

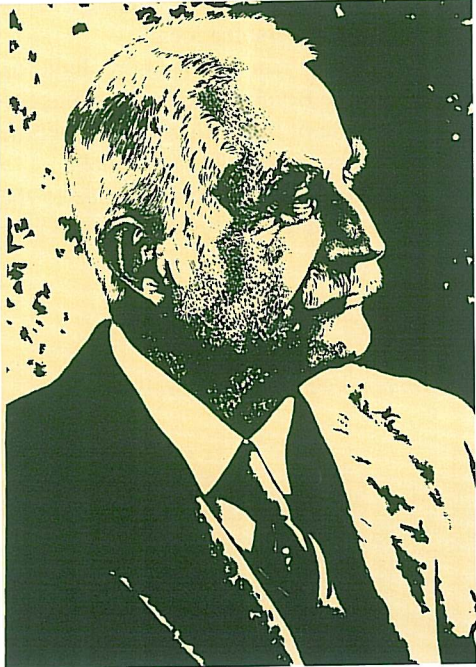
# Glimpses of the Past

by George Toms

No. 16

Brush Origins

The threads of Brush history reach back to quite different origins, and on this occasion we look at the electrical origins.



Charles Francis Brush.

Charles Francis Brush was born on 17th March 1849 at Walnut Hills Farm, Euclid, Ohio, in the U.S.A. He was the youngest of nine children and during his early boyhood he was possessed with an insatiable appetite for reading scientific literature. Keen, but passive, interest in electrical matters eventually evolved into experimentation with electric arc lighting.

He attended public schools in nearby Cleveland, latterly Cleveland High School from 1863 until 1867. In his early high school days he made many pieces of electrical equipment and chemistry became his chief interest. It was in 1865 that he made his first electric arc light with a lamp and battery of his own construction. He graduated from Cleveland High School with honours and was the first in his class.

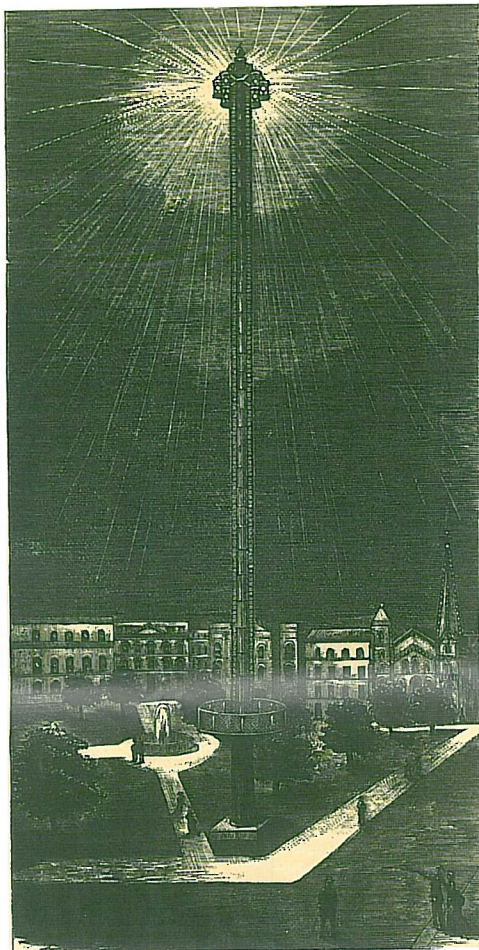
Next he attended the University of Michigan, graduating in 1869 with a degree of Mining Engineer, one year in advance of the rest of his class. He returned to Cleveland and spent the next four years working as a chemist. During these years he continued his experimental work, producing a first-rate induction coil of unique design. The Gramme dynamo made its appearance at this time in Paris and it deeply interested Brush, who saw the potential for industrial application.

He married Mary Ellen Morris in 1875 and they later raised three children. That same year he managed to obtain his first worthwhile job, with the Telegraph Supply Company in Cleveland. He gained access to the foundry and machine shop, which was given grudgingly for his experiments. It was here that parts for his first dynamo, designed in 1876, were made. He shipped the parts to his old country home where he had his little workshop and wound the armature and field magnets during his vacation there, and completed the assembly of the dynamo. It was taken to the workshops of the telegraph company, where steam power was available, and tested. Eventually the tests proved the initial success of the equipment and with encouraging prospects an agreement was reached with the company for the commercial exploitation of the dynamo and any other associated equipment Brush developed.

