SCIENCE

A WEEKLY JOURNAL DEVOTED TO THE ADVANCEMENT OF SCIENCE, PUBLISHING THE OFFICIAL NOTICES AND PROCEEDINGS OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

FRIDAY, JANUARY 20, 1905.

CONTENTS:

MSS. intended for publication and books, etc., intended for review should be sent to the Editor of SCIENCE, Garrison-on-Hudson, N. Y.

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

A TENTATIVE THEORY OF THERMO-ELECTRIC ACTION.*

LET the lines (1)–(1) and (2)–(2) in Fig. 1 be the lines representative respectively, of two metals M_1 and M_2 in the ordinary thermo-electric diagram. We may, if we please, think of these metals as copper and iron, respectively. The lowest horizontal line is the temperature coordinate and begins at the absolute zero.

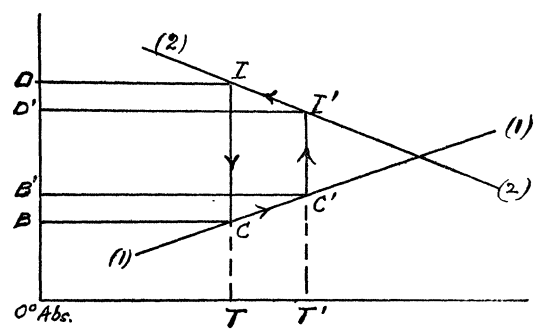

FIG. 1.

The diagram is so constructed that the area $CC'I'IC$ is equal to the net thermo-electromotive force, E, counterclockwise, in the circuit indicated by Fig. 2, in which the left-hand junction is kept at temperature T and the right-hand junction at temperature T'. We will suppose that E is expressed in mechanical units, as the

* Address of the vice-president and chairman of Section B—Physics, American Association for the Advancement of Science, Philadelphia, December, 1904. [The theory here given is certainly incomplete, and I fear that it is not entirely self-consistent. It is intended to be suggestive rather than conclusive or exhaustive.—E. H. H.]

one of the examples he informs the more careful reader that a large class of equations are excluded from consideration. This is, indeed, necessary, as otherwise the reasoning of § 172 may become illusory by the vanishing of $[\omega, \alpha]$, as simple examples will show. But even with this restriction it must be shown or assumed that this expression does not vanish.

Another point which we believe has not been sufficiently emphasized relates to the equality or inequality of rational functions of the roots. How often in Galois's theory do we have to decide whether a rational function of the roots has or has not been *changed* or *altered* by a set of substitutions. The only explanation of this fundamental and delicate matter we have found is in a footnote on page 124.

Would it not be well to restrict the term *general equation* to one whose group is the symmetric group? The author follows well-established usage in calling a general equation one whose coefficients are independent variables. Because algebraicists thought a century ago that these equations represented the general case is no reason to perpetuate a term which is sure to produce confusion in the mind of the beginner. Apropos of these equations we must express our regret that the author has allowed the demonstration given in § 158 to pass muster; it is a demonstration which does not demonstrate.

James Pierpont.

Yale University.

La contagion mentale. Dr. A. Vigouroux et Dr. P. Juquelier. Paris, 1905. Pp. 250.

This is one of the volumes in the French *Bibliothèque internationale de psychologie expérimentale, normal et pathologique.* Mental contagion is the name here given to what is generally known as imitation in the narrow sense, *i. e.,* unconscious imitation. The process is unconscious on the part of both the imitator and the person imitated. Thus contagion excludes voluntary imitation and personal suggestion. The first half of the book deals with normal contagion and the second half with abnormal.

Assuming that the reflex arc is the fundamental type of neural action, and that the impulse may enter a given sensori-motor circuit from any sense and at any point in the circuit, we may trace a physiological explanation for all the contagious acts, *e. g.,* yawning, laughing, crying, coughing, dancing, marching, etc. Then, on the theory that every emotion tends to express itself in muscular adjustment, that this adjustment may be transmitted by contagion, and that a given emotional expression creates the emotion, the same explanation accounts for the contagion of emotional states *e. g.,* fear in a panic, anger in a revolution, the soldier's adoration of Napoleon, the schools of art and the havocs of intellectual bias. The same principle may also be extended to ideas because all ideas are more or less fused with feeling, *e. g.,* belief, scientific theory, dogma. The idea is contagious in proportion to the feeling present. Good analytic and genetic accounts run parallel to this mode of explanation, and special emphasis is laid on the social conditions and significance of mental contagion. The second part of the book consists largely of citation and classification of cases. The less normal the individual or the group, the more liable to contagion. Like the microbe, the mental contagion may be either beneficent or noxious.

