

CONVERSATIONS
ON
CHEMISTRY;
IN WHICH
THE ELEMENTS OF THAT SCIENCE
ARE
FAMILIARLY EXPLAINED
AND
ILLUSTRATED BY EXPERIMENTS.

IN TWO VOLUMES.

The Fifth Edition, revised, corrected, and considerably enlarged.

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THE Author, in this fifth edition, has endeavoured to give an account of the principal discoveries which have been made within the last four years in Chemical Science, and of the various important applications, such as the gas-lights, and the miner's-lamp, to which they have given rise. But in regard to doctrines or principles, the work has undergone no material alteration.

London, July, 1817.

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PREFACE.

IN venturing to offer to the public, and more particularly to the female sex, an Introduction to Chemistry, the author, herself a woman, conceives that some explanation may be required; and she feels it the more necessary to apologise for the present undertaking, as her knowledge of the subject is but recent, and as she can have no real claims to the title of chemist.

On attending for the first time experimental lectures, the author found it almost impossible to derive any clear or satisfactory information from the rapid demonstrations which are usually, and perhaps necessarily, crowded into popular courses of this kind. But frequent opportunities having afterwards occurred of conversing with a friend on the subject of chemistry, and of repeating a variety of experiments, she became better acquainted with the principles of that science, and began to feel highly interested in its pursuit. It was then that she perceived, in attending the excellent lectures delivered at the Royal Institution, by the present Professor of Chemistry, the great advantage which her previous knowledge of the subject, slight as it was, gave her over others who had not enjoyed the same means of

private instruction. Every fact or experiment attracted her attention, and served to explain some theory to which she was not a total stranger; and she had the gratification to find that the numerous and elegant illustrations, for which that school is so much distinguished, seldom failed to produce on her mind the effect for which they were intended.

Hence it was natural to infer, that familiar conversation was, in studies of this kind, a most useful auxiliary source of information; and more especially to the female sex, whose education is seldom calculated to prepare their minds for abstract ideas, or scientific language.

As, however, there are but few women who have access to this mode of instruction; and as the author was not acquainted with any book that could prove a substitute for it, she thought that it might be useful for beginners, as well as satisfactory to herself, to trace the steps by which she had acquired her little stock of chemical knowledge, and to record, in the form of dialogue, those ideas which she had first derived from conversation.

But to do this with sufficient method, and to fix upon a mode of arrangement, was an object of some difficulty. After much hesitation, and a degree of embarrassment, which, probably, the most competent chemical writers have often felt in common with the most superficial, a mode of division was adopted, which, though the most natural, does not always admit of being strictly pursued—it is that of treating first of the simplest bodies, and then gradually rising to the most intricate compounds.

It is not the author's intention to enter into a minute vindication of this plan. But whatever may be its advantages or inconveniences, the method adopted in this work is such, that a young pupil, who should occasionally recur to it, with a view to procure information on particular subjects, might often find it obscure or unintelligible; for its various parts are so connected with each other as to form an uninterrupted chain of facts and reasonings, which will appear sufficiently clear and consistent to those only who may have patience to go through the whole work, or have previously devoted some attention to the subject.

It will, no doubt, be observed, that in the course of these Conversations, remarks are often introduced, which appear much too acute for the young pupils, by whom they are supposed to be made. Of this fault the author is fully aware. But, in order to avoid it, it would have been necessary either to omit a variety of useful illustrations, or to submit to such minute explanations and frequent repetitions, as would have rendered the work tedious, and therefore less suited to its intended purpose.

In writing these pages, the author was more than once checked in her progress by the apprehension that such an attempt might be considered by some, either as unsuited to the ordinary pursuits of her sex, or ill-justified by her own recent and imperfect knowledge of the subject. But, on the one hand, she felt encouraged by the

establishment of those public institutions, open to both sexes, for the dissemination of philosophical knowledge, which clearly prove that the general opinion no longer excludes women from an acquaintance with the elements of science; and, on the other, she flattered herself that whilst the impressions made upon her mind, by the wonders of Nature, studied in this new point of view, were still fresh and strong, she might perhaps succeed the better in communicating to others the sentiments she herself experienced.

