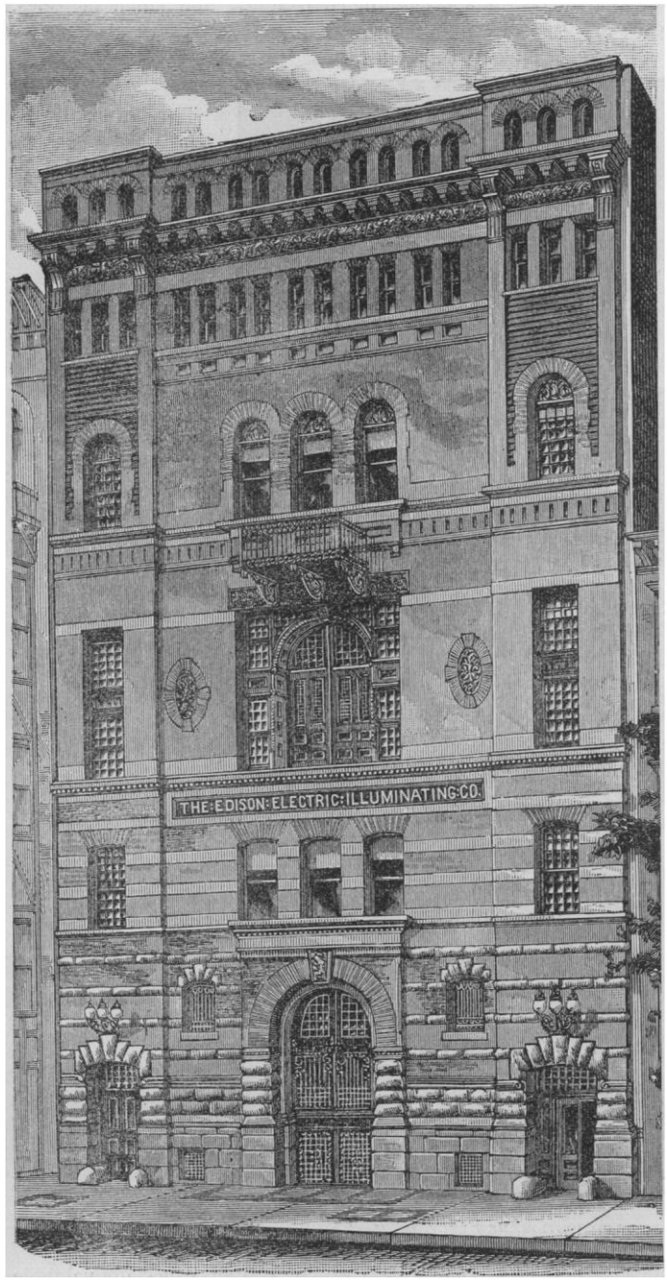
THE EDISON LIGHT FOR HOUSES, STORES, THEATRES, ETC.

THERE is probably no new industry of equal magnitude that is comparatively so little known to the general public, even in this city, as that of supplying the Edison incandescent light from central stations for interior illumination. Six years ago a small station was started at 255 and 257 Pearl Street. This station has been running continuously, night and day, since Sept. 4, 1882, and is now supplying some 15,000 lamps through a network of 56 miles



NEW EDISON CENTRAL STATION, W. 26TH STREET, NEW YORK.

of underground conductors. It was freely predicted that mechanical and electrical difficulties would constitute a barrier to its success; but, these apparently insurmountable obstacles having been overcome by the indomitable perseverance and peerless skill of Mr. Edison, the next prognostication was financial failure. In spite of these dire forebodings, the enterprise was long ago established upon a successful paying commercial basis, as a result of which the capitalists who were pioneers in the business have recently supplied the capital with which to construct two immense stations for supplying residences, stores, theatres, hotels, etc., in the upper portion of the city.

About 165 miles of conductors were laid under ground, covering a district from 18th to 59th Streets, and from Sixth to Fourth Avenues; and two substantial buildings were erected, — one on 39th Street, near Broadway; and one on 26th Street, near Sixth Avenue. These stations are about completed, and ready to furnish lights, and will have an ultimate capacity of 50,000 lamps each. This great luxury, so long enjoyed by many business-men in their down-town offices, will now be within reach of their uptown homes, and our citizens will welcome a light which does not heat or vitiate the atmosphere by burning up the oxygen; does not destroy or deteriorate decorations, pictures, books, etc.; obviates risk of fire; is as conducive to the preservation of eyesight as the natural light of the sun; and is capable of innumerable applications for ornamental and decorative purposes, as well as for the supplying of power for pumps, elevators, ventilating-fans, sewing-machines. For these and many other purposes the electric current will be ever present, night and day, and will be furnished and charged for by a meter the accuracy of which has been proved by six years of practical use, and at prices that will place one of the greatest luxuries of modern times within reach of all.

HADFIELD'S MANGANESE STEEL.[1]

THE most notable contribution to the metallurgy of manganese and its alloys made in recent years is the paper read before the Institution of Civil Engineers of Great Britain by Mr. Robert A. Hadfield, of Hadfield's Steel Foundry Company, Sheffield, on Manganese steel, the invention of his father, but which the author of the paper has done so much to perfect. This steel has been described in previous reports, but Mr. Hadfield's paper sets forth so clearly some of the very peculiar properties that manganese in large quantities imparts to steel, that, with his permission, we quote from it at considerable length.

The most noticeable characteristics of the Hadfield manganese steel are its peculiar hardness, combined with great toughness, the effect of water-quenching upon the steel, and its electrical properties.

Peculiar Hardness.

It is difficult to accurately describe its peculiar hardness, because all the specimens are exceedingly hard; in fact, it is scarcely possible to machine any of them on a practical scale, yet such hardness varies considerably in degree, being most intense in the cast material, containing 5 to 6 per cent manganese, which no tool will face or touch. A gradual decrease is noted then, and, when about 10 per cent is reached, the softest condition occurs. Then an increase again takes place, and at 22 per cent it is very hard, still not so much so as in the 5 per cent. After passing 22 per cent, the cause of hardness becomes more complicated, owing to the presence of more carbon, 2 per cent and upwards; in fact, the material begins to partake more of the nature of cast iron, though as to strength, when compared with the latter, specimen No. 225 (carbon, 2 per cent; manganese, 23.5 per cent) had a transverse strength of 34 tons against 10 tons for cast iron.

The 8 to 20 per cent material can be machined, although only with the utmost difficulty, as will be seen from the following example. The test-bar No. 22 B (manganese, 14 per cent), which elongated 44.5 per cent without fracture and had a tensile strength of 67 tons, was put under a double-geared 18-inch drill. Over an hour was occupied in drilling one hole one half-inch in diameter by three-fourths inch deep; and even to do this it was requisite to run at the lowest speed, or the edge of the drill would have given way. During this time fifteen to twenty holes of the same size could have been easily drilled in mild steel. Similar results from specimens sent to different engineering firms in Sheffield and elsewhere confirm this test, yet this specimen could be indented by an ordinary hand-hammer; so that, whilst so hard, it may be said to possess "a special kind of softness." Although, when being turned, it appears harder than chilled iron, its softness is particularly noticeable when testing the material for compression. Specimens of 10-per-cent manganese steel 1 inch long by .79 inch in diameter,

[1] Extract from a paper on 'Manganese,' by Joseph D. Weeks, to appear in the forthcoming volume of 'Mineral Resources of the United States,' published by the United States Geological Survey, edited by Dr. W. T. Day.