A practical lesson from this book is preeminent: mental contagion is preventable. If insanity and crime are contagious, that principle should be recognized in our penal and corrective institutions; and society may take steps to prevent epidemics of fanaticism and crime. To-day science is interested in the physical microbes of disease; in the near future there will be a similar interest in the facts of mental contagion.

C. E. Seashore.

University of Iowa.

SCIENTIFIC JOURNALS AND ARTICLES.

The American Journal of Science for January contains the following articles: 'Submarine Great Canyon of the Hudson River,' by J. W. Spencer; 'Radioactivity of Underground Air,' by H. M. Dadourian; 'Types of Limb-Structure in the Triassic Ichthyosauria,'

by J. C. Merriam; 'Interaction of Hydrochloric Acid and Potassium Permanganate in the Presence of Ferric Chloride,' by J. Brown; 'Crystal Drawing,' by S. L. Penfield; '*Anemiopsis Californica* (Nutt.) H. ea A.: An Anatomical Study,' by T. Holm.

THE December number of the *Journal of Nervous and Mental Diseases* opens with an article by Dr. J. Grinker on a case of juvenile tabes in a family of neuro-syphilitics, including careful investigations of the family history, and supplemented by a report of a rather unusual case of precocious tabes without evidence of syphilitic infection, with an exceptionally long course and with fragilitas ossium. Dr. Max Schlapp and Dr. J. J. Walsh unite in presenting a case of subcortical cyst and fibroma due to trauma producing Jacksonian epilepsy, cured by operation; and the original articles for the month close with a short paper by Dr. James Burnett on the therapeutic action of veronal. The proceedings of the Boston Society of Psychiatry and Neurology, May 19, 1904, are reported, and also the proceedings of the New York Neurological Society, May 4, 1904. The 'Periscope' gives abstracts of the *Journal of Mental Science, Nouvelle Iconographie de la Salpetriere, Journal de Neurologie,* and *Archives de Neurologie.* Books reviewed are: 'Unconscious Therapeutics,' by Dr. Alfred Schofield; 'Jahresbericht über die Leistungen und Fortschritte auf dem Gebiete der Neurologie und Psychiatrie,' by E. Flateau, E. Mendel and L. Jacobson, and 'Lehrbuch der speziellen Psychiatrie für Studierende und Aerzte,' by Dr. Alexander Pilcz.

The Popular Science Monthly for January contains the following articles: 'Some Experiments of Luther Burbank,' by David Starr Jordan, giving some of the results of his labors in producing new plants; 'The Present Problems of Paleontology,' by Henry Fairfield Osborn; 'Social and Political Effects of Immigration,' by Allan McLaughlin; 'Galileo,' by Edward S. Holden; 'Radio-activity and Matter,' by the late Clemens Winkler; 'Educational Problems,' by the Lord Bishop of Hereford; some interesting facts about 'The United States Pharmacopœia,' by H. C. Wood; and 'The Mosquito Investigation in New Jersey,' by John B. Smith, which shows the very important results secured during the last three years. There are very interesting brief articles in 'The Progress of Science.'

SOCIETIES AND ACADEMIES.

NEW YORK ACADEMY OF SCIENCES. ANNUAL MEETING, DECEMBER 19, 1904.

THE academy convened for the annual meeting at 7:30 P.M., on December 19, at the Hotel Endicott. The president, Professor Edmund B. Wilson, occupied the chair. A formal session for the transaction of the regular business of the academy was first held, and this was followed by a dinner at which sixty-six members and their friends were present.

The accompanying reports of the corresponding secretary, recording secretary, treasurer, librarian and editor were read and placed on file. The report of the treasurer was formally referred to the finance committee for audit.

The academy then proceeded to the election of officers for the year 1905; Professors Hovey and Lloyd were appointed tellers, ballots prepared by the council according to the provisions of the by-laws were distributed, and the votes were counted. The following officers were declared elected:

President—James F. Kemp.

Vice-Presidents—Edmund O. Hovey (Section of Geology and Mineralogy), Ernest R. von Nardroff (Section of Astronomy, Physics and Chemistry), W. M. Wheeler (Section of Biology), F. J. E. Woodbridge (Section of Anthropology and Psychology).

Corresponding Secretary—Richard E. Dodge.

Recording Secretary—Hermon C. Bumpus.

Treasurer—Charles F. Cox.

Librarian—Ralph W. Tower.

Editor—Charles Lane Poor.

Councilors (to serve three years)—Emerson McMillin and F. H. Wiggin.

Finance Committee—John H. Hinton, C. A. Post, H. F. Osborn.

The following eminent men of science were elected honorary members, being presented to