CHEMISTRY FOR ENGINEERS AND MANUFACTURERS. A PRACTICAL TEXT-BOOL. VOLUME I.-CHEMISTRY OF ENGINEERING, BUILDING, AND METALLURGY

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649426232

Chemistry for Engineers and Manufacturers. A Practical Text-Bool. Volume I.-Chemistry of Engineering, Building, and Metallurgy by Bertram Blount & A. G. Bloxam

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

BERTRAM BLOUNT & A. G. BLOXAM

CHEMISTRY FOR ENGINEERS AND MANUFACTURERS. A PRACTICAL TEXT-BOOL. VOLUME I.-CHEMISTRY OF ENGINEERING, BUILDING, AND METALLURGY



CHEMISTRY

POL

ENGINEERS AND MANUFACTURERS.

Vol. I.—Chemistry of Engineering, Building, and Metallurgy.

CHEMISTRY FOR ENGINEERS AND MANUFACTURERS.

A PRACTICAL TEXT-BOOK.

BY

BERTRAM BLOUNT, AND A. G. BLOXAM.

F.I.C., F.C.S., Consulting Chemist to the Crown Agents for the Colonics.

F.I.C., F.C.S., Consulting Chemist, Head of the Chemistry Department, Goldsmiths' Inst., New Cross.

With Numerous Illustrations. In Two Volumes, Large 8vo. Sold Separately.

WOLUME I.

CHEMISTRY OF ENGINEERING, BUILDING, AND METALLURGY.

GENERAL CONTENTS.

- I. INTRODUCTION.
 - 1. Chemistry of the Chief Materials of Construction.
 - 2. Sources of Energy.
 - 3. Chemistry of Steam-raising.
- 4. Chemistry of Lubrication and Lubricants.
- IL METALLURGICAL PROCESSES used in the Winning and Manu-facture of Metals.

VOLUME II.

THE CHEMISTRY OF MANUFACTURING PROCESSES.

GENERAL CONTENTS.

- L Sulphuric Acid Manufacture.
- II. Manufacture of Alkali, &c.
 III. Destructive Distillation.
 IV. Artificial Manure Manufacture.
 V. Petroleum.

- V. Fetroleum.
 VI. Line and Cement.
 VII. Clay Industries and Glass.
 VIII. Sugar and Starch.
 IX Browing and Distilling.
 X. Oils, Resins, and Varnishes.
- XI. Soap and Candles.
- XII. Boap and Candles.
 XII. Toxtiles and Bleaching.
 XIII. Colouring Matters, Dyeing, and
 Printing.
 XIV. Paper and Pasteboard.
 XV. Pigments and Paints.
 XVII. Leather, Glue, and Size.
 XVIII. Explosives and Matches.
 XVIII. MinorChemical Manufactures.

PHILADELPHIA: J. B. LIPPINCOTT COMPANY.

CHEMISTRY

FOR

ENGINEERS AND MANUFACTURERS.

A PRACTICAL TEXT-BOOK.

BY

BERTRAM BLOUNT,

F.L.C., F.C.S.,

CONSULTING CHEMIST TO THE CROWN
AGENTS FOR THE COLONIES.

AND

A. G. BLOXAM,

F.L.C., F.C.S.,

CONSULTING CHEMIST, HEAD OF THE
CHEMISTRY DEPARTMENT, GOLDSMITHS'
INSTITUTA, NEW GROSS.

With Bllustrations.

Volume I.—Chemistry of Engineering, Building, and Metallurgy.

LONDON:

CHARLES GRIFFIN AND COMPANY, LIMITED.
PHILADELPHIA: J. B. LIPPINCOTT COMPANY.
1896.

[All Rights Reserved.]

PREFACE.

In writing the present book the authors have had chiefly in view the needs of Practising Engineers, Managers of Works, and Technical Students desirous of obtaining some knowledge of Chemical Technology.

