

**A CATECHISM OF CHEMISTRY:  
WITH AN APPENDIX OF  
EXPERIMENTS, A VOCABULARY  
OF CHEMICAL TERMS, AND  
INDEX**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649034963

A Catechism of Chemistry: With an Appendix of Experiments, a Vocabulary of Chemical Terms, and Index by Samuel Parkes & William Barker

Except for use in any review, the reproduction or utilisation of this work in whole or in part in any form by any electronic, mechanical or other means, now known or hereafter invented, including xerography, photocopying and recording, or in any information storage or retrieval system, is forbidden without the permission of the publisher, Trieste Publishing Pty Ltd, PO Box 1576 Collingwood, Victoria 3066 Australia.

All rights reserved.

Edited by Trieste Publishing Pty Ltd.  
Cover @ 2017

This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form or binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

[www.triestepublishing.com](http://www.triestepublishing.com)

**SAMUEL PARKES & WILLIAM BARKER**

**A CATECHISM OF CHEMISTRY:  
WITH AN APPENDIX OF  
EXPERIMENTS, A VOCABULARY  
OF CHEMICAL  
TERMS, AND INDEX**



A  
CATECHISM  
OF  
CHEMISTRY:

WITH  
AN APPENDIX OF EXPERIMENTS, A VOCABULARY OF  
CHEMICAL TERMS, AND INDEX.

BY THE LATE  
SAMUEL PARKES, F.L.S., G.S.

REVISED AND CONSIDERABLY ENLARGED,  
BY WILLIAM BARKER, M.D.,  
PROFESSOR OF CHEMISTRY IN THE SCHOOL OF SURGERY UNDER THE DIRECTION OF THE  
ROYAL COLLEGE OF SURGEONS IN IRELAND.

New Edition, with Forty-four Wood-cuts.

LONDON:  
ADAM SCOTT, CHARTERHOUSE SQUARE,  
1854.



193. C. 34.

## ADVERTISEMENT.

---

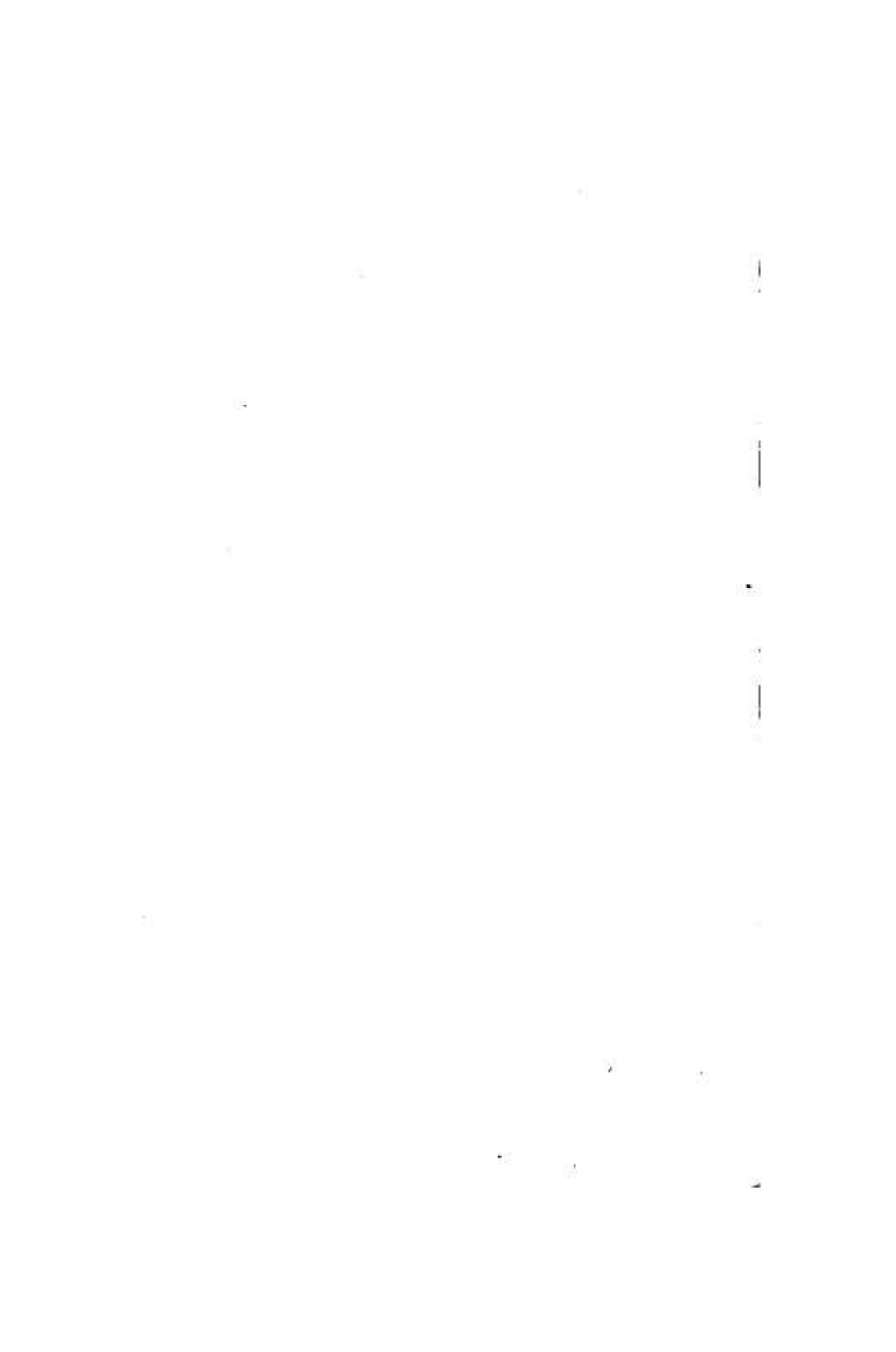
HAVING undertaken to prepare for the press a new edition of Mr. Parkes' *Chemical Catechism*, the Editor has carefully kept in view the objects for which the work was originally designed, and endeavoured to render it suitable for those who are desirous to become acquainted with the first elements of the Science. As many and important changes have taken place in the different branches of Chemistry, especially in nomenclature and classification, since the publication of the last edition prepared by Mr. Parkes, the present Editor, so far as was consistent with retaining the character and plan of the original work, has altered and revised it throughout, so as to adapt it to the present state of chemical science.

