# ELECTRIC LIGHTING: A PRACTICAL TREATISE, WITH FORTY-EIGHT ENGRAVINGS IN THE TEXT

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649569885

Electric Lighting: A Practical Treatise, with Forty-Eight Engravings in the Text by Hippolyte Fontaine & Paget Higgs

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

# **HIPPOLYTE FONTAINE & PAGET HIGGS**

# ELECTRIC LIGHTING: A PRACTICAL TREATISE, WITH FORTY-EIGHT ENGRAVINGS IN THE TEXT

Trieste

# ELECTRIC LIGHTING.

### A PRACTICAL TREATISE

BY

HIPPOLYTE FONTAINE.

Translated from the french By PAGET HIGGS, LL.D., Assoc. INST. C.E.

WITH FORTY-EIGHT ENGRAVINGS IN THE TEXT.



ÉONDON: E. & F. N. SPON, 46, CHARING CROSS. New York: 446, BROOME STREET. 1878.

22 - 23

128.78 Eng

MAN 8 1984

Lucy Orgend fund.

### TABLE OF CONTENTS.

.

#### CHAPTER I.

#### THE VOLTAIC ARO.

PAGES Means of obtaining the Electric Light-Voltaic Aro-Its Properties-Despretz' Experiments-Appearance of Two Carbon sduring Combustion - Matteucel's Experiment - M. Le Roux' Comparison-Analogy between Electric Light and Sunlight-Tyndall's Experiments on the Heat developed by the Voltaic Arc - Use of the Electric Light in Theatres-Lighting Works by Night-Report by M. Brüll on the Use of Serrin Regulators in Spain .. .. .. .. .. .. .. .. ..

#### CHAPTER IL

#### ELECTRIC LAMPS, OR REGULATORS.

Instillity of Present Researches as to Regulators-Deleuil's Experiments -Thomas Wright's Apparatus-Staite and Edwards' Regulator-Le Molt's Regulator-Archereau's Regulator-Lacassagne and Thiers' Regulator-Gaiffe's Regulator-Foucault and Duboseq's Regulator-Way's Regulator - Alteneck's Regulator - Serrin's Regulator -Girouard's Regulator-Carre's Regulator-M. Jablochkoff's Inven-

#### CHAPTER III.

#### ELECTRIC CARBONS.

Wood Carbon Rods-Retort Carbon; its Inconveniences-Staite and Edwards' Carbon - Le Molt's Carbon - Lacassagne and Thiers' Carbon-Curmer's Carbon-Jacquelain's Carbon-Peyret's Carbon-Archereau's Carbon-M. Carré's Experiments : his Processes of Manufacture-Comparative Trials of Archereau, Carré, Gaudoin, and Refort Ourbons .. .. .. .. .. .. .. .. .. .. .. ..

38

12

1

#### CONTENTS.

#### CHAPTER IV.

#### MAGNETO-ELECTRIC MACHINES.

Definition—Transformation of Work into Electricity—Influence of a Current on a Magnetised Needle—CRrstedt's Experiment—Mutual Action of Two Currents—Ampère's Discovery—Action of a Current on Soft Iron—Arago's Discovery—Action of a Magnetion a Magnetic Helix—Faraday's Discovery and Experiments—Induced Electricity —Pixii's Machine, Commutator—Clarke's Machine—Niaudet's Machine—Nollet's, or the "Alliance" Machine—Holmes' Machine— Wilde's Machine—Progress attained by Wheatstone and Siemens— Remanent Magnetism—Ladd's Machine

53

PAGES

#### CHAPTER V.

#### GRAMME'S MAGNETO-ELECTRIC MACHINE.

Success attained by the Gramme Machine—Principle on which it is based—Analysis of Effects obtained with a Chrcular Electro-Magnet —Action of the Soft Iron on the Copper Helix—Action of Permanent Magnets—Method of Collecting the Corrents—Partial Bobbins— Machine for Illustration—Vortical Machine for Galvanoplastic purposes—Horizontal Machine for Galvanoplastic purposes—Laboratory Machine with Jamin's Magnet—Pedal Machine—Application to Medicine—Several Applications—Transport of Motive Force to a Distance—Claims of others and Counterfeits—Worms de Romilly's Machine—Facinotit's Machine—Services rendered to Industry by M. Gramme

