

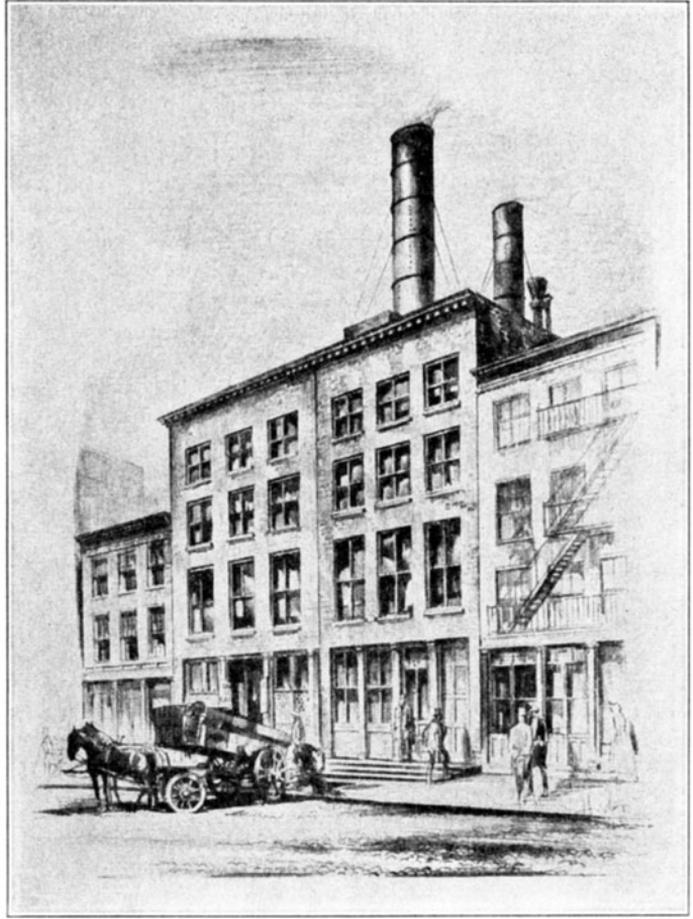
PEARL STREET CENTRAL STATION Doc. 2243

Edison had decided in 1880 to build his first commercial electric lighting system at the center of one of the world's great capital markets, New York's financial district in lower Manhattan. The boundaries of the distribution system he built in 1881 and 1882 encompassed banks, brokerages, offices, and

