

**BEARDSLEE ON WROUGHT-IRON  
AND CHAIN-CABLES.  
EXPERIMENTS ON THE STRENGTH  
OF WROUGHT-IRON AND OF  
CHAIN-CABLES**

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**L. A. BEARDSLEE & WILLIAM KENT**

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CHAIN-CABLES**



FRONTISPIECE.



FIG. 1.

THE PHENOMENON OF "BARKING," AS MANIFESTED BY IRONS F AND Ex. (See Page 36.)

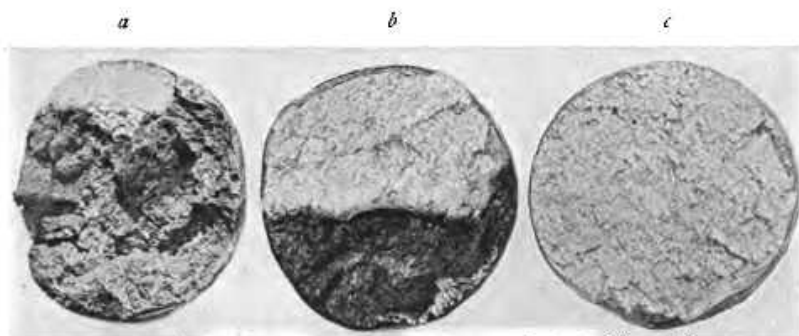


FIG. 2.

DIFFERENCE IN APPEARANCE OF FRACTURES PRODUCED BY IMPACT, OF VARYING DEGREES OF ENERGY, THE MATERIAL BEING THE SAME. (See Page 35.)



BEARDSLEE ON WROUGHT-IRON AND CHAIN-CABLES.

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EXPERIMENTS  
ON THE  
STRENGTH OF WROUGHT-IRON  
AND OF  
CHAIN-CABLES.

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REPORT OF THE COMMITTEES OF THE UNITED STATES BOARD  
APPOINTED TO TEST IRON, STEEL AND OTHER METALS,  
ON CHAIN-CABLES, MALLEABLE IRON, AND  
RE-HEATING AND RE-ROLLING  
WROUGHT-IRON;

INCLUDING

MISCELLANEOUS INVESTIGATIONS INTO THE PHYSICAL  
AND CHEMICAL PROPERTIES OF ROLLED  
WROUGHT-IRON.

BY

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Revised and Abridged

BY

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Associate Editor of the "American Manufacturer and  
Iron World," Pittsburgh, Penn.*

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15 ASTOR PLACE.  
1879.



## PREFACE.

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THE Report of which the following pages are an abridgment was published by the United States Government in 1879, as part of Executive Document No. 98, House of Representatives, Forty-fifth Congress, Second Session.

It forms an octavo of two hundred and sixty-seven pages, with thirteen heliotype-plates, and several wood-cuts. It is not only by far the most elaborate record of tests of wrought-iron and of chain-cables that has ever been given to the world, but it is the most valuable in results; in describing newly observed phenomena, in tabulating variations of strength due to differences in methods of manufacture, and revealing their causes, in investigation of the effect of impact, in pointing out causes of defects in strength of both bars and cables, and generally in giving information that is of immediate practical value to manufacturers of iron and to engineers.

As but a limited number of copies of the report were issued by the Government, and as it contains a large amount of detailed tabular matter, which, while necessary in an official report of this kind, to corroborate the conclusions deduced, is not necessary to a full comprehension of these conclusions, — it has been thought that an abridgment would be acceptable to many who would be unable to obtain the original work.

The undersigned, in preparing the abridgment, has had the full consent of Commander Beardslee, and obtained his approval of the manuscript prior to publication.

WM. KENT.

PITTSBURGH, PENN., May, 1879.





