

**CELLS WITHOUT TRANSFERENCE FOR  $pH$   
DETERMINATION**

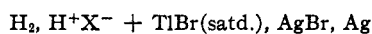
Sir:

Although methods of routine  $pH$ -determination have developed rapidly during the last few years, cells with liquid junctions, abandoned in most research work long ago, are still in use. In order to eliminate this source of experimental and theoretical inconvenience Hamer<sup>1</sup> suggested cells of the type



The concentration of the sodium chloride added to the solution must, of course, be known and allowed for in calculating the hydrogen ion activity.

For the same purpose we had examined cells of the type



before we had knowledge of Hamer's paper. The solubility of thallos bromide (0.00257 mole per 1000 g. of water at 30°) is high enough to secure a definite potential not influenced by common impurities. On the other hand, the solubility is so low that the activity of the hydrogen ion is practically not altered and the liquid junction potential between a solution containing no thallos bromide and a solution saturated with this salt may be neglected safely. Even this liquid junction might be avoided by saturating with thallos

(1) W. J. Hamer, *Trans. Electrochem. Soc.*, **72**, 45 (1937).

bromide that portion also of the solution which is in contact with the hydrogen electrode.

The applicability of this type of cell is restricted, of course, to solutions which do not form any precipitate when saturated with thallos bromide and do not contain thallos or bromide ions in an amount comparable with the solubility of this salt. In such a case, however, another reference electrode of similar kind may be used, for instance, some organic zinc salt in connection with zinc amalgam or silver sulfate with silver etc.

Applying the usual formula one may obtain from the e. m. f. the quantity  $a_H + (\gamma_{Br^-} / \gamma_{Tl^+})^{1/2}$  which is in any case identical with the hydrogen ion activity as far as the principle of ionic strength is valid. In this respect too the method compares not unfavorably with others. This type of cells might prove the most convenient basis of defining the term "hydrogen ion activity," which is well known to be arbitrary to some extent.<sup>2</sup>

As we were compelled to interrupt our work on various methods of routine  $pH$  determination, we wish to offer this suggestion.

(2) D. I. Hitchcock [THIS JOURNAL, **58**, 856 (1936)] suggested a different definition of  $pH$  on the basis of cells without liquid junction and discussed another suggestion made by Scatchard. The general idea of single ionic activities, introduced by Lewis and Randall, has been exhaustively discussed by E. A. Guggenheim (*J. Phys. Chem.*, **34**, 1758 (1930), and previous papers).

BERKELEY, CALIF.  
SHANGHAI, CHINA

OTTO REDLICH  
HANS KLINGER

RECEIVED JULY 5, 1939

**NEW BOOKS**

**Methodik der Hormonforschung.** (Methods of Hormone Investigation.) By Dr. Phil. Habil. CHRISTIAN BOMSKOV. **Ovar (Follikelhormone, Gelbkörperhormon), Hoden, Hypophysenvorderlappen.** [Ovary (Follicular Hormone, Corpus Luteum Hormone), Testis, Anterior Pituitary.] Georg Thieme Verlag, Rossplatz 12, Leipzig C 1, Germany, 1939. xxix + 1016 pp. 274 figs. 18 × 27 cm. Price, RM. 89; bound, RM. 91.

The work under review forms a second instalment to the volume which bears the same title, noticed in these columns in September 1937 (p. 1771). In the author's view, the subjects here considered constitute the most modern and successful chapters of endocrinology. They are: estrogenic hormones (264 pages), hormones of corpus luteum (72 pages), androgenic hormones (202 pages), hypophyseal hormones (gonadotropic 280 pages, growth-

stimulating 41 pages, thyreotropic 61 pages, lactogenic 23 pages, diabetogenic 7 pages, others of doubtful existence 22 pages). Of these, only the sex hormones at present offer extensive possibilities for chemical consideration.

As in the first volume, the author has performed his onerous task with conscientious thoroughness, and has prepared a survey notable for catholicity rather than critical selectivity. The compilation as a whole suffers at times from a certain lack of balance. For example, two whole pages are dedicated to a detailed description of Butenandt's procedure for the isolation of estrone from palm kernel oil, whereas reference to studies on the effects of sex hormones on the metabolism of cholesterol and of carbohydrate is dismissed in a few lines of literature citations, without a hint as to the nature of these effects.

Typographical errors are relatively scarce, but a few