

June 10, 1842

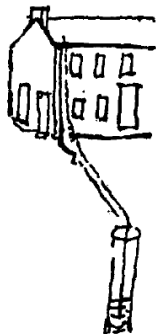
"RECORD OF EXPERIMENTS"

Henry Papers, Smithsonian Archives

June 10<sup>th</sup> 1842

First<sup>1</sup> Induction from a thunder cloud<sup>2</sup>

Agreeably to the suggestion given at the bottom of page 263<sup>3</sup> I connected by soldering a copper wire (bell size) to the tin roof of our house and passed the lower extremity into the water of the well. This was effected by fastning a cylinder of lead to the end of the wire and passing this through a hole in the cover near the pump of the well. The wire was then divided near the window of the study and a compound spiral inserted. This was formed of 6 strata of wire each consisting of 40 spires and insulated by cement.<sup>4</sup>



After this arrangement was completed (on monday last)<sup>5</sup> I waited with some anxiety for the appearance of a thunder cloud but none appeared until last evening when I observed before going to bed a few very distant and faint flashes of light but too distant to produce any effect: they must have been from a cloud at the distance of 100 miles. I placed a needle no 5 in the spiral and then went to bed. At a little before three o'clock I was awakened by a storm of rain and heard several distant discharges of lightning. I did not rise but in the morning I found the needle strongly magnetic in the direction which indicated a current upwards. This result is precisely in accordance with my anticipations and perfectly analogous to the experiment described page 263.<sup>6</sup>

*The deflection of the needle magnetized by the flash was 23 1/2° minus.*<sup>7</sup>

Commenced a series of experiments with needles n<sup>o</sup> 5 and a fine wire spiral (plated) containing about 200 spires. I commenced with 5 spark and increased the charge to 30 when I obtained a *minus* polarity strongly de-

<sup>1</sup> This word appears to be a later addition to the heading, probably to distinguish this experiment from that of June 13, below.

<sup>2</sup> On the opposite page is the running head: "experiments with the spiral." This refers to the experiments described in the final paragraph of the entry.

<sup>3</sup> See above, "Record of Experiments," May 28, 1842, fourth paragraph.

<sup>4</sup> An illustrated description of Henry's apparatus for this experiment is contained in his article "Meteorology in Its Connection with Agriculture, Part V: Atmospheric Electricity," *Report of the Commissioner of Patents, 1859:*

*Agriculture* (Washington, 1860), pp. 477-478.

<sup>5</sup> June 6.

<sup>6</sup> Henry is referring to the experiments described in the second and third paragraphs of the "Record of Experiments" entry of May 28, 1842, above.

<sup>7</sup> Henry reported his success in detecting induced currents from atmospheric electricity in the last paragraph of "Contributions V: Induction from Ordinary Electricity; Oscillatory Discharges." He later drew upon this work when called upon in 1846 to consider the effect of lightning on telegraph lines. *APS Proceedings, 1843-1847, 4:265.*

June 13, 1842

My dear Sir

I take it for granted that you will not be able to withstand the temptations presented to you in the note of our good friend above, & I shall therefore have a bed & plate in readiness for you at my house, where Mrs: B & myself shall expect you. I have now got into my new room,<sup>4</sup> & have much to interest us, & perhaps the opportunity of having Bache & yourself here together may not in a long time again occur. Now do lay aside whatever you may be engaged in & give a few days to the gratification & benefit of your friends. If you acknowledged military authority I should put an order on you.<sup>5</sup> With kind remembrance to Mrs: Henry I remain

Most sincerely yours  
W<sup>m</sup> H. C. Bartlett

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Attached to the Coast Survey, Bache participated in surveying the shoreline of much of the Mid-Atlantic region. By 1846, Bache was a lieutenant, commanding the brig *Washington*, assigned to survey the Gulf Stream. He was washed overboard and drowned during a storm off Virginia. *Niles National Register*, October 10, 1846; James Dallas, *The History of the Family of Dallas* (Edinburgh, 1921), pp. 513-514.

<sup>4</sup> Bartlett returned from a tour of European observatories late in 1840, having purchased various optical and astronomical instruments.

He then supervised the construction of a new observatory and library at West Point, with four towers designed specifically to house the astronomical apparatus. Jacob W. Bailey to John Torrey, February 27, 1841, Torrey Papers, Library, New York Botanical Garden; William H. C. Bartlett, "On the Instruments of the Astronomical Observatory of the United States Military Academy, West Point," *Transactions of the American Philosophical Society*, 1846, n.s. 9:191-203.

<sup>5</sup> Henry was unable to leave Princeton. See below, Henry to Bache, June 24, 1842.

### "RECORD OF EXPERIMENTS"

*Henry Papers, Smithsonian Archives*

June 13<sup>th</sup>  
Monday 1842  
Second

Induction from a thunder cloud<sup>1</sup>

A thunder storm occurred again to day at about 7 o'clock P.M but as is usual in this village the lightning was at a distance. There were two reports; at the time of the first no needle happened to be in the spiral. Before the next one came the rain was falling in great quantity; but notwithstanding this the needle was magnetized by the second flash. The distance of the thunder must have been between 3 and four miles, as indicated by the interval be-

<sup>1</sup> The first was reported in the "Record of Experiments" entry of June 10, 1842, printed

above. As in that entry, the ordinal appears to be a later addition.

June 14, 1842

tween the flash and the report. The inductive effect was the same in this case as in that of the morning of the 10<sup>th</sup> the needle was magnetized with the end in the spiral a south pole indicating a discharge upwards.

Since the arrangement of the wire and the spiral I have examined more attentively the insulation of the tin roof of the house and I am somewhat surprised that I have been able to get any results. I find that on the rear of the house is a gutter made by a ridge of tin along the lower edge of the roof and to this is soldered at the corners tin conductors, one of which passes along the side of the house to the front and then connects with the front gutter which is again connected with an iron pipe which leads into a stone cistern, so that the roof is in connection with the earth and a large quantity of water through the medium of a tin gutter pipe.

The deflection of the needle was considerably less in this case, than in the last, it was about  $-18^{\circ}$ .<sup>2</sup>

<sup>2</sup> This is an ambiguous reading. Henry might have written " $-10$ ."

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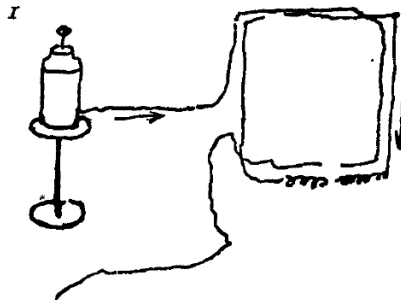
*Henry Papers, Smithsonian Archives*

June 14<sup>th</sup> 1842 Tuesday.

Currents by induction from the machi[ne] return stroke and statical induction

Unfavourable weather for electrical expermts

Attached a wire to the out side of a jar connected with the rectangle page [...].<sup>1</sup> Found an induced current which magnetized all the needles as if by a current in the *plus* direction.



<sup>1</sup> Henry neglected to record the page number. This is a reference to the second piece of apparatus pictured above in the "Record of Experiments" entry of May 28, 1842.