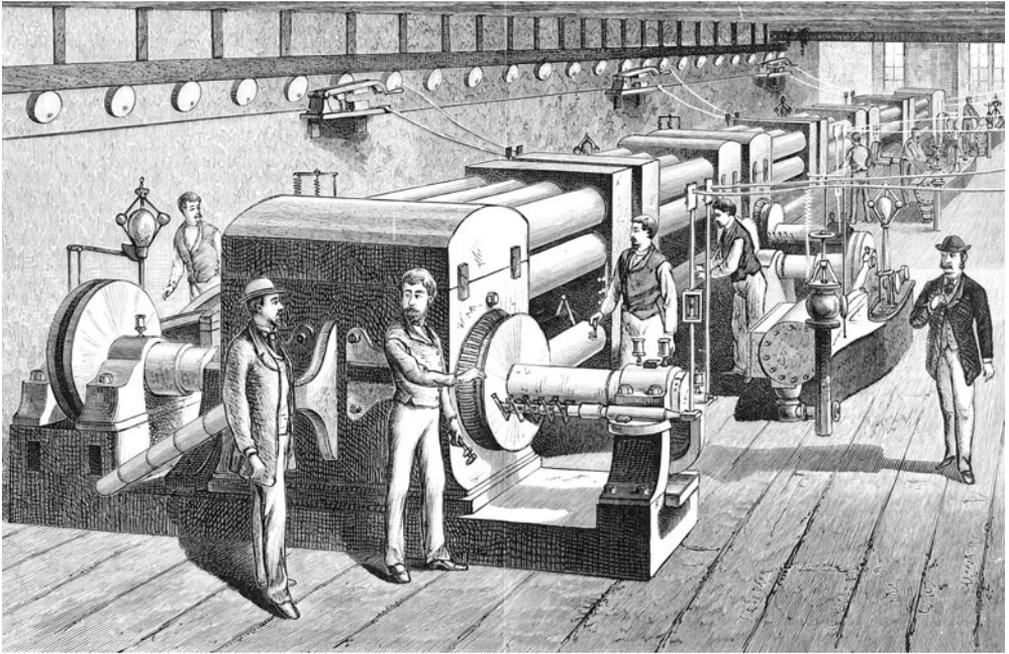
January–March 1882

423

*Exterior of Pearl Street
central station buildings.*



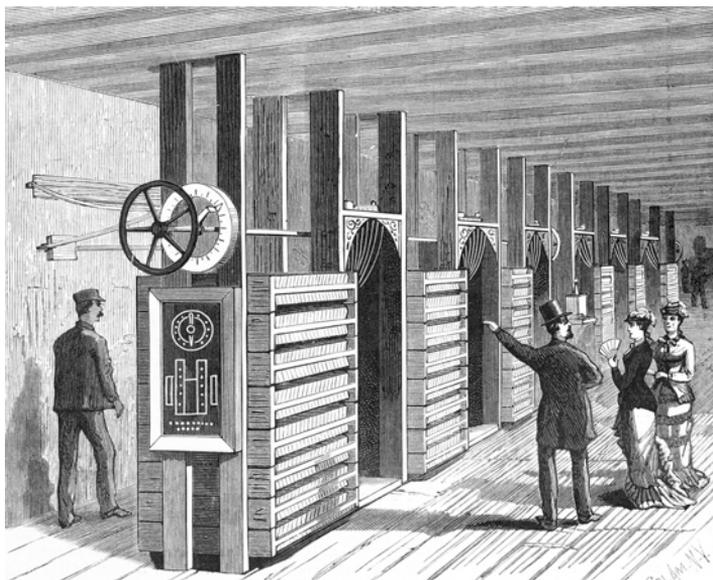
newspaper publishers, just blocks away from other important institutions such as the Western Union Telegraph Company building and City Hall.¹ The central station itself occupied two adjoining buildings on Manhattan's Lower East Side, near the new Brooklyn Bridge. The mechanical and electrical portion of the plant was located in 257 Pearl Street. The companion building at 255 Pearl Street was used for office, storage, and sleeping spaces; two Jumbo dynamos were installed in the basement in the spring of 1884. The combined lot was 50 feet wide and about 100 feet deep. John Lieb later wrote that 257 "was originally erected for commercial purposes, and as it was incapable of sustaining the weight of the engines and dynamos planned to be installed on the second floor, the old flooring was torn out, and a floor of heavy girders supported by stiff columns was substituted. This heavy construction, not unlike the



Dynamo Room.

supporting structure of the elevated railroad, was erected so as to be independent of the building walls, and occupied the full width of the building . . . and about three-quarters of its depth.”² A detailed description of the plant in the 26 August 1882 *Scientific American* reported that the ironwork included “pillars planted on heavy plates resting on three feet of solid concrete.”³ Four 240 horsepower Babcock & Wilcox boilers occupied the basement. Above them on the new iron frame rested the six engine and dynamo assemblies, each unit weighing about thirty tons and rated for 1,200 lamps.⁴ Not shown in the drawing were a traveling crane and hoists running the length of the room immediately above the dynamos. On the third floor, copper wire resistances wound on large wooden frames were used for manual regulation of the dynamo fields. An automatic indicator lighted a red lamp when the voltage rose too high, and a blue lamp when it dropped; the indicator was calibrated every few days against a reflecting galvanometer at the Edison Machine Works. Separate mechanisms, the so-called “cheese-knife” regulators, were available to manage the voltage on individual feeders.⁵ Ashes and coal were transported by a 20 hp. engine to and from a vault under the sidewalk at the front of the building.⁶ The top floor housed a battery of 1,000 lamps used to test dynamos removed from the main circuit for inspection or repair.⁷

