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

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JOHN TYNDALL

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THE ROYAL INSTITUTION OF GREAT BRITAIN

APRIL 28—JUNE 9, 1870.

BY

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PREFACE.

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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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