

**NOTES ON A COURSE OF SEVEN
LECTURES ON ELECTRICAL PHENOMENA
AND THEORIES: DELIVERED AT THE
ROYAL INSTITUTION OF GREAT BRITAIN,
APRIL 28-JUNE 9, 1870**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649196784

Notes on a course of seven lectures on electrical phenomena and theories: delivered at the Royal institution of Great Britain, April 28-June 9, 1870 by John Tyndall

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JOHN TYNDALL

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ELECTRICAL PHENOMENA
AND
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DELIVERED AT
THE ROYAL INSTITUTION OF GREAT BRITAIN

APRIL 28—JUNE 9, 1870.

BY
JOHN TYNDALL, LL.D. F.R.S.

LONDON:
LONGMANS, GREEN, AND CO.
1870.

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P R E F A C E .

THE reason assigned for the publication of my "Notes on Light" applies also to these Notes on Electricity. They are desired by persons interested in education.

I consign the proofs to the care of my friend Professor Goodeve prior to my departure for Switzerland. I have also to thank Mr. Vincent, Librarian of the Royal Institution, for his intelligent assistance.

JOHN TYNDALL.

ROYAL INSTITUTION,
June 29th, 1870.

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CONTENTS.

	NOTE
Voltaic Electricity: the Voltaic Battery	1
Electro-Magnetism: Elementary Phenomena	8
Electro-Magnetic Engines	19
Physical Effects of Magnetization	22
Character of Magnetic Force	28
Magnetism of Helix: Strength of Electro-Magnets	37
Electro-Magnetic Attractions: Law of Squares	41
Inference from Law of Squares: Theoretic Notions	50
* Diamagnetism: Magneto-Crystalline Action	52
Frictional Electricity: Attraction and Repulsion: Conduction and Insulation	63
Theories of Electricity: Electric Fluids	73
Electric Induction: the Condenser: the Electrophorus	77
The Electric Machine: the Leyden-jar	85
The Electric Current	91
The Electric Discharge: Thunder and Lightning	94
Electric Density: Action of Points	103
Relation of Voltaic to Frictional Electricity	108
Historic Jottings, concerning Conduction and the Leyden-jar	119
Historic Jottings, concerning the Electric Telegraph	125
Phenomena observed in Telegraph-Cables	140
Artificial Cables	157
Sketch of Ohm's Theory and Kohlrausch's Verification	169
Electro-chemistry. Chemical Actions in the Voltaic Cell: Origin of the Current	188
Chemical Actions at a Distance: Electrolysis	208
Measures of the Electric Current	231
Electric Polarization: Ritter's Secondary Pile	234
Faraday's Electrolytic Law	249
Nobili's Iris Rings	256
Distribution of Heat in the Circuit	260

Relation of Heat to Current and to Resistance	267
Magneto-Electricity: Induced Currents	274
Relation of Induced Currents to the Lines of Magnetic Force. Rota- tory Magnetism	295
The Extra-Current	304
Influence of Time on Intensity of Discharge. The Condenser ..	315
Electric Discharge through rarefied Gases and Vapours	322
Action of Magnets on the Luminous Discharge	332
Magneto-electric Machines. Saxton's Machine. Siemens's Armature ..	339
Wilde's Machine	345
Siemens's and Wheatstone's Machine	350
Induced Currents of the Leydan Battery	355

NOTES

ON

ELECTRICAL PHENOMENA AND THEORIES.

Voltaic Electricity: the Voltaic Battery.

1. If two pieces of the same metal (pure zinc or pure platinum for example) be immersed in water, which has been rendered sour by the addition of a little sulphuric acid, the acidulated water attacks neither.

The ordinary zinc of commerce being rendered impure by the admixture of other metals is attacked by the acid. It may, however, be enabled to withstand the acid by covering its surface with mercury. The zinc is dissolved by the mercury, detached from its impurities, and presented to the liquid. This process is called *amalgamation*.

2. If two pieces of two different metals (pure zinc and platinum for example) be immersed in acidulated water, no sensible action occurs *as long as the metals do not touch each other*; but the moment they touch, and as long as they continue in contact, the zinc is attacked by the acidulated water and dissolves, while bubbles of gas rise from the surface of the platinum.

3. This gas when collected proves to have the specific gravity of hydrogen; like hydrogen it also burns in the air. The water in fact is decomposed by the touching metals; its oxygen unites with the zinc to form oxide of zinc, while its hydrogen escapes from the platinum.

4. If the two metals be only partially plunged into the acidulated water, it does not matter whether contact occurs *within* the liquid or *outside* of it. The effect in both cases is the decomposition of the water, the solution of the zinc, and the liberation of the hydrogen gas.

5. When the two partially immersed metals are connected outside the liquid by a long wire (say of copper), the effect is the same as when they touch directly. In both cases a *circuit* is said to be formed, consisting of the two metals and the liquid. In the case last mentioned the copper wire is said to complete the circuit.

For these experiments a strip of platinum and a strip of amalgamated zinc are employed. The liquid is placed in a glass cell with parallel sides through which is sent a beam of light, and by means of a lens a magnified image of the cell and its two strips is cast upon