

(2) MR. J. W. BRIGHT read a paper on The Views of Begemann respecting the Teutonic Weak Preterite.

The aim of the paper was to present Begemann's attitude towards the "composition theory" along the line of its history from Bopp and Grimm to the present, and thus gradually to develop Begemann's own theory by its sharp and argumentative contrasts, and to indicate details of argument attaching to the whole discussion which yet await conclusive demonstration.

(3) PROFESSOR LANMAN read a paper on the Origin of the Belief in the Transmigration of Souls.

The belief may have arisen independently among the Egyptians, Semites, and Aryans. Several Vedic passages supposed to contain the germs of the Metempsychosis were examined. The development of the doctrine in India was referred to the Post-Vedic age.

(4) MR. B. F. O'CONNOR read a paper on the Principles of Orthography of French verbs ending in *-eler* and *-eter*.

These verbs, numbering about 230, present the peculiarity that some of them double the consonant before mute *e*, whereas others under the same circumstances accent the preceding *e*. The reason for this distinction is not clear, and there is much confusion among grammarians on the subject.

A careful study of each verb shows that the principle which originally governed them was Etymology, and that they should be classified according to this principle. The simplest way out of the difficulty would be to conjugate them all alike.

(5) PROFESSOR CROSS read a paper on The Testaments of the Twelve Patriarchs.

This showed the uncertainty of the results reached in attempting to establish the dependence of one document upon another, from isolated verbal coincidences; and that the argument for the previous acquaintance of the writer of the *Testaments* with certain books of the New Testament is inconclusive, because the words advanced to support this view are not peculiar to the two alone, but are of common occurrence in other Greek writers and in the LXX.; and that the date usually assigned for its composition cannot be established.

#### Historical and Political Science Association.

The regular January meeting of the Association was postponed on account of the semi-annual examinations.

#### Metaphysical Club.

December 9, 1879.

(1) The principal paper, by MR. E. M. HARTWELL, was on Reflex Action and its Analogies in the Fixing of Belief.

The various factors of reflex action were discussed separately and in their relations to one another. Simple and tetanic muscular contraction were shown by experiments upon the nerve muscle preparation of a frog. Several experiments were made upon frogs, in order to show reflex action, indicating purpose without volition. The steps whereby the mind resolves its doubts or reaches its beliefs were pointed out as analogous to those in the reflex action of a brainless frog.

(2) MR. DAVID STEWART presented a communication on The Ethics of Belief.

This paper discussed the moral grounds of a belief in the supernatural, and pointed out the dishonesty of treating as positive fact, dogmas which are matters of doubt or dispute.

January 13, 1880.

(1) MR. ALLAN MARQUAND presented a translation, which he had made, of the treatise of Philodemus, *περὶ σημείων καὶ σημειώσεων*.

This treatise, recovered from the ruins of Herculaneum, at the end of last century, reveals to us the method of induction taught in the school of Zeno, the Epicurean. The inference passes from the known to the unknown by means of resemblance. The method is contrasted with the *κατ' ἀναξίτητα* of the rhetoricians, and arguments are presented to show that the method of resemblance underlies the other. Various objections are considered, and it is shown in a very interesting way that the method cannot be attacked, except by assumptions which can be obtained only by induction itself. In the treatment of inductive fallacies we are referred to a lost work of Demetrius, the Epicurean, where this subject is said to have been treated very compactly.

MR. C. S. PEIRCE remarked upon the value of this treatise to the history of Inductive Logic and Epicurean Philosophy.

(2) MR. C. W. NICHOLS read a paper on Moral Insanity as a Cause of Crime.

This paper, based upon M. Despine's *Psychologie Naturelle*, called attention to many cases of mania and monomania, and urged a more scientific and humane treatment of the morally insane.

(3) MR. W. S. PRATT offered an abstract of Grant Allen's *Physiological Aesthetics* (London and New York, 1877).

Starting with the doctrine that pleasure and pain are subjective concomitants of nervous states, Mr. Allen first distinguishes the truly aesthetic pleasures, and then discusses at length the stimulations, both actual and ideal, to which the sensory organs and the coordinating centres of the intellect are subject, with a view to an *a priori* determination of their relative aesthetic values. Applications of the conclusions reached are made to painting and sculpture, and especially to poetry. Attention was called by Mr. Pratt to the admirable method of the book, and to its importance as a treatise on the sensuous elements of aesthetic enjoyment.

February 10, 1880.

(1) The principal paper was by MR. W. S. PRATT on Helmholtz's Theory of the Development of Musical Scales.

After calling attention to a few of the scales now in use, the answers that Helmholtz gives to the questions, (I) Why are scales with determinate degrees universally used? and (II) Why are certain degrees preferred to others? were discussed at length.

His answer to (I) was objected to, and the early development of *rhythm* suggested as a more satisfactory reason for the practice. This view was supported by *a priori* considerations, and by observations on the music of barbarous tribes. (2) His theory of the further progress of scale-development was divided into five parts: (a) The acoustic doctrines of partial-tones and of tone relationship; (b) The physiological doctrine that the ear is essentially a set of resonators sensitive to these partial-tones and to the natural kinships established by them; (c) Resting upon these, the mental tendency to choose scales containing only tones nearly akin to each other; the operation of which tendency is limited by (d) The smallest interval tolerated between consecutive notes, and by (e) The desire for uniform intervals. The interaction of these elements in the evolution of modern scales, was explained and illustrated.

A legitimate extension of this rationalization of the action of taste develops a large number of theoretical scales that are as yet unknown in practical use. The actual forms are often inferior in tonal correlation to the theoretical, and a fuller explanation is needed of the exclusion of the latter by the former. Helmholtz's failure to recognize the probability of some harmonic influence on the scales of even the most barbarous peoples, was also noted. In conclusion, a brief mention was made of the current dispute as to what shall be adopted as the standard scale.

(2) A paper on the Evolution of Nerves and Nervous Systems was read by MR. E. M. HARTWELL.

This gave an account of the investigations of Messrs. Romanes and Schaefer on the contractile and conductile tissues in the Medusid jelly fishes. It was claimed that they had demonstrated certain progressive stages of genesis and specialization in the nervous systems of various genera of the *Medusae*; and that their results afforded new and valuable inductive evidence in favor of the deductive theory propounded by Mr. Herbert Spencer, concerning the development of the nervous system from undifferentiated protoplasm.

#### Mathematical Seminary.

November 19, 1879.

DR. STORY, on a *Generalized form of Analytical Triangle*.

The method of Newton's parallelogram or of the "analytical triangle," is independent of the angle between the coordinate axes, and may therefore be applied to any trilinear system to determine the nature of a curve in the vicinity of the intersection of any two axes, if the third coordinate be regarded as constant. If, therefore, the curve be referred to a bilinear system, we may, by regarding the infinite straight line as the third axis of a trilinear system, determine the nature of the curve at the infinite points of the bilinear axes, and the tangents (asymptotes) at the points where the curve cuts either axis. The *generalized analytical triangle* is equilateral and shows the coordination of the three origins (so to speak), viz: the origin, in the ordinary sense, and the infinite points of the bilinear axes. The coefficients of the equation of the curve are arranged in the triangle in rows parallel to the *three* sides according to the powers of the three coordinates which the corresponding terms would contain, if the equation were made homogeneous. The essential difference between this arrangement and that of the ordinary analytical triangle, is the use of the rows parallel to the third side.