

motor omnibuses Falcon Engine & Car Works Ltd tramcars coachworks

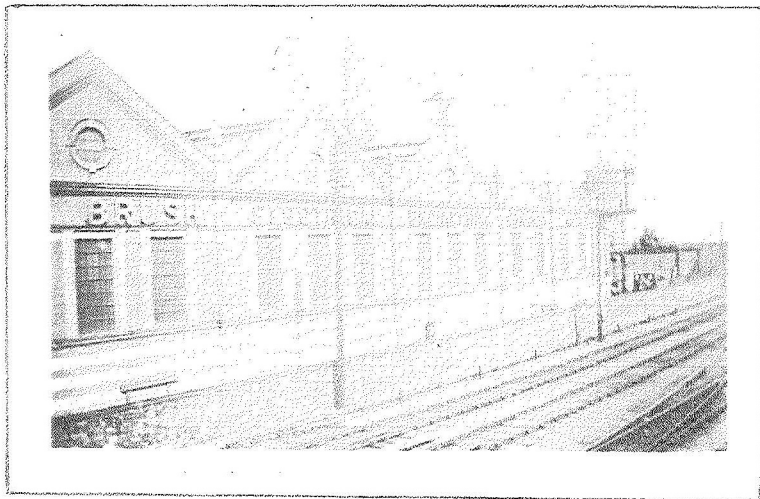
horse drawn tramcars

steam engines

Brush Electrical Machines Ltd

Rotating Machines Division

A brief history of **BRUSH** by GEORGE TOMS



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Published 1996 by REPRINT of Loughborough

diesel engines

turbines

diesel electric locomotives

Brush Transformers Ltd Brush Traction Ltd

Brush Switchgear Ltd

Hawker Siddeley Group

Brush Fusegear Ltd

INTRODUCTION

The history of Brush is extremely involved and eventful and not confined to Loughborough, so what follows cannot pretend to be more than an outline. It is hoped that in a modest way it will serve as an introduction to that history by offering some of the things that have marked the past course of the various Brush companies and their predecessors.

From humble beginnings in Loughborough and the USA, two quite diverse businesses plied their trades for some years before combining in 1889 to establish the Brush name in Loughborough. With it came a whole host of activities, to be developed and added to over the years and far too numerous to include but a few within these pages.

The Brush, as it has been affectionately known for many years, has provided a living for many people in and around Loughborough and the town is that much better off for it. With the limited availability of official Brush records during recent years and the continued emergence of official photographs the time is ripe to offer an history, albeit in limited form.

Without the cooperation of the Brush companies in recent years such as an attempt would have been difficult, though not impossible. It was Bill Petric during the late 1980s onwards, as managing director of Brush Electrical Machines Ltd, who encouraged retention of historical matter and kindly made it available for research. Your author therefore acknowledges this, and the kind permission of his successor Mr. David Wells to publish, with grateful thanks.

George Toms, Loughborough, November 1996.

George Toms.

COVER
General And V. Design



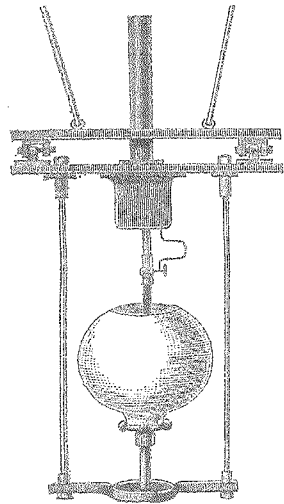
Charles Francis Brush 1849-1929

The American genius Charles Francis Brush was born in Cleveland, Ohio in 1849. He was well educated and an unusually keen student, displaying great talent in various subjects associated with physics and acquiring a particularly keen interest in electrical apparatus. He designed, developed and built his own equipment at home, but eventually had to lay this aside to earn a living. During his time in the Telegraph Company he was grudgingly afforded facilities to further develop his ideas. Such was the success of his equipment, electric dynamos, associated lamps and metal plating sets, that the company soon started to manufacture his inventions for commercial purposes. This was in the late 1870s.