The company began manufacture of the dynamo and arc lamps and by April 1877 they were patented, followed shortly after by patents for parts of arc lamps. During 1877 and 1878 two of these dynamos were

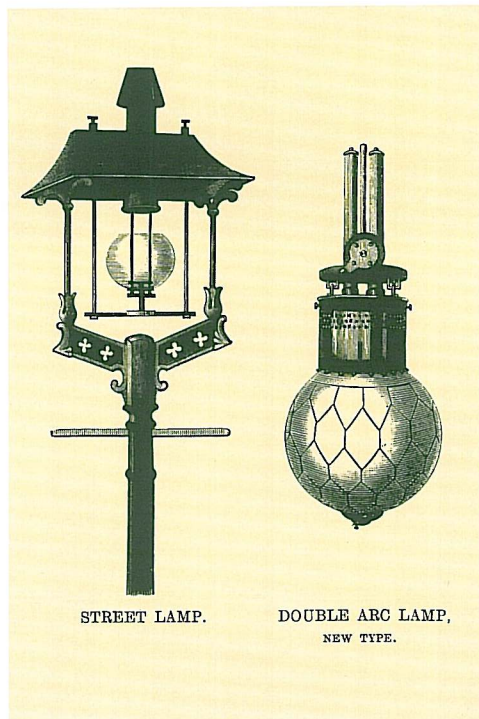
exhibited and tested at the Franklin Institute in Philadelphia, proving superior to other makes, (see also, page 2). The first sales followed and applications and public use gained in popularity.

Concurrent with the commercial exploitation in the U.S.A., attempts were made to establish outlets in other countries, including Great Britain. The Brush system made its debut in the latter country in 1878 when Brush filed a provisional patent. Development of the Brush lighting equipment was continuous and many difficulties were encountered, both in application and operation. Growth of the electric lighting business was very rapid and handsome profits were made.



An exaggerated impression of an electric light tower in the U.S.A.

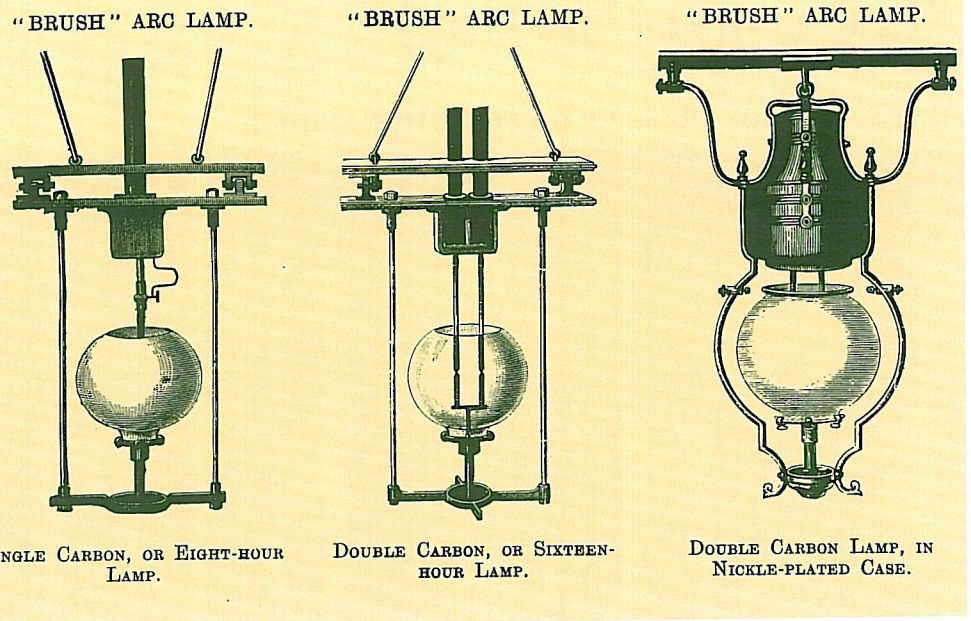
Two examples of arc lights.



