

**SCHOOL CHEMISTRY: OR,
PRACTICAL RUDIMENTS
OF THE SCIENCE**

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School Chemistry: Or, Practical Rudiments of the Science by Robert Dundas Thomson

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BY

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P R E F A C E.

It has been said by Bergmann, that Natural History, or the study of animals, plants, and minerals, teaches us the elementary rudiments or alphabet of the great book of nature; Natural Philosophy instructs us in spelling; and Chemistry in reading distinctly. To serve as an introduction to such an important science generally, and also to extend a knowledge of its practical elements among those who influence the studies of the rising generation, are the objects of the present publication. The Natural Philosophy of the last century included, not only what is taught at the present day under that title, but likewise Chemistry and Astronomy. The two latter have now become distinct sciences, but they no longer, as they formerly did, constitute part of the usual studies of the clerical and scholastic professions; although the phenomena of which Chemistry treats are of the most familiar occurrence, and many of the laws which it develops of constant domestic application. These, too, afford easily appreciable proofs of design. But if we desire examples of a more sublime nature, we have only to consult the details of Inorganic Chemistry, constituting

the first part of the volume, to find evidence that the ultimate particles of matter, so minute as to weigh less than the billionth part of a grain, have been impressed with unvarying laws, and adjusted with skill so admirable, as to impel us to the literal conclusion of the sacred writer, that the Divine Being has "comprehended the dust of the earth in a measure, weighed the mountains in scales, and the hills in a balance."

When we turn to Vegetable Chemistry, we learn that the same materials with which we become intimate in the mineral world, in one perpetual round, serve for the support and nourishment of all the plants which subsist upon the face of the globe. But the vegetable world, consisting merely of matter endowed with the power of nourishing itself, and without any nerves or sensibility, must be viewed as the garden of those beings to whom we afterwards proceed, where sense and intellect, in all their efficiency, discover the image of a Mighty Creator.

Much difficulty has been experienced in commencing the study of Chemistry from the novelty of the names, which, as in a new language, appear overwhelming. It has appeared to the author that this objection may in some measure be overcome by introducing the student practically to an acquaintance with the science, and thus to place its mode of acquisition upon a somewhat similar basis to that of botany or languages. Suppose, for example, a metal is placed

in the hands of one unacquainted with the science, he is directed to attend to its colour, to determine its specific gravity, &c. as explained in the first chapter of the work, to ascertain the effect of acids upon it, to test the solution of the metal in the acid by the tables in the second chapter, and the characters before the blowpipe of the matter which remains when a part of the acid solution is evaporated, as given in the same chapter. All these data are entered in a note book, with the conclusions which the student has drawn with respect to the nature of the metal subjected to his examination; and thus he is initiated into an acquaintance with the language of the science, and with inductive reasoning. The salts of the various metals may also be examined in a similar way. A teacher should therefore have in his possession the common metals, such as iron, copper, zinc, lead, tin, mercury, &c., and instruct the pupil to prove their nature by physical and chemical tests; even young boys will be found to engage in such inquiries with great spirit and energy. The teacher should also possess sets of the metallic and other salts, and give them out to be examined by the test tables; first singly, and when the pupil has become familiar with the oxides and sulphurets to which the test tables principally refer, and the distinguishing tests, he may have mixtures of two salts, and afterwards of three salts, &c., submitted to his examination. An hour or more in the day, according to circumstances, may be

devoted to such exercises, which tend to familiarise the pupil with the habit of observation, and with words. Another period, however, is to be set apart for the study of the principles of the science. The pupils are to be arranged round a table, in companies of two or three, with the necessary apparatus before them.* The teacher, commencing at Chapter III., is to read or describe the theory of the mode of forming oxygen and the other gases onwards, and then the pupils are to make the gas, and ascertain its properties as described. At the same time, they should become familiarised on the black board with the mode of writing formulae, and be made thoroughly to understand the source of the gases evolved, and the nature of the compounds from which they are obtained. In the earlier part of the work diagrams are given, so as to render the subject clear to the beginner; and these may be followed out on the board as the course of lessons proceeds, although given in the work in another form. After the gases are discussed, the alkalies, earths, and metals come under consideration, and many of their important compounds may be formed, such, more particularly, as are employed for useful purposes. Under Vegetable Chemistry, in Chapter VI., the various parts of plants may be examined with the assistance of the microscope, and their chemical

* Cheap apparatus of British or foreign glass, &c. may be obtained from Messrs. Griffin, Baker Street, London, and Buchanan Street, Glasgow.

constitution studied, while the processes of bleaching, dyeing, fermenting, &c. may be repeated. Flour and potatoes should be analysed, so as to prepare the pupil for understanding the uses of the several parts of the food in Animal Chemistry, in Chap. VII, which is principally devoted to the changes which the food, originally derived from plants, undergoes when swallowed by animals.

This work being intended also as an Introduction, in the College of Glasgow, (the first portion having been long familiar to the students,) to the System of Chemistry by Dr. Thomas Thomson, some parts have been printed in a smaller type, in order that it may include a tolerably complete sketch of the science.

GLASGOW COLLEGE,
Sept. 1848.

