

of "standard mixtures" having a known hydrogen ion concentration or p_H value. These investigators established their formulas very precisely by the use of a potentiometer method employing a hydrogen electrode. According to Clark,³ the p_H values in the freshly prepared mixtures may be considered reliable to a few hundredths of a p_H unit. Probably the widest application of these standard solutions is, in connection with color indicators, for comparisons with solutions having an unknown hydrogen ion concentration.

The fact that standard mixtures can readily be prepared, combined with the further fact that the hydrogen electrode is an appliance which is simple and convenient to use, leads to a very obvious suggestion. This is to utilize the hydrogen electrode as a means for comparison of an unknown with a standard solution. It should extend materially the usefulness of the standard solutions to which reference has been made.

We may suppose that we desire to titrate a solution of unknown p_H value to a definite hydrogen ion concentration. From the curves of Sørensen's article, or from the formulas of Clark and Lubs, we select the particular solution having a p_H value which corresponds to the point to which we desire to titrate. This solution is placed in one vessel with a hydrogen electrode, and connection is established between the standard solution and the unknown, in a second vessel, by means of a salt bridge of saturated potassium chloride, so that concentration potentials may be eliminated.⁴ Another hydrogen electrode is placed in the solution of unknown concentration, and the two electrodes are connected through a tapping key and a galvanometer of high resistance. Appropriate protective resistance may also be put in this circuit. The process of titrating to the desired end point then consists merely of adding the titrating solution until, upon tapping the key, no deflection of the galvanometer is

³ Private communication.

⁴ The suggestion of using an agar-agar salt bridge to minimize diffusion effects (Falles and Vosburgh, *J. A. C. S.*, 40, 1306, 1918) seems a good one.

observed. The inference is that zero potential difference between the hydrogen electrodes is an indication of equal hydrogen ion concentrations of the two solutions. The supposition may be verified by putting both electrodes into one or the other of the solutions and noting whether the galvanometer deflection remains zero.

It may be pointed out that such a titration can be carried out in any solution in which a hydrogen electrode will maintain its equilibrium, regardless of color, turbidity, or other experimental conditions. The electrolytic portion of the galvanometer circuit will, in most cases, have a low resistance, which insures the desirable condition for sensitiveness of response of the instrument. The method has most of the advantages of the potentiometer method over the colorimetric methods, with the obvious exception that it can be used only for titrating and that the titration can be carried only to the end point which is determined by the standard solution. With the potentiometer it is possible, of course, not only to titrate to any end point but also to make a direct measurement, without titration, of the p_H value, whatever this may be.

It should be noted, finally, that in the titration described no calomel electrode is used, and that the accuracy with which the titration may be made is limited only by the accuracy with which the p_H value of the standard solution is known.

PAUL E. KLOPSTEG

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THE AMERICAN SOCIETY OF MAMMALOGISTS

THE second annual meeting of the American Society of Mammalogists was held May 3-5, 1920, in the American Museum of Natural History, New York City. Officers for the coming year are Dr. C. Hart Merriam, president; Mr. E. W. Nelson and Dr. Wilfred H. Osgood, vice-presidents; Dr. H. H. Lane, recording secretary; Dr. Hartley H. T. Jackson, corresponding secretary; Mr. J. W. Gidley, treasurer; Mr. N. Hollister, editor; Dr. Glover M. Allen, Dr. R. M. Anderson, Dr. Joseph Grinnell,

Dr. M. W. Lyon, Dr. W. E. Matthew, Dr. John C. Merriam, Mr. Gerrit S. Miller, Jr., Dr. T. S. Palmer, Mr. Edward A. Preble and Dr. Witmer Stone, directors.

A program of unusual interest was presented as follows:

MONDAY, MAY 3

Morning Session, 10 A.M.

Modern methods of mammalogical field work: VERNON BAILEY. Twenty-five minutes. Illustrated with apparatus.

Notes on the howling monkeys and other mammals from British Guiana: WILLIAM BEEBE. Twenty minutes. Illustrated with lantern slides.

Fetuses of the Guiana howling monkey: ADOLPH H. SCHULTZ. Twenty minutes. Illustrated with lantern slides.

Some life histories of African mammals gathered during the Congo expedition: H. LANG. Forty minutes. Illustrated with lantern slides.

Notes on the mammals of Mount Rainier, Washington: WALTER P. TAYLOR. Thirty minutes. Illustrated with lantern slides.

MONDAY, MAY 3

Afternoon Session, 2 P.M.

Resemblances and contrasts between zoological and paleontological research in mammalogy. Desirability of uniform standards and systems in classification, in description, in measurement, in reasoning: HENRY FAIRFIELD OSBORN. Fifteen minutes.

On the history of the gray squirrel: ERNEST THOMPSON SETON. Thirty minutes.

The Roosevelt Wild Life Forest Experiment Station: CHARLES C. ADAMS. Ten minutes.

Business session, 3 P.M. (Open only to members.)

MONDAY, MAY 3

Evening Session, 8 P.M.

*Notes on the sea lion (*Otaria jubata*) of the Peruvian coast:* ROBERT CUSHMAN MURPHY. Thirty minutes. Illustrated with lantern slides and motion pictures.

Preliminary results of the second Asiatic expedition to China and Mongolia: ROY CHAPMAN ANDREWS. One hour. Illustrated with lantern slides and motion pictures.

TUESDAY, MAY 4

Morning Session, 10 A.M.

The mammals of Jamaica: H. E. ANTHONY. Thirty minutes. Illustrated with lantern slides.

The Calvert Miocene formation and some of its mammals: WILLIAM PALMER. Thirty minutes. Illustrated with lantern slides.

On some early states in the evolution of mammalian dentition: WILLIAM K. GREGORY. Forty minutes. Illustrated with lantern slides.

Some scattered observations about narwhals: MORTON P. PORSILD. Ten minutes.

Beginnings of the placental mammals: W. D. MATTHEW. Twenty-five minutes. Illustrated with lantern slides.

TUESDAY, MAY 4

Afternoon Session, 2 P.M.

*A dissection of a pigmy sperm whale (*Kogia*):* C. L. CAMP AND J. P. CHAPIN. Fifteen minutes. Illustrated with lantern slides.

(a) *Notes on New England.* (b) *Bison remains in New England.* (c) *Exhibition of specimens of *Myotragus*, the remarkable Pleistocene goat of the Balearic Islands:* GLOVER M. ALLEN. Twenty-five minutes. Illustrated with photographs and specimens.

Blue-fox farming and the maintenance of the fur supply: NED DEARBORN. Thirty minutes.

The fate of the European bison: T. S. PALMER. Twenty minutes.

Saving the Yellowstone elk herd: E. W. NELSON. Twenty minutes. Illustrated with lantern slides.

WEDNESDAY, MAY 5

Members met at The American Museum of Natural History at 9:30 in the morning, and went to the Bronx Park, where they were conducted through the park and entertained at luncheon as the guests of the New York Zoological Society.

HARTLEY H. T. JACKSON,
Corresponding Secretary

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