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CHEMISTRY AND THE FUTURE

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IN discussing any subject which deals with an extrapolation from the past to the future, one can not make any certain or dogmatic statements. In the physical sciences extrapolations are very likely to be incorrect even when they involve only a small percentage of the region covered by reliable data unless a very fundamental theory of the phenomena based upon broad scientific evidence exists. Such conditions do not obtain with regard to my subject, and I can not risk more than the most general predictions in regard to the future. Moreover, these general predictions must be predicated upon several alternatives which are definitely beyond the control of chemists or scientists, and which are vital to their future.

It is necessary, in the first place, to consider the objectives of two groups of people. The first of these is the scientific group, and the second is the group consisting of the community as a whole. In neither case are the objectives exactly formulated, though it seems to me that those of the scientific group are more definite than those of the community in which we work. Of course, the objectives for all chemists or all scientists are not the same, but there is a very considerable agreement between these individuals. The people of the community, on the other hand, are swayed by so many emotions that these appear to be the most unpredictable quantity in the entire problem.

Scientific men are those who are posing particular questions to nature and its laws as they operate about us. In doing so they arrange most carefully devised experiments to test whether the ideas which they have in regard to the operation of natural law are in fact in accordance with these laws. If their postulates are not correct, the answer which they receive is an em-

The instrument herein described utilizes a balanced circuit, but the balance is achieved by the use of a variable resistance in circuit of one of the photoelectric cells. The apparatus consists of a Leeds and Northrup 2420-c galvanometer, the light of which has been replaced by a 21 c-p. headlight bulb supplied with a 7-volt current from a transformer fed by ordinary house current (110 volts, alternating current). One photoelectric cell (General Electric, Cat. No. 4120833 G 1) is fastened to each side of the galvanometer box after a small window has been cut to allow the passage of light. Interposed between the lamp and the photoelectric cells are 2-inch square light filters, selected from molded filters of Corning Glass Works to transmit only light of the wave-length absorbed by the substance being analyzed, and absorption cells made by drilling a ¾-inch hole in a 1-inch Lucite block (du Pont). The filters, absorption cells and photoelectric cells are shielded to exclude all light save that coming from the lamp. The photoelectric cells are connected in opposition with a decade resistance (Leeds and Northrup, Cat. No. 3976) in the circuit to reduce the output of the left photoelectric cell. The apparatus is illustrated in Fig. 1. The materials and parts cost about one hundred dollars.

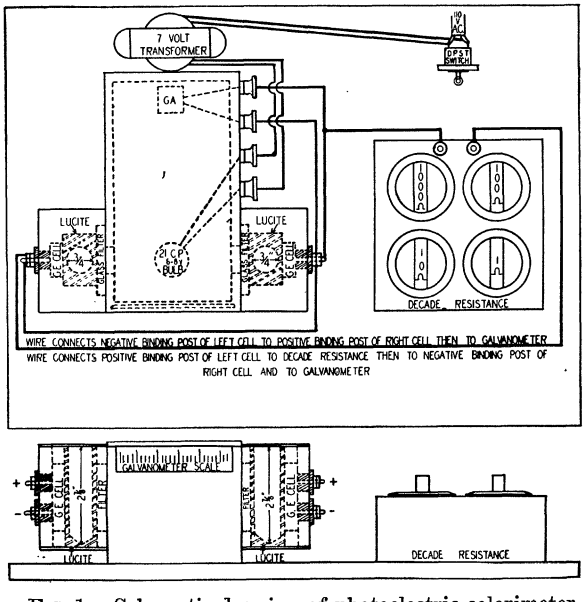

FIG. 1. Schematic drawing of photoelectric colorimeter. Upper drawing—vertical view. Lower drawing—frontal view.

The colorimeter has been employed so far only in the determintion of creatinine concentrations, using the alkaline picrate method. For this Corning filters No. 428 were used. The alkaline picrate diluted 1:2 with water is placed in both the right and left absorption cells and the galvanometer balanced, the reading in ohms representing the blank. After this blank determination the fluid is removed from the right cell by suction. To 20 cc of a creatinine solution 10 cc of alkaline picrate is added and the right absorption cell filled with the mixture. The galvanometer is balanced 12 minutes after the creatinine and alkaline picrate are mixed. The blank is subtracted from this reading. A calibration curve, based on triplicate determinations of dilute creatinine solutions, is shown in Fig. 2. The

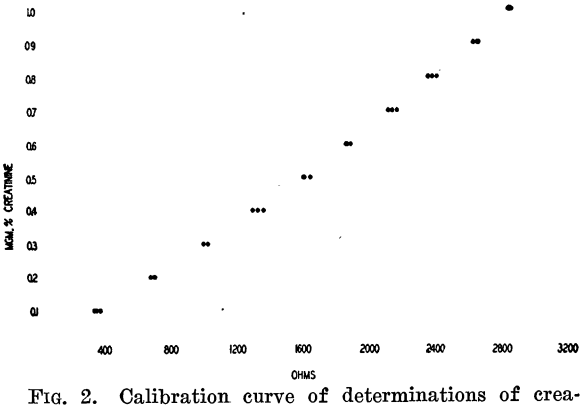

FIG. 2. Calibration curve of determinations of creatinine concentrations with photoelectric colorimeter.

instrument is most accurate in determining low concentrations.

A filter may be substituted for the left absorption cell and a receptacle containing a test-tube used in place of the Lucite cell on the right. The Lucite cells have given more accurate results and, while test-tubes can be used more conveniently, we have preferred to retain the more accurate and slower method.

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BOOKS RECEIVED

LIPPINCOTT, JOSEPH W. *Animal Neighbors of the Countryside.* Pp. 272. Illustrated by LYNN BOGUE HUNT. J. B. Lippincott Company. $2.50.

SAVA, GEORGE. *The Healing Knife; A Surgeon's Destiny.* Pp. x + 310. Harcourt, Brace. $2.50.

STROUD, JAMES B. *Introduction to General Psychology.* Pp. xv + 681. 110 figures. Prentice-Hall. $3.25.

SUTTON, RICHARD M., Editor. *Demonstration Experiments in Physics.* Pp. viii + 545. 408 figures. McGraw-Hill. $4.50.

VOSBURGH, WARREN C. *Introductory Qualitative Analysis.* Second edition, revised. Pp. vii + 222. 11 figures. Macmillan. $2.25.

WALKER, A. EARL. *The Primate Thalamus.* Pp. xxiii + 321. 95 figures. University of Chicago Press. $3.00.

WELLS, A. K. *Outline of Historical Geology.* Pp. xiv + 266. 99 figures. George Allen and Unwin, Ltd., London, and Nordemann Publishing Company, New York. $3.50.