5. In February 1872, Edison had borrowed $3,100 from Josiah Reiff to help his brother, Pitt Edison, with the Port Huron and Gratiot Street Railway. Quad. 70:7, p. 704 (TAEM 9:722).

6. About this time the Exchange Telegraph Co. of London stopped buying Edison's instruments and had their printers made in England. Scott 1972, 16.

7. Account.

8. That is, they do not ask a discount of their creditors for paying bills before they are due.

9. See Docs. 368 and 369 for Edison's discussion of his battery experiments. Nothing is known of such an offer by the British government.

10. Edison owed his former partner William Unger this money from the dissolution of their partnership. Some of the notes had been paid off by this time. Doc. 264; receipts and cancelled notes, 72-001, 73-007, DF (TAEM 12:663, 665, 667, 670, 672, 674, 1115-16, 1118).

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Memorandum: Experimental Apparatus

Thomson mirror astatic high .r2
Standard B A Rheo.3
Gaugain tangent Gal4
Coulombs balance Gal.5
Rhumkoff high r Gal.6
Siemens Universal Gal7
2 ordinary gal. astatic
1 " Low r"
1 Plate Glass E Mac8
1 Holz Large 19
Bennetts Electroscope10
1 Plate Condenser on slide11
1 battery 20 Leyden jars12
1 Universal discharger13
1 Dry pile 5000 disks14
1 Voltmeter15
1 Small Rhumkoff coil16
1 Large "
1 Large Nobili Thermo pile17
One Large Electrophosis18
" Small d[ett]o
1 Single wire slide Rheo19
1 Grame Magneto Mac
1 Small ordinary do
1000 cells vial battery
1 Thomson portable Electrometer20
1 Siemens Polzd Relay
2 Large regulating clock

[Newark, Summer 1873?]

June-September 1873
1 Chronograph
1 Varley replenisher
1 Electric Light L Dubocq
1 Proof plane
2 Hughes printer
1 air pump
Pith ball stands.
20 Trays 10° gutta .P. batteries.
100 Large Carbon battery Laws
25 Nitro chromic batteries
6. Trays BP.O. battys
50 E Gravity Batteries
1 Ink recorder Siemens
2 Clockworks for chemical paper with Governors.
1 Standard Condr Equal 5 Knots 1865 Cable.
1 Rheo 1 Million ohms


1. Edison probably drew up this list of desired experimental apparatus following his 1873 trip to Great Britain, where he saw many of these items for the first time.

2. Galvanometers are instruments for measuring electric currents by movement of a needle or coil in a magnetic field; an astatic form is not affected by the earth's magnetic field. Thomson's mirror galvanometer was used for receiving signals on cable telegraphs. Knight 1876–77, s.v. "Galvanometer."

3. That is, a rheostat based on the standard ohm established in the 1860s by a committee of the British Association for the Advancement of Science.

4. The standard tangent galvanometer measured current by the tangent of the needle's deflection. Gaugain wound the current-carrying wire on a conical frame and placed the needle at the cone's apex, creating an "apparatus superior to all others for exact measurement." Prescott 1877, 136–39.


6. A Ruhmkorff galvanometer was designed by Heinrich Ruhmkorff (see TAEB 1:82) or employed his induction coil.


8. That is, a device for producing static electricity by friction. Atkinson 1890, 721–23.


10. An electroscope detects the presence of an electrical charge; Bennett's, which became the standard because of its sensitivity, employed gold leaf. Ibid., 718–19.

11. Perhaps a variable condenser.
12. The Leyden jar (named after the Dutch town where it was invented) was the first condenser. It incorporated a glass bottle with separate internal and external coatings of metal foil; the internal coating touched a conducting rod passed through an insulated stopper. Atkinson 1890, 741–43.

13. That is, a device for discharging condensers, electroscopes, etc. Ibid., 745–46.

14. A dry pile is a battery in which hundreds or thousands of metallically coated disks of paper or leather replace liquid electrolytes. It produces a high voltage but very little current. Ibid., 789.

15. A voltameter determines current strength by passing the current through dilute or pure sulfuric acid and measuring the volume of gas evolved. Prescott 1877, 157–61.

16. That is, an induction coil.

17. The Nobili pile, devised by Leopoldo Nobili, is a thermoelectric battery consisting of bars of bismuth and antimony soldered together. Atkinson 1890, 956.

18. Perhaps an electrophorus, a device invented by Alessandro Volta for producing static electricity by induction. Ibid., 720.

19. Probably an adjustable rheostat.

20. Sir William Thomson devised a delicate electrometer, an instrument to measure electrical charge. Ibid., 749.

21. A small generator of static electricity used to maintain the charge on an electrometer. Atkinson 1910, 814.


23. A proof plane (or “carrier”) transferred static charges in experiments. Atkinson 1910, 696.


25. See TAEB 1:607 n. 4.

26. Possibly a battery, employing carbon as one of the electrodes, such as that used with Samuel Laws’s gold-reporting telegraph.

27. Probably a battery employing nitric acid with bichromate of potash. This type of battery gave a fairly constant current and was considered useful when a strong current was required. Sprague 1875, 108.


29. Possibly Edison’s battery; see TAEB 1:481.

30. The ink-recording telegraph of Werner Siemens and Johann Halske was used extensively in Germany as well as on government telegraph lines in Great Britain and India. Prescott 1877, 489–96.

31. That is, the 1865 Atlantic cable.

LABORATORY NOTEBOOK  Docs. 354–361, 366, and 419

Edison used this notebook extensively during the summer of 1873 to record ideas and information pertaining to automatic, multiple, and cable telegraphy. He made a few further entries