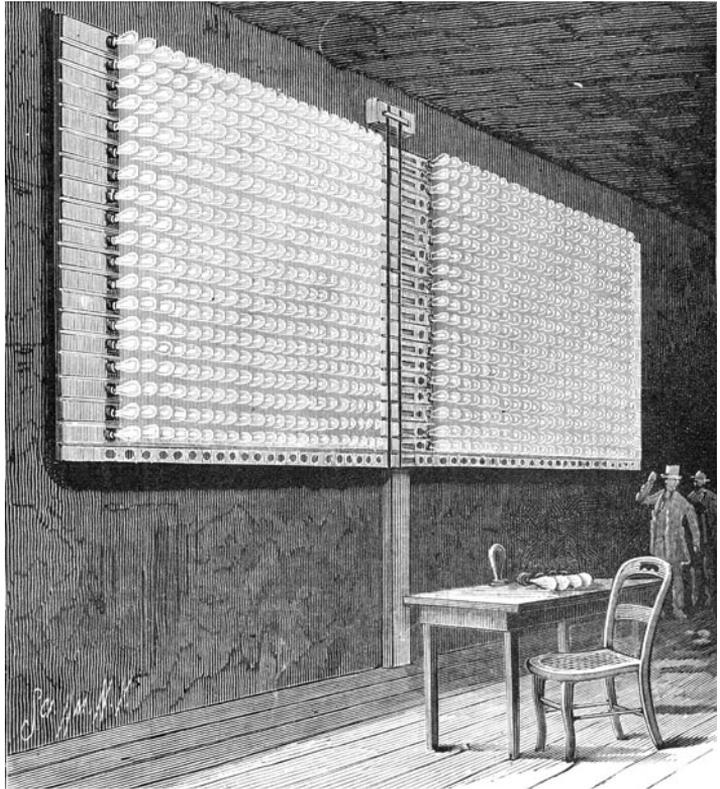
The large coils of copper wire were used to regulate dynamo voltage by manually varying the field resistance.



Construction of the station began in late summer 1881 and the Edison Electric Light Co. published progress reports in its Bulletins over the next year.⁸ On 22 September Edison, John Kreusi, and their work crews began excavating at the corner of Peck Slip and South Street for the network of underground conductors.⁹ Work stopped during the winter because of frozen ground, but resumed in late February 1882. By the first of April the crews had installed about two-thirds of the roughly 80,000 feet of conductors, although they had not yet connected the feeders to the mains. By mid-April 1882 the central station structure (including boilers) was largely complete. The mechanical and electrical equipment was not yet set up, although assembly of the dynamos was well under way at the Edison Machine Works and the finished Porter-Allen engines were on hand. The first engine and generator assembly was tested on 5 July.¹⁰ By late July crews had completed the installation of the underground feeders and mains except for connecting to individual buildings (946 in all). As they did this, a number of buildings were lighted to test the engines and dynamos.¹¹ After the station officially began service on 4 September, it remained in operation until a fire partially destroyed it in January 1890.¹² It was reconstructed and operated until 1894. The buildings were sold soon afterward and no longer exist.¹³

The Edison Electric Illuminating Co. paid about \$300,000 to acquire the Pearl Street properties and construct the central station and distribution system. Administrative expenses, in-

One thousand incandescent lamps installed on the top floor could be used to test individual dynamos off-line.



terest, canvassing, and patent license fees to the Edison Electric Light Co. brought the total cost chargeable to the first district to more than a half million dollars.¹⁴ The company did not charge customers for current until early 1883.¹⁵

