

THE ABC OF IRON

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649514854

The ABC of Iron by Chas. W. Sisson

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

CHAS. W. SISSON

**THE ABC
OF IRON**

THE
A B C OF IRON

BY
CHAS. W. SISSON.

~~Univ. of~~
CALIFORNIA

LOUISVILLE, KY.:
PRESS OF THE COURIER-JOURNAL JOB PRINTING CO.

1893

TN 105
36

COPYRIGHTED, 1892,
BY THE AUTHOR.

TO THE
LIBRARY

ELECTROTYPED AND PRINTED
BY
COURIER-JOURNAL JOB PRINTING CO.

CONTENTS.

IRON—WHAT IS IT ?

A description of the metal and its uses, showing in what combinations it is found and the principal sources.

PIG IRON.

An account of the blast furnace process by which the ores are reduced to pig iron.

CONSTITUENTS OF IRON.

A description of the elements in pig metal which influence cast iron. Described in chapters on

CARBON IN CAST IRON. PHOSPHORUS IN CAST IRON.
SILICON IN CAST IRON. MANGANESE IN CAST IRON.
SULPHUR IN CAST IRON.

NUMBERING OF PIG IRON.

Showing the character and analysis of different grades of pig iron, appearance of fracture and the uses to which the several grades are adapted.

GRADING OF IRON.

Should it be by analysis or by fracture?

HOW TO REDUCE COST OF MIXTURE.

STEEL.

PHYSICAL PROPERTIES OF METALS DEFINED.

Table of shrinkage of castings. Weights of castings from patterns, etc.

STATISTICS.

Showing the varieties and production of iron ore, pig iron, pig iron and steel products, railroad mileage and equipment, etc., etc., etc.

EARLY HISTORY AND MANUFACTURE OF IRON.

Brief history of the manufacture and uses of iron from earliest times, being principally extracts from Mr. James M. Swank's "HISTORY OF IRON IN ALL AGES."

10

11

12

13

14

15

16

17

18

19

INTRODUCTORY.

There is nothing so essential for a foundryman to understand as the action which the different elements in pig iron have on his product. Manufacturers now realize that pig iron is not a simple substance, but is in reality an alloy compound of a number of elements very dissimilar; that its physical characteristics, strength, elasticity, etc., depend upon the percentages of these elements.

Greater knowledge is being sought concerning the chemical questions involved in foundry practice, and as this knowledge is resulting in the production of better and cheaper material, it becomes necessary for the foundryman who would successfully meet competition to study this well. No foundryman can afford to be ignorant of the nature and properties of iron if he expects to overcome the numerous emergencies that beset every melter of pig iron.

The increasing inquiries on these subjects suggested the publication of this book.

Learned discussions are had on these subjects before societies and mechanical institutions, and papers are written on special subjects which are reproduced in piece-meal in our trade papers and journals. Only few, however, have the opportunity or can afford to attend the meetings of these societies, and the majority do not get to see their transactions published.

There are very valuable works published on the metallurgy of iron and steel, but they are voluminous and technical, and for this reason very discouraging for a beginner. The author has endeavored in the A B C of Iron, to place before the public such information as all foundrymen should possess, in a plain, condensed form, hoping that

those who read it will be assisted in their desire to master their business.

The chapters relating to *Constituents of Iron* are made up of gleanings from the writings and publications by authorities on these subjects, and from personal investigation. Except where extended quotations are given, no mention is made of the authority, for the reason that often it became necessary to change the language to have it simple and readily understood.

The author is indebted for information to Howe's "Metallurgy of Steel;" the papers of Mr. W. J. Keep, of the Michigan Stove Company; to Major Edward Doud, C. E., Port Henry, New York; to "The Journal of the Iron and Steel Institute;" Bloxam's Chemistry, numerous other works, and to practical foundrymen.

Beside the chapters relating to the chemical qualities of iron and the source of supply and process by which the ores are reduced to pig iron, the other contents are inserted as being of value and interest.

The statistics compiled from undoubted authority, will be a revelation to many, showing the magnitude and diversity of the iron industry of this country.

IRON—WHAT IS IT?

Iron is a metal. Bloxam tells us that "a metal is an element capable of forming a base by combining with oxygen." These compounds of elements with oxygen are called oxides. The Latin word for iron is *ferum*, and the chemical symbol for it is *Fe*. The oxides of iron are spoken of as ferric oxide, or ferrous oxides, the termination of *ous* signifying that there is a less proportion of oxygen.

Iron is found in almost all forms of rock, clay and earth, and its presence is shown by their colors, iron being one of the commonest of natural mineral coloring ingredients. We find it in small proportions in plants and in larger quantities in the bodies of animals, especially in the blood, which is said to contain about 0.5 per cent. of iron, imparting its color.

Except in the case of meteorites, large metallic masses which occasionally fall to the earth, sometimes of enormous size and of unknown origin, iron is not found in the metallic state.

The chief forms of combination in which iron is found available as sources of the metal, are in the different varieties of the ores of iron. By ores of iron we mean