73

98

#### CHAPTER VI.

#### GRAMME MACHINES FOR THE ELECTRIC LIGHT.

Vertical Machine, with Six Bar Electro-Magnets and Three Bobbins-Vertical Machine with Two Bobbins-Horizontal Machine, with Four Electro-Magnet Bars and One Double Bobbin-Comparison between an "Alliance" Machine and a Gramme, from the triple point of view of Weight, Size, and Price-Workshop Machine, normal type-Photometric Mcasures-Difference between Measures taken at several Angles-Luminous Intensity of a Workshop Machine

vi

#### CONTENTS.

#### CHAPTER VII.

#### INDUSTRIAL APPLICATIONS.

PAGES

Conditions to be realised for Effective Use of the Electric Light-Space Lighted by a Single Machine — Introduction to the Inventor's Workshops — Dacommun's Establishmeut at Mulhouse — Sautter, Lemonnier, and Co.'s, at Paris-Ménier, Grenelle, and Roye Works-Introduction to Spinning Mills — Chapelle-Paris Goods Dépôt — M. Jeanne Deslande's Yards at Harre-Luminous Ceiling-Manne Canal Harbour-Lighting Skating Rinks-Other Applications ... 103

.

.

#### CHAPTER VIII,

#### APPLICATION TO LIGHTHOUSES, SHIPS, AND FORTS.

#### CHAPTER IX.

#### MOTIVE POWER ABSORBED BY THE GRAMME MACHINE.

#### CHAPTER X.

#### COST OF ELECTRIC LIGHTING.

Cost of Lighting with a Bunsen Battery-Evaluation by M. Becquerel-Table of Costs by Mesars. Lacassagne and Thiers-Cost of Lighting by means of the "Alliance" Machine-Cost of Lighting by means of the Gramme Machine-Comparative Table of the Cost of other Lights-M. Heilmann's Colculations-Comparative Estimate of the Introduction of Gas and of Electricity

#### CONTENTS.

#### CHAPTER XI.

#### LIGHTING BY INCANDESCENCE.

PAGES

Use of Goissler Tubes-Report presented to the Academy of Sciences by M. Coste in the name of M. Gervais-King's Invention-Lodyguine lamp-Report by Mr. Wild to the Academy of St. Petersburg -Konn's Lamp-Bouliguine's Lamp-Experiments made by the Author on Lighting by Incandescence-H. Fontaine's Lamp ... 168

### CHAPTER XII.

#### DIVISIBILITY OF THE ELECTRIC LIGHT.

viii

## TABLE OF ILLUSTRATIONS.

12-020

•

2 - 10

PIG.													PAGES
1.	Voltaio Are			1.1				220		10		322	4
2.	Lighting a Dock	vard d	urin	ig Co	nstru	ction	1						9
3.	Staite and Edwar												13
4.	Le Molt's						сe :						15
5.	Archereau's												17
8.	Gaiffe's					<u>.</u>							21
7.	Foncault-Dubosc	q	.,,										25
8.	Hefner-Alteneck	-											27
9.	Serrin's						$\alpha \rightarrow$	æ	000	44		14.40	81
10,	Faraday's Experi	ments		142									55
11.	Faraday's Experi	ments									+		56
12.	Pixii's Machino											•••	57
13.	Commutator												58
14.	Clarke's Machine	in a second	**				$\sim$		0002	**	-		. 60
15.	Niaudet's "						12		4.				61
16,	Siemous' "		÷		10								62
17.	"Alliance"		••		**								68
18.	Holmes'		ų.,			S. 1							66
19.	Wilde's "	3062	10						943).		1996		68
20.	Ladd's "		÷.,				22						70
21.	Magnetised Bar	and M	etall	lie He	lix	11	ā.						74
22,	Magnetised Bar	and Mo	tall	lie He	lix			••					74
23.	Gramme Ring							••					75
24.	Gramme Ring an	d Mag	net	0.845		× .			•••	44	300	9963	76
25.	Construction of G												78
26,	Gramme Machin					24 C		••		66	(10)		79
27.				for E		opla	ting			••		22.2	81
28.				al for						12	44		83
29.				inary		nets			32				85
30,	37 17			Mag									86
31,	PR 13			lal A			••				**		87
32.				of 50				**					94
33.	17 15			al, of			rners						95
34.				al, of					$\mathbf{x} \in \mathcal{X}$	••			97
35,				Works		type							100
36.		with	its :	Motor					**	18			107