

**FIRST PRINCIPLES OF MODERN
CHEMISTRY; A MANUAL OF
INORGANIC CHEMISTRY FOR
STUDENTS AND FOR USE IN
SCHOOLS AND SCIENCE CLASSES**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649583935

First Principles of Modern Chemistry; A Manual of Inorganic Chemistry for Students and for Use in Schools and Science Classes by U. J. Kay-Shuttleworth

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U. J. KAY-SHUTTLEWORTH

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A Manual of Inorganic Chemistry

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BY

U. J. KAY-SHUTTLEWORTH.

LONDON:
JOHN CHURCHILL & SONS, NEW BURLINGTON STREET.

MDCCCLXVIII.

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P R E F A C E.

WHILST this little book is an attempt to supply the want of a, strictly elementary manual of inorganic chemistry, adapted for use in science classes, I have also endeavoured to indicate how, with the aid of modern theories, a student's early steps may be made less tedious and more suggestive than they commonly are.

Dr. Frankland, with a kindness for which I cannot thank him sufficiently warmly, has assisted me by most valuable advice as well as by revising the whole of the manuscript and proofs.

The lectures delivered by Dr. Williamson at University College, in the Session 1864-5, and those of Dr. Frankland at the Royal College of Chemistry, in the following winter, supplied me with a considerable part of the matter here collected together.

I have also gratefully to acknowledge the readiness with which Professor Tyndall has sanctioned the use I have ventured to make of his treatise on "Heat considered as a Mode of Motion;" whilst to the authors of the books enumerated below I owe many apologies for

the extent to which I have availed myself of their statements or explanations of facts:—Dr. William Allen Miller's "Elements of Chemistry," Parts i and ii; Dr. Frankland's "Lecture Notes for Chemical Students;" Professor Roscoe's "Lessons in Elementary Chemistry;" Professor Naquet's "Principes de Chimie;" Dr. Atkinson's Translation of Professor Ganot's Elementary Treatise on Physics.

For the study of the Metals and their compounds the reader is referred to more complete works, as the time and space at my command have kept the present volume almost within the limits to which the examination in chemistry is restricted at Matriculation in the University of London. Nor have detailed directions as to manipulation and apparatus been attempted: indeed such directions are seldom very intelligible except when given orally in presence of the objects used, and it may be assumed that practical study in a laboratory should always accompany a course of reading on chemistry.

Old methods for the description of chemical changes are retained in the following pages; for the atomic theory and its more modern adjuncts—though founded only in part on experimental data, and sure ere long to pass away—have a temporary value which it would be short-sighted to overlook.

I have employed the system of notation proposed by Dr. Frankland in the belief that its advantages ought to insure its almost universal adoption. As I have also made use of Dr. Crum Brown's graphic formulæ, it may

be as well—once and for all—to protest against the imputation that those who use graphic formulæ are liable to fall into the error of regarding them as pictures of the physical arrangement of atoms. This objection to a method which teachers have found of great value, in bringing home to their pupils' minds essential ideas on the constitution of compounds, is not supported by the experience of many who have given it an impartial trial.

Since I have found it difficult to avoid the use of several terms which seldom occur in books of general reading, I have added a short glossary giving the meanings and derivations of such of them as have escaped a full explanation in the text.

In conclusion, I would assure any of my readers who may find mistakes to correct, or improvements to suggest, how grateful I shall feel if they will communicate with me without delay.

GAWTHORPE HALL, BURNLEY,
December, 1867.

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