

**LEAD-SMELTING: THE CONSTRUCTION,
EQUIPMENT, AND OPERATION OF LEAD
BLAST-FURNACES, AND
OBSERVATIONS ON THE INFLUENCE OF
METALLIC ELEMENTS ON SLAGS AND
THE SCIENTIFIC HANDLING OF SMOKE**

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Lead-Smelting: The Construction, Equipment, and Operation of Lead Blast-furnaces, and Observations on the Influence of Metallic Elements on Slags and the Scientific Handling of Smoke by Malvern Wells Iles

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MALVERN WELLS ILES

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LEAD-SMELTING.

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BLAST-FURNACES,*

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OBSERVATIONS ON THE INFLUENCE OF METALLIC ELE-
MENTS ON SLAGS AND THE SCIENTIFIC
HANDLING OF SMOKE.

BY

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PERSONAL AND EXPLANATORY.

THE literature of smelting lead, gold, and silver ores with blast-furnaces is limited in volume. It has mainly emanated from students of Chemistry and Metallurgy who have not enjoyed the advantage of personal contact with the practical problems confronting the lead-smelter. I recall no publication of this character that is not recognized as a distinct aid to research in the almost boundless realm of the twin sciences. But their dependable usefulness is limited to the didactic. The chasm separating theoretical from practical results is sufficiently wide and deep to engulf unmeasured capital and vaultless ambition. The theory of Smelting is a prerequisite to successful practice, but its mastery does not complete the equipment. Experience in applying the principles of Chemistry

and Metallurgy to the hard problems of Smelting activity, under widely varying conditions and environment, is a no less important factor in achieving financial as well as theoretical triumphs over Nature. My initial endeavors were almost coincident with the birth of the industry of lead-smelting in the United States. Others had preceded me in the direction and management of smelting plants, but their contemporaneous experiences and observations were to me a sealed book. The knowledge acquired during a period covering two decades came through direct contact with the sterner realities of smelting life, and by means of tests and experiments incident to the handling of a wide range of mineral substances, by all the manifold processes and devices discovered from time to time. The net results of twenty years' operations easily might have been multiplied had the unrecorded experiences of contemporaries been accessible to me. To the younger men of the period, on whose shoulders rest the responsibility for maintaining steady progress in the science of Metallurgy, I cheerfully dedicate this volume, in the confident hope that it may be serviceable in the solution of problems along the

broader lines, and useful as well in many of the lesser details.

Without attempt at literary embellishment, and with perhaps censurable disregard for niceties of diction, I go directly to the pith of the subject. My endeavor shall be to give novelty to that which was old, condensation to that which was diffuse, perspicacity to that which was obscure, and accuracy to that which was recondite. I shall attempt truthfully to relate what *has been* and *is*, humbly asking the considerate reader

"Gently to hear, kindly to judge."

THE AUTHOR.

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1902.

TABLE OF CONTENTS.

	PAGE
BLAST-FURNACES	I
Drawings and Specifications.....	33
The Inner Lines.....	39
The Foundation.....	46
The Crucible.....	54
The Water-jackets.....	60
The Superstructure.....	67
The Power Plant.....	72
Tools and Implements.....	78
Blowing-in.....	86
Calculation of Charges.....	88
Daily Reports.....	98
Supervision and Operation.....	101
INFLUENCE OF METALLIC ELEMENTS	108
Alkaline Earths.....	109
Baryta.....	111
Sulphur and Matte.....	112
Magnetic Slags.....	115
Magnesia.....	116
Alumina.....	117
WALL ACCRETIONS	118
HANDLING OF SMOKE	123
METALLURGICAL RESULTS	129
ANTIMONIAL LEAD	134
ROASTING-FURNACES	141
SMOKE	146
<i>The Draft Factor</i>	146
On Lead Blast-furnaces.....	146