1. Edison had the area of his proposed first central station canvassed in 1880 to tabulate potential demand for electric light and power (see Doc. 1995). At that time, there were reportedly about 18,000 gas jets, 90 elevators, and 80 sewing machines there (“The Electric Light in Houses,” *Harpers Weekly* 26 [1882]: 394; in Cat. 1018:11H, Scraps. [TAED SM018039a; TAEM 24:253]; see also Doc. 2338 n. 5). Partial lists of central station customers as of April and October 1883 are in Edison Electric Light Co. Bulletins 17:3 and 20:3 (TAED CB017, CB020; TAEM 96:809, 867); a list of the first year customers itemized by type of business is in Jones 1940, 183–87. For a discussion of Edison’s choice of location see Bazerman 1999, 228–32.

2. Clarke 1904, 50; Lieb 1904, 61; the map in Jehl 1937–41 (1043) represents slightly different depths for the two lots.

3. “The Edison Electric Lighting Station,” *Sci. Am.* 47 (1882): 127–30.

4. Charles Dean’s itemization of the weight of the machine’s components was published in Edison Electric Light Co. Bulletin 10:7–8, 5 June 1882, CR (TAED CB010; TAEM 96:714). In March 1883, Edison

executed an unusually long application for a broad patent on the form and regulation of dynamos and high-speed steam engines in large central stations, emphasizing the economic advantages of his arrangements embodied in the Pearl St. station. He received U.S. Patent 281,351 in July 1883.

5. See Docs. 2269 and 2272.

6. *Edisonia* 1904, 61–73; Clarke 1904, 43; Jehl 1937–41, 1049–53.

7. “The Edison Electric Lighting Station,” *Sci. Am.* 47 (1882): 127, 130. Julius Hornig made an incomplete estimate of the cost to equip the station on 5 January (DF [TAED D8223A; TAEM 60:1020]). More complete cost estimates by Hornig, as well as mechanical and structural specifications of the plant, are in Series 2, Box 23, Folder 1, WJH; see also the Edison Electric Light Co.’s comprehensive 3 August estimate of construction and operation costs of a central station district and plant (DF [TAED D8227ZAT; TAEM 61:525]).

8. See Doc. 2145; Edison Electric Light Co. Bulletins, CR (TAED CBo00; TAEM 96:667).

9. Hammer memorandum, 22 Sept. 1882, Ser. 2, Box 23, Folder 1, WJH. During the winter and spring, the New York Steam Co. built its own underground network of pipes for a central station steam heating system in an area slightly overlapping the Pearl St. district. The simultaneous construction resulted in damage to Edison’s conductors on at least one occasion. “The Distribution of Light and Heat in New York City,” *Sci. Am.* 45 (1881): 319–20; Sherburne Eaton to TAE, 2 June 1882, DF (TAED D8226O; TAEM 61:227; see App. 1.B.18).

10. Edison Electric Light Co. Bulletins 7:1–3, 17 Apr. 1882; 12:2, 27 July 1882; CR (TAED CBo07, CBo12; TAEM 96:692, 728); Martin 1922, 47.

11. Edison Electric Light Co. Bulletins 4:9–10, 24 Feb. 1882; 9:1–2, 15 May 1882; 12:1, 27 July 1882; 13:1, 28 Aug. 1882; all CR (TAED CBo04, CBo09, CBo12, CBo13; TAEM 96:676, 706, 728, 738); see also Doc. 2220 n. 5. During the summer, the company sent a circular letter to every property owner and tenant in the district, advising that connecting each building to the mains would take only a few hours and would be done without charge “subject to the terms of our contract with you, which is, that if you ultimately decide to adopt our light permanently, you will pay the expense of making the connection and the expense heretofore incurred in wiring your building; but if you decide not to adopt our light, no charge whatever is to be made against you.” “Edison’s First District Completed,” *Operator* 13 (1882): 320.

12. *Edisonia* 1904, 73; Jehl 1937–41, 1069–72.

13. Jehl 1937–41, 1080; Lieb 1904, 73.

14. See Doc. 2289.

15. Jones 1940, 209, 212.