



XIII. Proposed philosophical experiments

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To cite this article: H.F. Talbot Esq. M.P. F.R.S. (1833) XIII. Proposed philosophical experiments , Philosophical Magazine Series 3, 3:14, 81-82, DOI: [10.1080/14786443308648127](https://doi.org/10.1080/14786443308648127)

To link to this article: <http://dx.doi.org/10.1080/14786443308648127>



Published online: 01 Jun 2009.



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THE
LONDON AND EDINBURGH
PHILOSOPHICAL MAGAZINE
AND
JOURNAL OF SCIENCE.

[THIRD SERIES.]

AUGUST 1833.

XIII. *Proposed Philosophical Experiments.* By H. F. TALBOT,
*Esq. M.P. F.R.S.**

1. *On the Velocity of Electricity.*

SOME ingenious experiments have lately been made by Mr. Wheatstone, with a view to determine the velocity of the electric spark *passing through air* by means of a revolving mirror. But has it ever been shown with certainty that the passage of electricity, *even through a conducting body*, is performed in a space of time so short as to be absolutely inappreciable? An experiment is upon record in which the spark was sent through seven miles of iron wire, which it is said to have traversed in an instant. But it may fairly be presumed that the philosophers who made this observation, could not answer for an interval of time smaller than the tenth part of a second. Now, as the revolving mirror gives us the power of increasing the accuracy of observation at least a thousand-fold, I will suggest a method of applying it to determine this question.

Let the greatest length of wire that can be procured, be disposed so that the two extremities are brought very nearly together. Let one end of the wire receive the spark from the machine, and the other end give it out again to any body which communicates with the earth.

If the flashes of electric light, entering the wire, and leaving it after traversing its whole length, appear simultaneous to the eye, take a mirror mounted on a revolving axis, and place

* Communicated by the Author.

it in such a position that (the mirror being at rest) the images of the two sparks coincide, or are superposed one upon the other.

This being effected, let the observation be made through a fixed tube, placing the combined image exactly in the centre of the tube; then if the mirror be made to revolve with great speed, if any separation of the combined spark into two take place, it will be a proof of the existence of an interval of time between them.

The necessity of the tube is apparent; for if the eye were directed to other points of the revolving mirror, the two images would appear separate from the mere effect of perspective.

2. *Proposed Method of ascertaining the greatest Depth of the Ocean.*

This is a problem concerning which we can hardly be said to possess any certain knowledge; since our power of sounding does not extend much beyond a thousand fathoms. But in the central parts of the Atlantic and Pacific, the ocean may be many leagues in depth;—at least such is the confident opinion of Laplace. As this is one of the most important points in the physical constitution of the globe, it would be very desirable, if possible, to reduce it to the test of actual experiment.

The method which I would propose, with some hope that it would prove successful, is to let fall from the deck of a ship one of the newly-invented percussion shells, which would explode on striking the ground; and the interval of time before the explosion was heard, would give the depth of water with great accuracy. The experiment should be first tried in a known depth of water, say a hundred fathoms, or whatever lesser depth would be consistent with security. The descent of the shell through the water would after the first few seconds be uniform, as is well known to be the case with all heavy bodies moving in a resisting medium. The time taken by the sound in returning through the water might be neglected, unless great accuracy were required; since it would move at the rate of a mile in half a second.

If it should be objected that the report of the shell might not be audible at great depths, I would remind the reader that in M. Colladon's experiments the sound of a *bell* was distinctly heard through the water of the lake of Geneva for a distance of *nine miles*.

[To be continued.]