# CONTENTS.

## SECTION I.

	PAGE
INTRODUCTION . . . . .	1
THE BAR.—PART I. . . . .	4
Testing-Machines, and Methods of Testing . . . . .	5
Notes upon the "Records of Bars tested by Tension" . . . . .	6
Strength and Elastic Limit of Round Bar-Iron . . . . .	8
THE BAR.—PART II. . . . .	11
Investigation of the Effect of Differences in the Amount of Reduction by the Rolls . . . . .	11

## SECTION II.

PART I.—PROPER FORM AND PROPORTIONS OF TEST-PIECES . . . . .	20
PART II.—COMPARATIVE STRENGTH OF BARS IN THEIR NORMAL CONDITION, AND AS REDUCED BY TURNING AWAY THE SKIN AND ADJACENT IRON . . . . .	27

## SECTION III.

TESTS OF BARS BY IMPACT; SHOWING ACTION OF VARIOUS TYPES OF IRON UNDER SUDDEN STRAINS . . . . .	31
Method of testing by Impact . . . . .	32
Barking . . . . .	36
Crystallization . . . . .	36
Record of Impact Tests . . . . .	37

## SECTION IV.

A PAPER DESCRIBING A SERIES OF EXPERIMENTS TO DETERMINE FACTS IN REGARD TO THE OPERATION OF THE LAW CALLED THE ELEVATION OF THE LIMIT OF STRESS . . . . .	40
---	----

## SECTION V.

THE CABLE . . . . .	49
Experiments upon Comparative Strength of Studded and Unstud- ded Links . . . . .	52
Description of Method of testing Cables . . . . .	54
Weight of Chain-Cables . . . . .	57
Methods by which the Weight of Chain-Cables can be reduced in a greater Ratio than the Strength . . . . .	58
Comparison of Results obtained by Tension upon Sections of Cable-Links, and upon Bars of the Iron from which Links were made . . . . .	62

## SECTION VI.

PROOF-STRAINS FOR CHAIN-CABLES . . . . .	68
Effects of the Use of Strains prescribed by the Admiralty Proof- Table . . . . .	68
Discussion of the Principles upon which Proof-Strains should be based . . . . .	71
Ratio of Strength of Sections of Links to that of the Bars from which they were made . . . . .	72
Probable Strength of Round Bars, calculated with an Allowance for Variation in Strength due to Variation in Diameter . . . . .	77
Probable Strength of Cables made from Bars of given Strength . . . . .	79
Recommended Proof-Table . . . . .	81
Comparison of the Proof-Strains recommended, and the Strains in Use . . . . .	81

## SECTION VII.

PART I. — NOTES UPON THE IRONS EXAMINED . . . . .	83
PART II. — COMPARISON OF CHEMICAL AND PHYSICAL RESULTS. . . . .	92
Analyses of the Irons used in making Chain-Cables . . . . .	93
Relative Values of Iron in Bars, in Tenacity, Reduction of Area, and Elongation, and in Proportion of Chain to Bar . . . . .	95
Summary of the Principal Physical and Chemical Properties of Sixteen Irons . . . . .	96
Effects of Phosphorus . . . . .	97
Effects of Silicon . . . . .	101
Effects of Carbon . . . . .	102
Effects of Manganese, Copper, Nickel, Cobalt, Sulphur, and Slag, Welding . . . . .	105
What is learned from Chemical Analyses . . . . .	106
Conclusions derived from a Comparison of Chemical and Physical Results . . . . .	113



# REPORT

OF THE

RESULTS OF INVESTIGATIONS MADE BY COMMITTEES D, H, AND  
M, OF THE UNITED-STATES BOARD APPOINTED TO  
TEST IRON, STEEL, AND OTHER METALS.

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## SECTION I

### INTRODUCTION.

THE investigations assigned to the three committees designated by the letters D, H, and M were as follows:—

To Committee D, "On Chain and Wire Ropes," with instructions "to determine the character of iron best adapted for chain cables, the best form and proportions of link, and the qualities of metal used in the manufacture of iron and steel wire rope."

To Committee H, "On Iron, Malleable," with instructions "to examine and report upon the mechanical and physical properties of wrought-iron."

To Committee M, "On Re-heating and Re-rolling," with instructions "to examine and report upon the effects of re-heating and re-rolling, or otherwise re-working, of hammering as compared with rolling, and of annealing the metals."

The work thus assigned to three different committees was of such a nature, that experiments made by any one of them would necessarily furnish data which would prove of value to