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THE HISTORY OF EVOLUTIONARY THOUGHT[1]

AS RECORDED IN MEETINGS OF THE BRITISH ASSOCIATION

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SIR WILLIAM THOMSON, in his address at Edinburgh in 1871, said that "the real origin of the British Association" was given in the words of a letter written by David Brewster to John Phillips on February 23, 1831, a few months before the first meeting: "The principal object of the Society would be to make the cultivators of science acquainted with each other, to stimulate one another to new exertions, and to bring the objects of science more before the public eye, and to take measures for advancing its interests and accelerating its progress." That the time was fully ripe for the birth of the association is made very clear by the words written by John Keble to a friend, referring to the D.C.L. degrees conferred, at the Oxford meeting in 1832, on David Brewster, Robert Brown, John Dalton and Michael Faraday: "The Oxford Doctors have truckled sadly to the spirit of the times in receiving the hodge-podge of philosophers as they did"—an opinion on which Lord Salisbury commented at the Oxford meeting in 1894: "It is amusing at this distance of time, to note the names of the hodge-podge of philosophers whose academical distinctions so sorely vexed Mr. Keble's gentle spirit." It is not only amusing but pathetic that such words should have been used by a revered member of a university which had done splendid service for science, as has been so well shown in Dr. R. T. Gunther's volumes.[2]

Faced by the serious duty of preparing this address, I felt that the best hope of interesting you would be to choose a subject which has received special attention at our meetings. I have selected the progress of thought on organic evolution as it may be followed in addresses,

[1] Address of the president of the British Association for the Advancement of Science, given at Nottingham, September 1, 1937.

[2] "Early Science in Oxford," vols. i–xi.

itself. When the counter has completed its stroke a short-circuiting contact is made which momentarily reduces the anode potential to a value low enough to stop the current flow, whereupon the contact opens as the counter armature returns and awaits the next heart beat. It will be noted that this contact operates *after* the stroke has been completed, and therefore imperfections in the contact cause no inaccuracy in the count, provided only that the potential is reduced for an instant below the ionization value before the next beat.

A telephone message counter in which the original armature has been replaced with one made from 1/32 inch steel has been found to work perfectly as a counter up to 235 strokes per minute (this high rate was secured by artificial means). It is not necessary to use other contacts if a graphic record of the beat is desired, as a thread connected to a recording pen can be attached to a flat spring which is placed so that it is hit by the counter armature near the end of its stroke. The counter and other parts of the output circuit must be well shielded, as must the circuits associated with the first amplifier stage. Also, the first 6F5 tube must be carefully selected, as about 30 per cent. of the tubes commercially available seem to have a very high hum level or are defective in other ways.

This apparatus seems to be very dependable in operation. It is only necessary to attach the electrodes, turn the amplifier on and adjust the amplification so that the meter needle swings well above the point at which the trigger action occurs. The setting is not at all critical. If the amplification is more than about 15 fold above this value, multiple counts may occur due to electric feed-back between the counter and amplifier, but, in practical use, such high amplification is not necessary. When the electrodes are properly placed, the uninsulated subject can engage in any sort of violent activity without affecting the count.

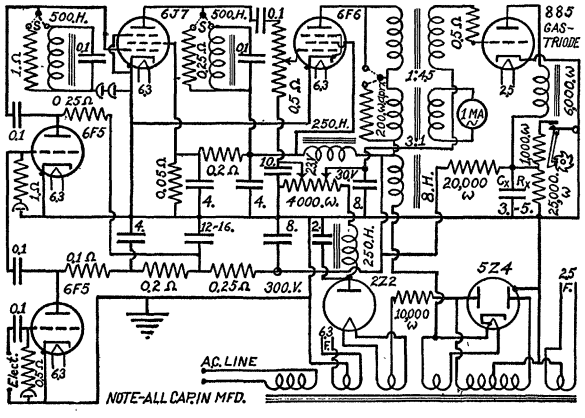

FIG. 1. The electric cardiometer.

The device seems particularly well adapted to the graphic recording of rate in connection with magnetic-clutch operated interval recorders as described by Fleisch[3] and by Gesell.[4] Additional contacts are not necessary; the magnet coil of the Fleisch apparatus, for example, is simply placed in series with the resistance R_x (see Fig. 1), which is reduced to compensate for the resistance of the coil. Experiments in progress indicate that a differentially wound magnet coil for the clutch is even better, as the anode current of the gas-triode can then release the clutch while at the same time the counter is being actuated. The clutch is "off" for the duration of the counter stroke, which seems to be reasonably constant and which may be varied within limits by changing capacitor C_x and associated resistors.

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[3] A. Fleisch, *Am. Jour. Psychol.*, 45: 335, 1933.
[4] R. Gesell, SCIENCE, 79: 275, 1934.

BOOKS RECEIVED

BAUGHMAN, IMO P. *Elementary Chemistry.* Second edition, revised. Pp. 296. 19 figures. Lea and Febiger. $2.75.

BAWDEN, ARTHUR T. *Man's Physical Universe.* Pp. xvii + 812. 368 figures. Macmillan. $3.50.

COLLINS, KREIGH. *Tricks, Toys and Tim; A Book of Model-making and Magic.* Pp. xii + 238. Illustrated. Appleton-Century. $2.00.

CRAMER, HARALD. Cambridge Tracts in Mathematics and Mathematical Physics. *No. 36—Random Variables and Probability Distributions.* Pp. 120. Cambridge University Press, Macmillan. $2.25.

DARWIN, CHARLES. *The Origin of Species.* (Condensed). Pp. 112. Quarter Books, Los Angeles. $0.25.

ENGLISH, O. SPURGEON and GERALD H. J. PEARSON. *Common Neuroses of Children and Adults.* Pp. 320. $3.50.

KOLTHOFF, I. M. *Acid-base Indicators.* Translated by CHARLES ROSENBLUM. Pp. ix + 414. Macmillan. $7.00.

LANDÉ, ALFRED. *Principles of Quantum Mechanics.* Pp. vii + 115. 15 figures. Macmillan. $2.25.

SHRADER, J. EDMOND. *Physics for Students of Applied Science.* Pp. ix + 638. 581 figures. McGraw-Hill. $4.00.

TIMOSHENKO, S. and D. H. YOUNG. *Engineering Mechanics; Dynamics.* Pp. xii + 324. 314 figures. $2.75. *Engineering Mechanics; Statics.* Pp. xiv + 334. 464 figures $2.75. McGraw-Hill.

TOUMEY, JAMES W. and CLARENCE F. KORSTIAN. *Foundations of Silviculture upon an Ecological Basis.* Second edition, revised. Pp. xxi + 456. 22 figures. Wiley. $4.50.

TREWARTHA, GLENN T. *An Introduction to Weather and Climate.* Pp. ix + 373. 108 figures. McGraw-Hill. $3.00.

WILLCOX, O. W. *ABC of Agrobiology.* Pp. 323. 22 figures. Norton. $2.75.

WILLIAMS, SAMUEL R. *Foundations of College Physics.* Pp. x + 630. 531 figures. Ginn. $4.00.

WINSLOW, C.-E. A. and SAVEL ZIMAND. *Health under the "El"; The Bellevue Yorkville Health Demonstration in Mid-town New York.* Pp. xiii + 202. Illustrated. Harper. $2.25.

YATES, RAYMOND F. *How to Make Electric Toys.* Pp. xvi + 199. Illustrated. Appleton-Century. $2.00.