6. The question of reformed spelling should be considered. When a student learns that a sulphide is a very different thing from a sulphite and a sulphate he surely should be pardoned if he thinks that a sulfide is a representative of still another class and a sulfid of a fifth.

I offer these suggestions in the hope that, even if not acted on at the present time, they will cause thought and may be acted upon in the future. I am firmly convinced of the desirability of most, if not all of the changes suggested and I am also firmly convinced that such reforms would make the study of the science far easier for beginners; would remove some of the obstacles to which Lavoisier objected so strongly; and would make the nomenclature of chemistry more nearly perfect than it now is.

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Some of the points which are covered in the preceding paper have already been provided for in the usage of the Journal of the American Chemical Society and Chemical Abstracts. Especially, these journals never use the ending "ic" for elements which have only one valence or where the valence is not specifically in mind. Thus the words potassic and argentic are never used. Also the term hydrate is never used where hydroxide is intended. A good many rules which are followed in these journals will be found in the Directions for Abstractors, which were published in Chemical Abstracts for June 20, 1910. These rules, in the main, follow the usage of the London Chemical Society and are designed to secure as complete uniformity as possible in such matters. Some of the other points brought up by Professor Booth will be considered later by the Board of Editors of the Journal of the American Chemical Society, to whom the question was referred at the Minneapolis meeting.—EDITOR.

INSTRUCTION IN PHYSICAL CHEMISTRY: TWO MODIFICATIONS.[1]

BY RESTON STEVENSON.

In teaching physical chemistry at the College of the City of New York, there have been advantageously introduced two practices which are not common. The first is the use of a station for each experiment instead of a desk for each student; the second is the study and tabulation of the errors involved in each experiment.

1. *The System of Stations.*—No student has a desk with a meager assortment of apparatus that is seldom used. Instead, there is arranged in a series of desks, a large and varied collection of all kinds and sizes of chemical apparatus. In this way, any student has at his disposal a sufficient amount and large diversity from which to make his selection and

[1] Communicated with the sanction of Dr. Charles Baskerville, Director of the Dept. of Chemistry, College of the City of N. Y.

he learns about chemical apparatus and how to select forms for his particular needs.

The experiments are arranged very much as in physical laboratories and not as in chemical laboratories. There is a station at which each experiment is to be performed, where the apparatus is collected and sometimes assembled (as in the case of thermostats). Supplementary to each station is a desk which contains for that experiment the appurtenances such as chemicals, finer apparatus, special directions, references, notes, curves, etc. In this way the laboratory accommodates an indefinit number of students who move about from station to station. The student is required to assemble and construct only enough apparatus to teach him laboratory technic. There are also stations for glass manipulation, blast lamps, hot plates, steam baths, mercury purifiers, reagents, chemicals, gas generators, etc., in commission.

2. *The Study of Errors.*—Manuals of physical chemistry are satisfied in their consideration of errors when they explain the meaning of the "probable error." This is important but not adequate. Every experiment performed in a scientific laboratory is a measurement and in making a measurement, it is of first importance to know in what ways and to what extent the measurement is misleading and how this divergence can be avoided or remedied. To understand an experiment, therefore, we must know the sources of errors, their magnitude and their correction. From such a tabulation of errors, one can decide how to proceed for the rapid approximate measurements and how for slower, precise determinations. At the end of every report of an experiment the student submits a tabulation of errors, divided for convenience into (*a*) errors of manipulation and (*b*) errors of apparatus and method. The arrangement of such a tabulation is indicated below.

ERRORS—EXPT. 9.—CRYOSCOPY, MOLECULAR WEIGHT OF SOLUTES.

(*a*) ERRORS OF MANIPULATION.

Source.	Magnitude.	Correction.
Parallax in reading temperatures,	0–1%, ±	Use of lens, cathetometer, telescope, etc.

(*b*) ERRORS OF METHOD AND APPARATUS.

Source.	Magnitude.	Correction.
Variation of the concentration of the solution. The freezing out of ice.	< 3%, +	Calculate from the amount of supercooling, the weight of solvent frozen out and subtract from the weight of solvent taken.

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