

**ELEMENTS OF CHEMISTRY.
A WORK FOR USE IN HIGH
SCHOOLS, ACADEMIES
AND MEDICAL COLLEGES**

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Elements of Chemistry. A Work for Use in High Schools, Academies and Medical Colleges by
S. P. Meads

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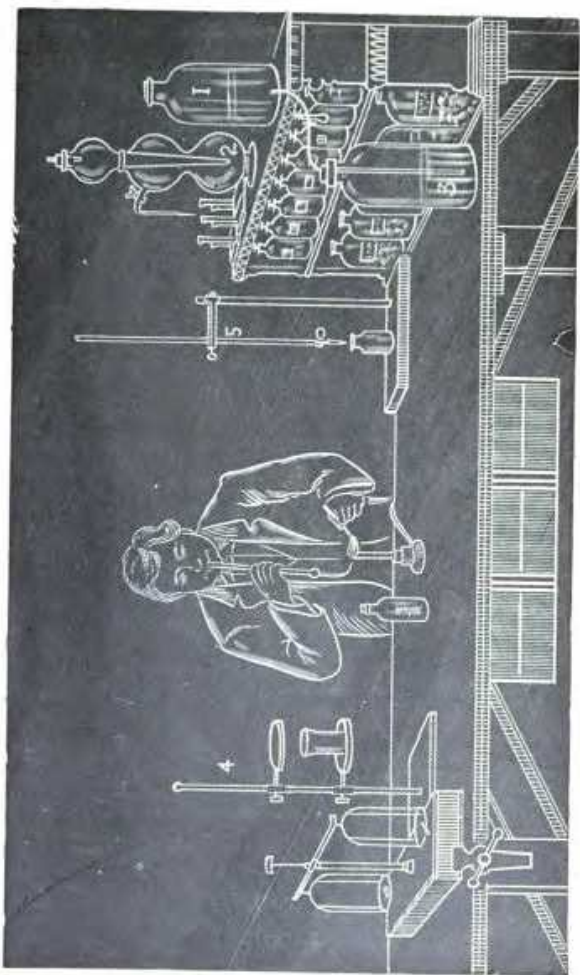
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S. P. MEADS

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TWELFTH EDITION



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Preface to Second Edition.

THIS Primer has been prepared for use especially in those schools that can give to chemistry only one term's work. It has grown out of the needs of the class-room, as I have felt them. Its statements are necessarily somewhat narrow, confining the pupil to general rules. Refined accuracy means a treatise, not a primer. I have given in the following pages as much as I think the average class can digest in a single term, and I hope my fellow-teachers will carefully examine the plan *throughout* before passing judgment.

I have freely consulted whatever chemical works were within my reach, especially Attfield, Barker, Roscoe and Schorlemmer, Eliot and Storer, Appleton, and Jones.

For criticisms and valuable suggestions in preparing this Second Edition, I am indebted to Prof. Joseph LeConte and Prof. W. B. Rising, of the University of California. I wish to acknowledge my obligation to many teachers who are using my humble work in their classes, especially to Prof. Geo. R. Kleeberger, of the State Normal School, San Jose, and to Mr. Volney Rattan, of the Girls' High School, San Francisco. Nor should I forget my indebtedness to Mr. C. B. Bradley in the preparation of my First Edition.

An experience of three years in teaching chemistry to medical students has enabled me, I hope, to anticipate their wants in several directions. It has shown me how greatly they need an elementary book before opening the excellent but voluminous works which should be their life companions.

*Natural Science Dept.,
Oakland High School, Jan. 2, 1884.*

S. P. MEADE.

Preface to Fifth Edition.

ACTING upon the advice of many teachers who have used my book since its first appearance, I have changed the name in this edition from *CHEMICAL PRIMER* to *ELEMENTS OF CHEMISTRY*. I have also availed myself of suggestions, and have improved the body of the work in several respects. I have enlarged the Appendix, that the book may furnish material for a second term's work. I have kept in mind, not those few high-school teachers who are teaching chemistry with sufficient knowledge and thoroughness to meet the requirements of a college course, but rather those teachers who, though well aware that they are coming short of an ideal standard, yet are conscientiously desirous of doing the best they can with limited time and limited facilities. The good words which come to me occasionally from these last fellow-laborers of mine have been a great source of pleasure to me.

Oakland, California, April 16, 1891.

S. P. MEADE.

BRIEF SUGGESTIONS—MIXED.

FOR SMALL SCHOOLS AND INEXPERIENCED TEACHERS.

DO not allow pupils lazily to pronounce the symbol or the formula instead of the name; *i. e.*, wherever "H" occurs, see that it is called hydrogen. . . . Have the pupils copy the two Reference Tables (pp. 16, 29; see NOTE 2, p. 18), and allow them the free use of these for the entire term. Never compel them to memorize formulas, atomic weights, strength, etc. It is as important to know what not to remember, as to know what should be remembered, since the former comprises by far the larger portion of any text-book. . . . Let the pupils perform all experiments (except, perhaps, a few difficult ones, or for the sake of taking your turn with the class) in presence of the class, explaining each experiment as it proceeds. It takes time, but it is the best way to teach chemistry where a table for each student cannot be provided. If you haven't time, omit half the experiments to accomplish this result. . . . If possible, secure tables, so that pupils may perform their own experiments individually. . . . *Every* experiment teaches something, and the sooner you can impress this fact the better. While you should make every experiment as impressive as it can be made, get the pupils through the babyhood, which craves noisy or showy experiments, as early in the term as possible. . . . See that a number of larger works upon chemistry are at your desk for reference. . . . After you have passed the "Reactions," encourage any pupils *who may show a special liking for the science* to work out after school hours a number of solutions (not too complex) and dry solids by the Charts (p. 161 to end). . . . Teach pupils to use *small flasks* (test-tubes answer well) and *small quantities of chemicals*. It isn't necessary to burn a forest to prove that hydrocarbons are combustible, nor to blow up a continent to prove a substance explosive. . . . Do not be afraid to teach anything contrary to the text, *if you have good authority for it*; but let disputed points alone. Teach any simple principles beyond the text, instead of others more complex omitted; but do not teach intricate matter outside of text, else the result will be pupils will know neither the text nor the "intricate matter." . . . Remember that one of the chief ends of a small text-book in science is to teach the pupil to read intelligently larger works. . . . Spend at least half the time in reaching carbon, p. 63. . . . Use the METRIC SYSTEM throughout; it is *the* system. . . . Use either thermometer. The CENTIGRADE (C) is used in this book, though the corresponding Fahrenheit (F) degrees are given in a few places.

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