STREET LAMP.

DOUBLE ARC LAMP, NEW TYPE.

During 1879 Brush sent his friend and representative, Thomas J. Montgomery, to Britain to negotiate with financial people in London for the exploitation of his patents. Success was not immediate, but on 12th December 1879 the Anglo-American



Three varieties of Brush arc lamps in the 1880s.

Electric Light Corporation was formed, with offices at 74 Hatton Garden, London EC. On 24th March the following year a new company was registered as the **Anglo-American Brush Electric Light Corporation Ltd** with a capital of £800,000. It was formed to take over the previous company and to extend its operations and had offices at 112 Belvedere Road, Lambeth, London SE1. These offices were combined on the same site as the main works, on the south bank of the River Thames. The works had been occupied by Western & Co. (makers of grinding mills, drills and miscellaneous equipment for quarries and mines) and was known as the Victoria Works, a name continued by the Brush company.

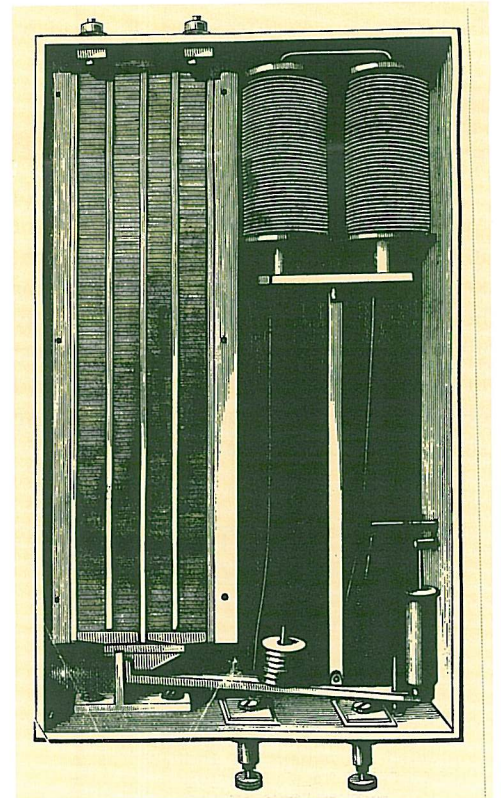
It was a cramped site, but sufficed for a number of years in conjunction with other premises elsewhere. The main building had three floors, each with an area of 4,700 square feet, and contained 85 lathes, 35 drills and 12 milling machines in its inventory of equipment. Thomas J. Montgomery was one of the directors and it was he who maintained the link with the U.S.A. The new lights were exhibited in London in 1880 and some of the earliest applications were in public places in the capital during the same year. The Admiralty also ordered Brush lighting for warships, the first such installation being in HMS Inflexible.

For a time development followed that initiated in the U.S.A., but soon competent engineers in Britain directed a separate course. The various Brush companies in the U.S.A. continued until the 1890s, when great amalgamations within the electrical industry took place.

The 1880s were times of competition and development and Anglo-American Brush, amid success, faced patent litigation, fierce opposition from the gas lighting industry and a new threat from incandescent electric lighting. The latter had distinct advantages over arc lighting, particularly for domestic purposes, and indeed supplanted the latter completely over the next few decades.

The 1880s also saw company fortunes swing from a 'boom' to 'slump', but guided by an influx of fresh management and engineers, there followed a resurgence. By 1889 there was a need for new and larger premises, and a new company; the old works was much too cramped and expensive and patent litigation, conducted both ways, was proving too costly whether justified or not. It was felt that there was a need to enter the electric tramcar business and thereby extend the use of Brush motors to traction purposes.

In the same year The Falcon Engine & Car Works was acquired and by amalgamation of companies the **Brush Electrical Engineering Company Ltd** was formed. A gradual transfer of operations from London to the Falcon Works in Loughborough commenced. The rest, it is said, is history.



Automatic regulator in the 1880s.

Brush dynamo machine c.1890.

