

**LABORATORY EXERCISES: WITH  
OUTLINES FOR THE STUDY OF  
CHEMISTRY TO ACCOMPANY  
AND ELEMENTARY TEXT**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649623211

Laboratory Exercises: With Outlines for the Study of Chemistry to Accompany and Elementary Text by H. H. Nicholson

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)

**H. H. NICHOLSON**

**LABORATORY EXERCISES: WITH  
OUTLINES FOR THE STUDY OF  
CHEMISTRY TO ACCOMPANY  
AND ELEMENTARY TEXT**



# LABORATORY EXERCISES

WITH

## OUTLINES FOR THE STUDY OF CHEMISTRY

*TO ACCOMPANY ANY ELEMENTARY TEXT*

BY

H. H. NICHOLSON

*Professor of Chemistry in the University of Nebraska*

AND

SAMUEL AVERY

*Professor of Chemistry in the University of Idaho*



NEW YORK

HENRY HOLT AND COMPANY

1899

NY

## PREFACE.

THE primary object of the authors in preparing this book is to place in the hands of the science teachers in the State a laboratory manual adapted to the average high-school requirements. In it we have endeavored to emphasize the value of laboratory instruction *in the laboratory*.

The aim is to give the student facts, practically of his own finding, before a discussion and correlation of these facts. Our experience in teaching has led us to the conclusion that to reach the best results a student of chemistry must first be given experimental work. In this way his interest is sufficiently aroused to hear with profit descriptive lectures, or to read with some attention the discussion of facts and principles as found in elementary text-books. To this end he is carefully guided in his experimental work, after which he is expected to study the subject of his experiment in one or more of the texts referred to at the end of each exercise.

These texts are not necessarily the best that might be given, but they are in many cases the only ones available to the pupil. They are in all cases those found to be at hand in class use or otherwise in the high schools of this State.

In all cases the references themselves are to the specific subject under investigation.

It is not intended that this manual should take the

place of any of the many excellent text-books now in use, but rather that it shall supplement and make more useful those now in the hands of the pupils or in the school libraries.

The authors' acknowledgments are due to Mr. Jesse E. Beans of Omaha for his efficient service in preparing the illustrations. We would also express our thanks to Dr. John White of this university for valuable suggestions.

THE AUTHORS.

UNIVERSITY OF NEBRASKA,  
June 10th, 1899.

## ABBREVIATIONS.

THE abbreviations calling for explanation are as follows :

cc.	cubic centimeter.	gm.	gram.
cm.	centimeter.	mm.	millimeter.

Under "References":

- Clk. Elements of Chemistry, by F. W. Clarke. New York: American Book Company. Date of copyright 1884.
- Cly. New Text-book of Chemistry, by LeRoy C. Cooley. New York: American Book Company. Date of copyright 1881.
- R. (Briefer Course.) An Introduction to the Study of Chemistry, by Ira Remsen. New York: Henry Holt and Company. Date of copyright 1893.
- S. Elements of Inorganic Chemistry, by James H. Shepard. Boston: D. C. Heath and Company. Date of copyright 1885.
- S. and L. An Elementary Manual of Chemistry, by F. H. Storer and W. B. Lindsay.



*ABBREVIATIONS.*

- New York: American Book Company. Date of copyright 1894.
- W. Elements of Chemistry, by Rufus P. Williams. Boston: Ginn and Company. Date of copyright 1897.

## SUGGESTIONS.

A NUMBER of carefully selected reference books should be placed in the school library. The following are especially recommended :

Inorganic Chemistry (Advanced Course), by Ira Remsen. Henry Holt and Company, New York.

General Inorganic Chemistry, by Paul C. Freer. Allyn and Bacon, Boston.

Organic Chemistry, by Ira Remsen. D. C. Heath and Company, Boston.

Treatise on Chemistry, by Roscoe and Schorlemmer. Volumes I and II. D. Appleton and Company, New York.

The articles on chemical topics in the "Britannica" will be found especially valuable. The lives of famous investigators may be studied in connection with their discoveries, thus :

In connection with	The life of
Oxygen .....	Priestley.
Chlorine .....	Scheele.
Air .....	Cavendish.
Atomic Weights .....	Berzelius and Stas.
Atomic Theory .....	Dalton.
Combustion .....	Lavoisier.
The Alkali Metals .....	Davy.

## TO THE PUPIL.

WORK independently. You are not concerned with what your fellow student is doing.

Do not talk, except with your instructor about your work.

Do not ask questions of your instructor until you have tried to answer your questions for yourself.

Keep in a note-book, especially reserved for this use, an accurate record of your laboratory work. Record your observations when you make them, not from memory afterwards.

Do not hurry.

Keep the apparatus clean.

Work cautiously, using small quantities of reagents; avoid inhaling poisonous gases, and be especially careful to avoid getting acids, alkalies, or any other corrosive or poisonous substance into the eyes.