Soon the name of the firm was changed to include the word Brush and Charles Francis Brush patents were exploited from 1878. Indeed it was not only in the USA but elsewhere that his exploitation occurred. In 1879 a company was set up in London, the Anglo-American Electric Light Company. It was short lived due to the need to reform to cater for a rapidly changing situation in the infant electric lighting industry. The title remained unchanged, but only for a short time as reformation again took place and the Anglo-American Brush Electric Light Corporation was born in 1880. The head office and main works in London were soon established in Belvedere Road, Lambeth. This was the Victoria Works, the title being inherited from the previous lessees. Subsidiary works were already in existence not far away in Portpool Road and Borough Road.

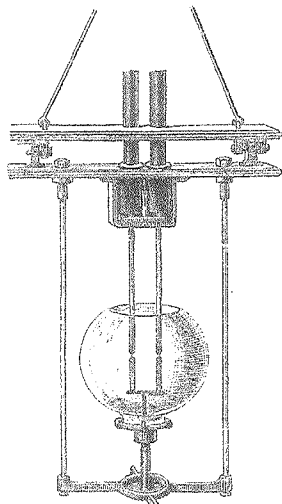
Brush arc lamps of the 1880s and 1890s

"BRUSH" ARC LAMP.



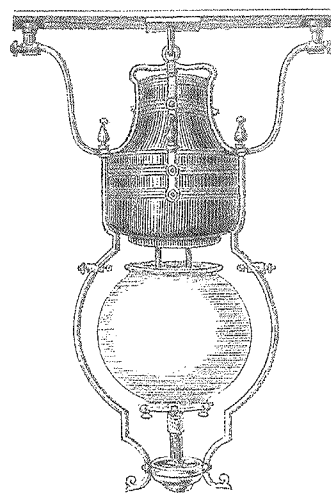
SINGLE CARBON, OR EIGHT-HOUR LAMP.

"BRUSH" ARC LAMP.



DOUBLE CARBON, OR SIXTEEN-HOUR LAMP.

"BRUSH" ARC LAMP.



DOUBLE CARBON LAMP, IN NICKLE-PLATED CASE.

The early years were hectic and highly profitable, though often somewhat inefficient. Government legislation of the electric supply industry in 1882 severely limited progress to the point of causing losses within that industry. Frequent litigation also arose from allegations of infringements of patents.

By the mid 1880s relaxation of parts of the 1882 Act allowed steady progress, but for the Brush company in London the restrictions of operating in the Capital became apparent. In 1889 the company sought a country site with almost unlimited room for expansion. Because its articles of association did not include engineering in its strictest sense it was desirous to amalgamate with an engineering firm and reform yet again.

The site chosen was the Falcon Works, near the Midland Railway station in Loughborough, Leicestershire. At the time it was occupied by the Falcon Engine & Car Works Ltd., a company established in 1882 out of the ashes of the Hughes' Locomotive & Tramway Engine Works Ltd.

The origins of the Falcon Works date to circa 1853 on the Derby Road when the Falcon Engine Works was established on a small site between that road and the canal. Within two years a young engineer from London arrived at the works and appears to have been groomed for taking over the business, for indeed that is exactly what he did before the end of the decade. This man was Henry Hughes, 1834-1896.

He took on a partner, William March, but the partnership was short-lived. Circa 1861/2, following some years producing various steam engines and dealing in timber, the building of steam locomotives was commenced and in late 1863 a new site had been acquired close to Loughborough Midland Railway station. First to be moved was the timber yard, then as new buildings were erected the engineering side was transferred. His partner at this time was Hiram Coltman, his onetime foreman. The new Falcon Works site was about seven acres and had plenty of room for expansion. In 1867 the works were described as complete, meaning sufficient for the current level of business and financial situation.

