# SCIENCE

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#### THE TREND OF MORPHOLOGY<sup>1</sup>

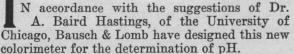
THE trend of morphological investigation has seemed to me a particularly appropriate topic for consideration before the American Association of Anatomists on this occasion. Others might suppose that since all of us are morphologists we are naturally familiar with this trend and such a discussion is out of place or useless. Yet are we as workers in a science always conscious of its trend, or is the trend the same in the minds of any number of us? It may be that each sees the trend from the view-point of his own endeavor and any one might have difficulty in convincing his colleagues that he is looking straight forward rather than sidewise or possibly even backwards. The exact direction of progress is somewhat problematical and attempting to follow it becomes an experimental venture, since the speaker is forced to employ his own personal compass and takes the chance of being alone or in a company of questionable size when the end of the survey is reached. In spite of the risks involved. I shall attempt to trace an impartial outline of the growth of morphology with an analysis of its sudden modifications at the beginning of this century and the possible effects of these on its immediate problems.

The very early history of the subject has no place in such an outline, and a convenient point for starting is with the introduction of the definite term morphology. It is strangely interesting that this word was first used by one of the most romantic poets of history, who at the same time chanced to be an eminent morphologist of the early nineteenth century. Goethe, in 1817, employed the word to indicate unity of structure in place of the more awkward term metamorphosis which had been applied in a similar sense by the great naturalist Linnaeus. Goethe's instinctive biological ideas frequently occur even in his poetry and drama-in the poet's great masterpiece Mephistopheles remarks to Faust the oft-quoted morphologic truth, "Blut ist ein ganz besonderer Saft!" All hematologists are still unwilling to disavow it.

The investigation of living mechanisms considered as the structural side of biology has followed in its history something of a parallelism with the two other great natural sciences—physics and chemistry.

<sup>&</sup>lt;sup>1</sup> Address of the president of the American Association of Anatomists, University of Rochester, New York, March 27, 1929.

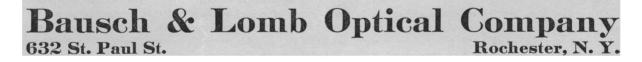
## Determining the Hydrogen Ion Concentration ~



It can be used with two cups in each optical axis as in the original Gillespie technique or with three cups as in the newer Hastings method. A single rack and pinion operates both the larger cylindrical cups and the substage cups, maintaining them at the same relative depths. The upper flare-top cups are controlled independently of each other and of the cups on the stage by separate racks and pinions. When used with two cups in each axis, the unknown with the indicator is placed in the upper left-hand flare-top cup; and the acid and alkali forms of the indicator in the right-hand cups, the acid in the upper flare-top cup and the alkali in the lower large cylindrical cup. Movement of the flare-top cups gives all color variations within the range of the indicator used.

In Dr. Hastings' method, the substage cups are used either with or without the constant temperature device. In this technique the acid and alkali forms of the indicator are placed in the right-hand cups as in the two-cup technique, but the unknown with the indicator is placed in the left-hand substage cup, and the unknown without indicator in the right-hand substage cup, the left-hand large cylindrical cup being filled with distilled water.

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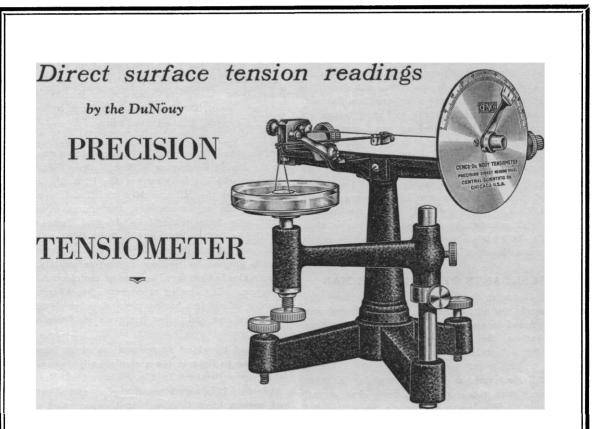
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