In a book of this scope, lengthy descriptions of plant and of processes which differ from each other merely in detail would be out of place. For this reason, only such processes are described as are typical of the class to which they belong.

The adoption of this plan has given opportunity for presenting the subjects dealt with in a manner which shows their relations to each other. It is hoped, therefore, that the book as a whole may prove useful even to the expert in any one of the subjects touched upon. In order to achieve this degree of usefulness the authors have specially endeavoured to explain the general principles underlying each process, even when the working details appear complex and arbitrary.

Vol. I. includes the chemical principles of subjects which are of particular interest to the Mechanical Engineer, to the Architect and Builder, and to all Manufacturers who are concerned in the erection of plant and the production of power. The information given is designed to be of so practical a character as will enable an owner of machinery or user of power to detect causes of bad economy, and to realise when saving may be effected by calling in expert assistance.

Vol. II. treats of the chief manufactures which have a chemical basis. The authors trust that for many readers, especially students of manufacturing chemistry, the information given will be found adequate to afford a sound groundwork of knowledge without proving as difficult to grasp as is the mass of facts proper to a monograph.

LONDON, December, 1895.

CONTENTS.

PART I.

INTRODUCTORY.

CHAPTER I.

Chemistry of the Chief Materials of Construction.

PA	OR I	PAGE
Stone, Brick, and Concrete-		Galvanised Iron, Tinned
Siliceous Stones,	1	Iron, 26
Calcareous Stones,	4	Strength, Permanency, and
Bricks,	6	Preservation of Materials—
Concrete, Cement, Mortar,	9	Table of Strength of Building
Testing Hydraulic Cements,	11	Stones and Metals, . 28
Structural Metals—	-	Permanency of Structural
Cast Iron,	13	 Materials, Weathering,
Wrought Iron,	15	Welding, Brazing, and
Ingot Iron and Mild Steel,	18	Soldering, Corrosion of
Copper and its Alloys,	1555.000	Metals, 31
Brasses and Bearing		Preserving Structural
Metals,	20	Materials, Special Pre-
Aluminium, Nickel,	24	servative Paints, Timber
Roofing Materials-		Preservation, 42
Slates and Tiles,	25	

CHAPTER II.

The Chemistry of the Sources of Energy.

So	lid Fuels	_					Wood and Ch	Broom	ıl, .		56
	Coal, C	alorime	try,			50	Liquid Fuel-				
	Coke,		1000			53	Petroleum,	100	4	12	57
	Brown	Coals	and	Pe	at,		Gaseous Fuel-				
	Briqu	ettes,				55	Coal Gas, .	•6	•		60

CONTENTS.

		PAGE	TAUS				
Producer Gas, Regener	ation	12 23 23 23 23 23 23 23 23 23 23 23 23 24 24 24 24 24 24 24 24 24 24 24 24 24	Industrial Temperatures, . 85				
Smoke Prevention,	100	63	Direct Conversion of Chemical				
Water Gas,		69	into Electrical Energy—				
Semi-water Gas, .		71	Galvanic Cells, 86				
Natural Gas,	- 60	73	Storage cells, 90				
Hydrogen,		74	Gas Batteries, 92				
Oxygen,		75	Natural Forms of Kinetic				
Electrical Heating,		77	Energy—				
Measurement of Temperate	are-	Water Power, Tides, Wind, 93					
Thermometers and			Transmission of Energy, . 96				
meters,	″ €	79					
			¥7 ₩				
Water— Hard Calcareous Waters Soft Waters, . Saline Waters, Sea W Boiler Incrustations, recion of Boilers, .	ater, Cor-	99 101 101	Softening and Purification of Boiler Water— General Considerations, . 108 Clark's Process, 108 Boiler Compositions, . 112				
The Chemistry Liquid Lubricants— Fatty Oils,	1000		ER IV. icants and Lubrication. Solid Lubricants,				
Mineral Oils,	8.0	117	cants, 120				
Mixed Oils,		118					