Joseph Henry: A Campus Plan, a House, and a Few Fun Experiments that Changed the World

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Purpose – we all live in Princeton – this is about Princeton – local history that spills over to the national and international scenes – much of Henry’s work was done in Princeton.

Who is Joseph Henry? Why should we care?


Telegraph – another big deal – and it is connected to Princeton – telegraph line between Henry’s lab and his 1st house – first to use the earth as a pathway. Also Henry’s electric motor – another big deal – work started in Albany and continued in Princeton. Also Henry magnetized steel sewing needles as detectors. He also made the strongest magnets.

Henry’s experiment to detect radio using sewing needles – this is interesting but obscure – done in his 2nd house.

Henry and Bell – Henry inspired Bell – led to the Telephone
On October 22, 1746, a Royal Charter was granted to create the College of New Jersey (now Princeton University). Organized by Presbyterian ministers, the College (shown in a 1764 drawing) opened in 1747 in Elizabethtown, NJ, before moving to Newark and then finally to Princeton.
Vice President John Maclean’s House
Prof. Henry Vethake’s House
President James Carnahan’s House

1825 Sketch
<table>
<thead>
<tr>
<th>Who</th>
<th>Joseph Henry</th>
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<tr>
<td>What</td>
<td>Telegraph, Motor, Transformer, encourages A. G. Bell</td>
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</table>
| When   | 1828 – 1846 Electromagnetism  
          | 1846 – 1878 Smithsonian |
| Where  | Albany, Princeton, Washington |
| How    | builds strong electromagnets |
| Why    | - Science (Unit of Induction)  
          | - Information (Telegraph)  
          | - Power (Motor - Transformer) |
Creation of New Knowledge
Education for Leadership

“In the Nation’s Service and in the Service of all Nations”
Henry’s graphic of his telegraph

Henry’s pole reverser at Princeton
• Demo of telegraph
• Before Ohm’s Law
• Weakening effect of a long line
• Boosts voltage to compensate

Henry’s graphic of his telegraph

Henry’s pole reverser at Princeton
1 volt and up to 1 amp

Parallel – greater current

Series – greater voltage

Henry’s graphic of his telegraph

Henry’s pole reverser at Princeton
Henry’s Hand Drawn Map (1833)
Front Campus – with poplar and elm trees

- President Carnahan’s House
- Our House
- Vice President Maclean’s House
- Henry’s Lab and College Kitchen
“The electro-magnetic telegraph was invented by me in Albany in 1830.”

“I think that the first actual line of telegraph using the earth as a conductor was made in the beginning of 1836. A wire was extended across the front campus of the College grounds from the upper story of the Library building to the Philosophical Hall on the opposite side, the ends terminating in two wells. Through this wire signals were sent from time to time from my house to my laboratory.”

- Joseph Henry
Henry’s Lab and College Kitchen

Henry’s House

Library

"A northeast view of Nassau Hall"
1836  Joseph Henry’s Plan of the Campus, 1836, Princeton University Archives

A    Old Nassau
B.B. New Colleges
C.C. Library. Philosophical Hall
D.D. Present sites of Professor’s & Steward’s Houses. These to be removed to G & G
E    Site reserved for Chapel
G.G. Intended sites for Professor’s & Steward’s Houses
I    President’s House
F    Vice President’s House
H.H. Sites of new Society Halls
The following letter was written by myself and the appeal was by Dr Brackenridge. The plan of the improvement of the grounds is also due to me. The buildings were erected during my visit to Europe and I regret that the committee did not strictly adhere to the plan. The buildings should have been put as in the plan on the back line of the college grounds and then space would have been left for building lots between the colleges and the halls.

“The following letter [that is, the text in the lithographed circular] was written by myself and the appeal [was] by Dr Brackenridge. The plan of the improvement of the grounds is also due to me. The buildings were erected during my visit to Europe and I regret that the committee did not strictly adhere to the plan. The buildings should have been put as in the plan on the back line of the college grounds and then space would have been left for building lots between the colleges and the halls”.

Map 1852 - 1859
Map 1852 - 1859
Charles Steadman
Munster N.Y. Sept. 18, 1878 Received
vssent on the Treasurer of the College
for twelve dollars for draving of
Joseph's house

8/12—

Ch. Steadman
Vice President’s House
Top: 44 Washington Road

Bottom: Joseph Henry House
The Historical Society of Princeton presents

A Candlelight Walking Tour of Charles Steadman Houses and Their Neighbors.
• 7 April 1974 • 4-8 p.m.
West side of Alexander Street – all Steadman Houses
36 and 40 Mercer Street – 36 Mercer James Green
40 Mercer – Steadman’s daughters
Henry writes to Silliman

I have lately succeeded in producing motion in a little machine by a power, which I believe has never before been applied in mechanics – by magnetic attraction and repulsion.

The article in its present state can only be considered a philosophical toy, although in the discovery and invention it is not impossible that the same principle, or some modification of it on a more extended scale, may hereafter be applied to some useful purpose.
Early Albany Magnet & Battery

Princeton Motor - 1835

Pole Reversal Motor
Early Albany Magnet & Battery

Princeton Motor - 1835

Pole Reversal Motor

A, the magnet covered with linen, the ends of the wires projecting so as to be soldered to the galvanic element B. C, a cup with dilute acid on a moveable shelf. D, a graduated lever. E, a counterpole. F, a scale for supporting weights; when a small sliding weight on the lever is not used; a second galvanic element is attached to the apparatus so that the poles of the magnet can be instantly reversed, this is omitted in the figure.
Albany Magnet - 1829

21 Pounds - Lifts 750 Pounds

Princeton Motor - 1835

Pole Reversal Motor
Albany Magnet - 1829

21 Pounds - Lifts 750 Pounds

Princeton Magnet - 1833

100 Pounds - Lifts 3500 Pounds
Albany Magnet - 1829

Albany Transformer - 1831

21 Pounds - Lifts 750 Pounds
Mary Henry: Galvanometer made by Henry while in Albany and the one probably used in the great discovery of magneto-electricity
I cannot sit down without again reflecting on the men whose lives have been patterns to the world. There is none more remarkable perhaps than the man of this country, Joseph Henry, who ended his days here. He and Faraday were patterns of scientific investigators. In some degree they went parallel and made similar scientific discoveries. Henry, indeed, preceded Faraday in the great discovery of the electro-magnetic induction between unmoved conductors.
Henry gave the warmest welcome to all practical applications of his discoveries. He sought to make none himself, not because he superciliously despised the applications of science to the public good, but because his own convictions constrained him to go on in pure science; because he felt … it would have taken him from his work to have devoted himself at all to the practical applications of his discoveries.

But what a beautiful trait of character it is to see what a kindly welcome he gave to those who did make the practical applications. He saw what might be done, but deliberately left it to others.
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Henry tells Bell to “Get it” when Bell says he does not have the electrical knowledge necessary to overcome his difficulties. Bell tells parents – I cannot tell you how much these two words have encouraged me.
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The first detection of Radio Waves - 1843
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