The reader will soon perceive, in perusing this work, that he is often supposed to have previously acquired some slight knowledge of natural philosophy, a circumstance, indeed, which appears very desirable. The author's original intention was to commence this work by a small tract, explaining, on a plan analogous to this, the most essential rudiments of that science. This idea she has since abandoned; but the manuscript was ready, and might, perhaps, have been printed at some future period, had not an elementary work of a similar description, under the tide of "Scientific Dialogues," been pointed out to her, which, on a rapid perusal, she thought very ingenious, and well calculated to answer its intended object.

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ERRATA.

Vol. I. page 56. last line but one, for "caloric," read "calorific."

179. Note, for "Plate XII." r. "Plate XIII."

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Transcriber's Notes

Terminology

Many scientific terms used in this book are different from today's standard terminology. The following is not meant as a comprehensive list.

oxy-muriatic acid	chlorine <i>proposed as an element in 1815: see Conversation XIX</i>
"columbium or tantalium"	niobium and tantalum <i>the two elements always occur together, and were not recognized as separate until much later in the 19th century</i>
phosphat of lime	calcium diphosphate or calcium <i>the element calcium was isolated in 1808, but is named only once in this 1817 edition</i>
glucium	beryllium <i>Humphry Davy's name for the element</i>
muriatic acid	hydrochloric acid <i>but still called "muriatic acid" for some commercial uses</i>
muriat of lime	calcium chloride
oxymuriate of potash	potassium chlorate
muriat of soda	sodium chloride (table salt)
carbonic acid	carbon dioxide

Note also:

simple body, fundamental principle	element
fecula	starch (usually spelled "fæcula")
spirit of wine	alcohol
philosopher	scientist
arts	industry, manufacture, crafts etc. (seldom "fine arts")

Some essential concepts relating to living things—photosynthesis, microorganisms, the cell, proteins—are either unknown or not mentioned. The atom theory had been proposed, but not by Humphry Davy; it is not mentioned in this book.

The word "explode" is used at least once in its original, figurative sense ("a word that should be exploded in chemistry") but far more often in its later, concrete one. The word "explosion" is always used concretely ("an explosion, or a *detonation* as chemists commonly call it").

Calculated Values:

"the point of zero, or the absolute privation of heat, must consequently be 1260 degrees below 32 degrees"

-1228° F. The calculation is based on wrong premises; the correct figure is about -460° F or -273° C.

"Mercury congeals only at seventy-two degrees below the freezing point."

-40° F, which is also -40° C. This figure is correct, though approximate.

“The proportion stated by Sir H. Davy, in his Chemical Researches, is as 1 to 2.389.”

[ammonia] “consisted of about one part of hydrogen to four parts of nitrogen.... and from the latest and most accurate experiments, the proportions appear to be, one volume of nitrogen gas to three of hydrogen gas”

These and similar calculations involving relative weight and volume make more sense when one knows the elements' atomic weights. For nitric acid, HNO_3 , the figures are 1:14:48, giving a proportion closer to 1:3.5. For ammonia, NH_3 (not 4), the figures are 14:3.

The first proportion was printed “2,389”. No other decimal numbers occur in the text, but a comma appears once as a thousands separator.

“The *oxalic acid*, distilled from sorrel, is the highest term of vegetable acidification; for, if more oxygen be added to it, it loses its vegetable nature, and is resolved into carbonic acid and water;”

Oxalic acid = $\text{H}_2\text{C}_2\text{O}_4$; carbonic acid (carbon dioxide) = CO_2 . $\text{H}_2\text{C}_2\text{O}_4 + \text{O}$ becomes $\text{H}_2\text{O} + \text{CO}_2 + \text{CO}_2$.

Chapter Numbering

The 3rd and 4th editions used the same Conversation (chapter) numbering. The apparent disappearance of XI and XII is the result of changes between the 4th and 5th (present text) editions:

Volume I: On Simple Bodies

4th 5th
edn. edn.