In the late editions of this work the text was much encumbered with a mass of notes, sometimes useless, and frequently trifling and irrelevant; consequently, in the present edition, none have been retained or added which did not seem necessary to illustrate or elucidate the text.

The order of the chapters has been also altered; the chapter on Chemical Attraction, which, in the former editions, was placed at the end, has been placed in the beginning of the work, and the chapters on Atmospheric Air and Water have been incorporated with those which explain the nature of the elements which compose them.

W. B.

21, HATCH STREET, DUBLIN.



## CONTENTS.

	Page
I. Definitions of Chemistry—Analysis and Synthesis—General Properties of Matter—States of Aggregation of Bodies—Specific Gravity of Bodies . . . . .	1
II. Heat or Caloric—Theories respecting it—Sources of heat—Communication of Heat—Conductors of Heat—Expansion of Bodies by Heat—Thermometers—Radiation of Heat—Reflection of Heat—Latent Heat—Capacity of Bodies for Heat—Effects of Heat on Bodies . . . . .	8
III. Attraction—Laws of Chemical Attraction—Simple and Compound Chemical Attraction—Repulsion—Causes Modifying Chemical Attraction—Atomic Theory . . . . .	23
IV. Simple Substances—Oxygen, its Properties—Mode of Preparation—Chlorine—Iodine—Bromine—Hydrogen—Composition of Water . . . . .	35
V. Nitrogen or Azotic Gas—Compounds of Nitrogen with Oxygen—Atmospheric Air—Eudiometry—General Properties of the Atmosphere . . . . .	45
VI. Sulphur—Compounds with Oxygen—Hydrogen and Sulphur—Sulphurets—Selenium—Boron—Phosphorus—Its Compounds with Oxygen and Hydrogen—Carbon—Uses of Charcoal—Carbon and Hydrogen . . . . .	53
VII. General Properties of the Acids—Sulphuric Acid—Muriatic Acid—Muriates—Chlorine and Perchloric Acids—Euchlorine—Nitric Acid—Nitrous and Nitric Oxide Gases—Carbonic Acid—Phosphoric Acid—Fluoric Acid—Boracic Acid—Arsenic Acid—Tungstic, Chromic, Molybdic Acids—Acetic Acid—Oxalic Acid—Tartaric Acid—Citric, Malic, and Lactic Acids—Gallic and Tannic Acids—Prussic Acid—Cyanogen . . . . .	65



	Page
VIII. Properties of the Alkalies—Potash—Its Composition—Potassium, its Preparation—Soda—Sodium—Distinguishing Properties of Potash and Soda—Uses of the Fixed Alkalies—Soap—Lithia—Ammonia—Its Competition . . . . .	82
IX. General Properties of the Earths—Composition of the Earths—Silica—Uses of Silica—Glass—Alumina—Its Uses—Porcelain—Dyeing—Zirconia—Glucine—Yttica—Baryta—Its Uses—Strontia—Lime—Uses of Lime—Magnesia . . . . .	89
X. Salts—Nomenclature—Sulphur Salts—Chlorine Salts—Nitrates—Phosphates—Fluates—Arsenic Salts—Oxalates—Crystallization of Salts—Efflorescence and Deliquescence . . . . .	98
XI. General Characters of Metals—Classification of Metals—Gold—Its Uses—Silver—Platina—Mercury—Copper—Iron—Tin—Lead—Nickel—Zinc—Cadmium—Antimony—Bismuth—Arsenic—Cobalt—Manganese—Chromium—Uranium—Titanium—Tellurium—Palladium—Rhodium—Iridium—Osmium . . . . .	109
XII. Oxides—General Properties of Metallic Oxides—Mode of Reduction—Chlorides . . . . .	133
XIII. Combustion—Oxygen not essential in any case of Combustion—Combustibility of Metals—Supporters of Combustion—Flame—Light given by Flame—Safety Lamps . . . . .	139

