; review of Kiepert's 'Calculus,' by E. W. Davis; 'Correction'; 'Notes'; 'New Publications.'

DISCUSSION AND CORRESPONDENCE.

FORCE AND ENERGY.

To the Editor of Science: In my address, published in your number for July 4, I have used the word 'force' without saying as clearly as I should have done that it is used in the sense of energy, as that term is now applied in physics. It seemed to me that to a general audience force would be more significant. As Helmholz wrote of the Erhaltung der Kraft, perhaps an outsider may be pardoned for using 'force' with the above defined meaning.

CHARLES S. MINOT.

BOSTON, July 5, 1902.

ETHER WAVES FROM EXPLOSIONS.

ABOUT a year ago the writer began a systematic attempt to examine into the effect of explosions upon the ether. A few prior experiments had yielded results explainable on the assumption that such action existed. The investigation was suggested by Young's observation upon a solar outburst as given in his work on the sun.* The Greenwich magnetic curves which Young gives for the dates August 3 and 5, 1872, are so persuasive in their character that an attempt was made to reproduce these results by a terrestrial explosion. It was also thought that the motion of rifle bullets might yield some recognizable result.

It seems probable that, in order to produce a magnetic disturbance, recognizable by a needle, the explosion should be as large and violent as possible. With the coherer as a receiver, it would seem that sharpness of the explosion and atomic periodicity might be more directly involved.

* 'The Sun,' 1881, pp. 156–159.

The work has been attended with great difficulty. The buildings and grounds of Washington University, where the work has been attempted, are in the heart of the city of St. Louis, and street cars are almost continually passing. Only between two and three o'clock in the morning was it found possible to obtain brief intervals fairly free from great disturbance. Even then the needle was continually in motion. The explosions at such an hour were necessarily limited in violence by the possibilities of damage to property, and have been doubtless an outrage upon people who wished to sleep.

So far the results have been inconclusive. Deflections have been obtained, but they have not been reducible to any system which could be rationally explained. It was apparent that the sound wave and the shock have been involved. This work will be carried on in the open country, where larger explosions can be made at a distance from the receiving apparatus. In the meantime it is most interesting to know that the volcanic explosion on the island of Martinique has apparently produced the results which we had been seeking.

FRANCIS E. NIPHER.

ECOLOGY.

To the Editor of Science: Doubtless your readers are heartily tired of the discussion upon the word ecology, and I shall not attempt to reply to Mr. Bather's letter in your issue of June 20, farther than to state that his explanation does not appear to me to improve his case materially beyond providing an ample cloud to cover a graceful retreat.

But aside from the main points at issue, I agree with Mr. Bather that the use of the word ecology in such an expression as 'the ecology of a glacial lake' is somewhat unfortunate. Every botanist interested in such studies knows that this phrase is simply a convenient abbreviaton for 'the ecological relations [or features, etc.] of the vegetation of a glacial lake,' and, when used in a botanical publication, it produces no misunderstanding. Nevertheless, as the present discussion has shown, it may mislead others, and therefore botanists could better use the word in such a way as to make