I.	I.	
II.	II.	<i>No change</i>
III.	III.	
IV.	IV.	<i>4th</i> : On Specific Heat, Latent Heat, and Chemical Heat. <i>5th</i> : On Combined Caloric, Comprehending Specific Heat and Latent Heat.
	V.	On The Chemical Agencies Of Electricity. <i>Chapter added in 5th edition</i>
V.	VI.	On Oxygen And Nitrogen.
VI.	VII.	On Hydrogen. <i>5th</i> : new sections on Gas lights and Miner's Lamp
VII.	VIII.	On Sulphur And Phosphorus. <i>5th</i> : new section on Decomposition of Sulphur
VIII.	IX.	<i>4th</i> : On Carbone. <i>5th</i> : On Carbon.
IX.	X.	On Metals.

- X. On Alkalies.
- XI. On Earths.
Conversations X, XI were moved to Volume II as XIV, XV.

Volume II: On Compound Bodies

- | | | |
|-------------|-------------|---|
| 4th
edn. | 5th
edn. | |
| XII. | XIII. | On The Attraction Of Composition. |
| | XIV. | On Alkalies. |
| | XV. | On Earths.
<i>Conversations XIV, XV were previously X, XI in Volume I.</i> |
| XIII. | XVI. | <i>4th:</i> On Compound Bodies.
<i>5th:</i> On Acids.
<i>Most of XIII, On Compound Bodies, became XVI, On Acids. Some introductory material was moved to XIV, On Alkalies.</i> |
| XIV. | XVII. | <i>4th:</i> On The Combinations of Oxygen with Sulphur and with Phosphorus; and of the Sulphats And Phosphats.
<i>5th:</i> Of the Sulphuric and Phosphoric Acids: or, The Combinations of |
| XV. | XVIII. | <i>4th:</i> On The Combination of Oxygen With Nitrogen and with Carbone; and of The Nitrats And Carbonats.
<i>5th:</i> Of The Nitric And Carbonic Acids: Or The Combination ... |
| XVI. | XIX. | <i>4th:</i> On Muriatic And Oxygenated Muriatic Acids; and on Muriats.
<i>5th:</i> On The Boracic, Fluoric, Muriatic, and Oxygenated Muriatic Acids; and on Muriats. |
| XVII. | XX. | On The Nature And Composition Of Vegetables. |

Remainder of book: number in 4th edn. + 3 = number in 5th edn.

Plates

Most Plates include the following text, engraved in smaller print:

Drawn by the Author / Engraved by Lowry / Published by Longman & C^o. Oct^r. 2nd.
1809.

This date corresponds to the 3rd edition. Plates V, X and XIII—each containing material new to the 5th edition—read only “Lowry sculp.”

Inconsistencies and variant spellings

None of these lists are meant to be inclusive. They are typical of variations that were not marked as errors.

Standard spellings throughout the book:

bason, judgment, embrio, volcanos (plural), potatoe (singular)

Inconsistencies:

capitalization of “Fig.” or “fig.”

hyphenization of words such as “oxy-muriatic”

“glauber salt” and “Glauber’s salt” both occur

Variant forms:

opake, opaque

aëriform, aeriform

gasses, gases

phosphoret, phosphuret (but always carburet)

Libya, Lybia

dy(e)ing (from “dye”)

nap(h)tha

pla(i)ster

slak(e)ing

earthen-ware, earthen ware

“sulphurous”, “naphtha” are used in the Contents and the Index; “sulphureous”, “naphtha” in the body text

forms in “-xion” (such as “connexion”) appear only in the Contents and the Index

Volume I has more archaic forms than Volume II:

“shew”, “inclose” are sometimes used instead of “show”, “enclose”

“carbone” with final “e” appears in one Plate caption. (In the same plate’s header, the “e” appears to have been removed by the engraver.)

“develope(ment)” is more common in Volume I, “develop(ment)” in Volume II

“-ize” and “-yze” forms (for later “-ise” and “-yse”) are common in Volume I, rare in Volume II except in the Index

The “Dr. Marcet” mentioned in a few footnotes and figure captions is the author’s husband. Humphry Davy (“Sir H. Davy”) was knighted in 1812, between the 3rd and 4th editions of the book.

Reminder

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