## APPENDIX.

Experiments . . . . .	153
Tables . . . . .	185
Vocabulary of Terms . . . . .	191
Index . . . . .	213

# CHEMICAL CATECHISM.

---

## I. INTRODUCTORY AND MISCELLANEOUS.

### 1. *What is Chemistry?*

Chemistry is the science which enables us to discover the peculiar properties of bodies, either in their simple or compound state.

### 2. *How are the properties of bodies examined?*

The chemical examination of bodies is, in general, effected by producing a change\* in the *nature* or *state* of the body under examination.

### 3. *By what means do chemists effect a change in the qualities or states of bodies?*

This is generally effected by means of *heat*,† or by the *mix-*

\* It may, with few exceptions, be considered as an axiom, that *whenever chemical action takes place, a real change is produced in the substance operated upon, and that its identity is destroyed*. Thus, if a little carbonate of lime (powdered chalk), be mixed in a glass of water, the chalk will soon sink to the bottom of the vessel. No chemical action has taken place; therefore the water and the carbonate of lime both remain unaltered. But if a small quantity of muriatic acid be added to a glass of chalk and water, a violent effervescence will commence when they come into contact with each other; in consequence of this *chemical* action, a complete change is effected in the characters of the chalk and the acid—the chalk dissolves in the water, and acquires a sharp taste, and the acid has lost its sourness; in fact a new substance (muriate of lime), is produced.

† Heat has a tendency to separate the particles of bodies from each other. Hence nothing more is necessary to effect the decomposition of many bodies than to apply heat, and collect the substances which are separated by that means. We have a familiar example of this in the burning of common limestone; in this operation the carbonic acid of the limestone is expelled, and the lime remains in its caustic state; a complete *chemical* change has been produced, in this case, by *heat* alone; the lime will no longer effervesce in vinegar or any other acid, as limestone will, and it will have acquired a sharp acrid taste, the limestone, before burning, being perfectly tasteless: magnesia undergoes a similar change. Many other instances will occur hereafter.—ED.

ture of some other matter with the matter intended to be examined.

4. *How does the application of heat and mixture enable chemists to examine the properties of bodies?*

By these means we effect the *decomposition* of a compound body, and thus acquire a knowledge of the nature of its ingredients.

5. *What is meant by decomposition?*

In chemical language, decomposition means the art of dividing a body into its simple elements. Thus water may be decomposed, and reduced into oxygen and hydrogen, which are simple substances, incapable of further decomposition.

6. *What is analysis?*

Analysis is the *separation* of the parts of a compound body from each other, by means of *re-agents*, so as to present the constituents either in an uncombined or a new state of combination.

7. *What is synthesis?*

Synthesis is the *putting together* or combining the separated constituents of a body so as to reproduce the original compound.

8. *Give an example of these modes of examination.*

Water may, by *analysis*, be resolved into oxygen and hydrogen gases, and we can verify this *analysis* by uniting oxygen and hydrogen so as to reproduce water.\*

9. *What are the most general properties of matter?*

*Extension*, or the property of occupying space, and *impenetrability*, or that property of matter in consequence of which no two portions of matter can co-exist in the same portion of space.

10. *Has matter any other properties?*

Yes, it is susceptible of rest or motion, divisible and indestructible.

\* The following may also be given as examples of analysis and synthesis:—If we make a solution of sulphate of magnesia (Epsom salt), in boiling water, and pour into it a little of a solution of carbonate of soda, the soda will precipitate a white powder, which, on examination, will be found to be carbonate of magnesia. When settled, decant the supernatant liquor, evaporate it till a pellicle rises on its surface, and set it aside to crystallize. When cold, crystals of sulphate of soda (Glauber's salt), will be found in the vessel. In this decomposition, the sulphuric acid of the Epsom salt combines with the soda to form sulphate of soda, and the carbonic acid of the soda combines with the magnesia to form carbonate of magnesia. Thus Epsom salt may be analyzed, and shown to consist of sulphuric acid and magnesia. In order to prove the composition of this salt by *synthesis*, dissolve magnesia in diluted sulphuric acid, saturate the liquor, and crystallize. Epsom salt will be the result.