Business prospered for some years and small locomotives were supplied to many parts of the world. Then in 1875/6 moves to steam tramway engine business were made, a shrewd move despite laws limiting mechanical traction on street tramways. A combination of requiring more capital and Hiram Coltman's wish to pull out of the partnership in order to set up a business in his own right saw the business of Henry Hughes & Co. sold and a new company, Hughes Locomotive & Tramway Engine Works, formed in 1877. Henry Hughes was retained as Works Manager, but various financial problems combined to bring him and the company into difficulties. These were not finally resolved until 1882, when the aforementioned Falcon company was formed.

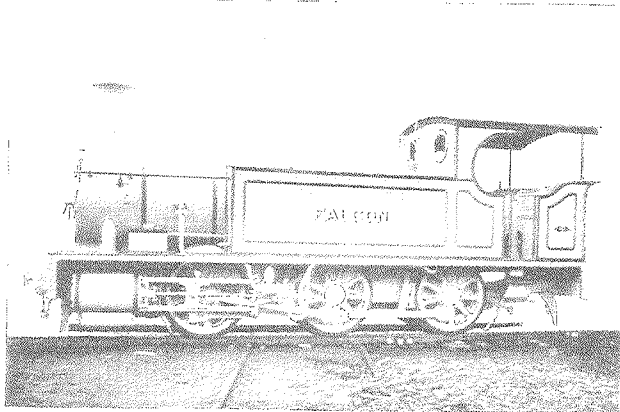
By the time Brush came onto the scene in Loughborough in 1889 not only were locomotives being produced but also horsedrawn and steam-hauled tramcars. A new line was that on horse omnibuses. The wish to enter the infant electric tramcar business was keen by 1889.

The Brush Electrical Engineering Company, Ltd.

FALCON ENGINE & CAR WORKS,

TELEGRAPH ADDRESS:
FALCON, LOUGHBOROUGH

LOUGHBOROUGH, LEICESTERSHIRE.



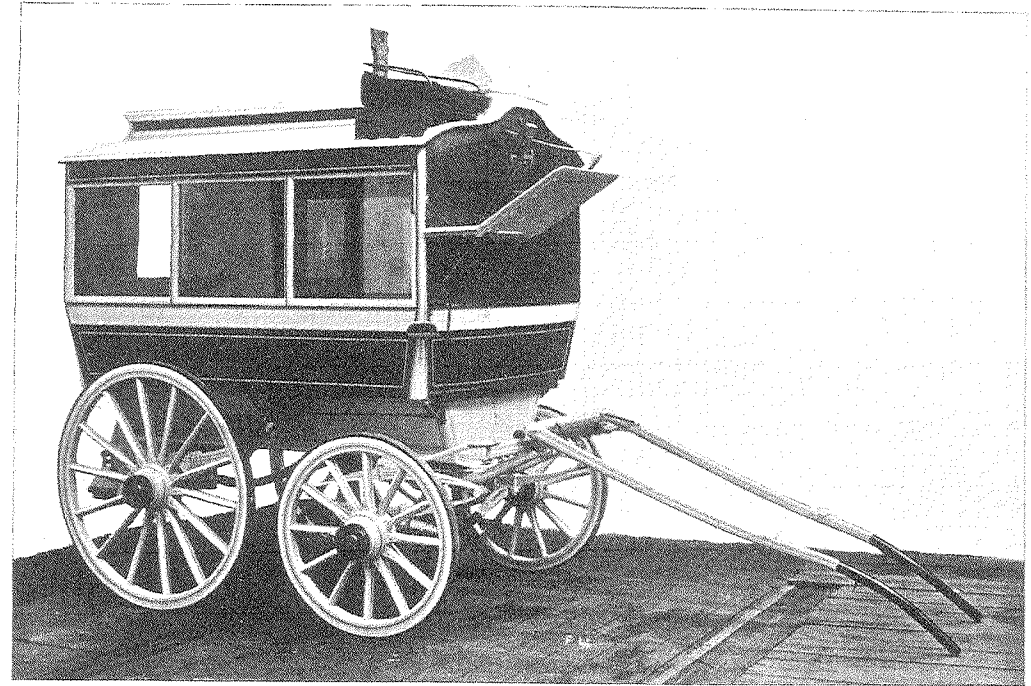
CLASS B, Nos. 6, 7, 8, 9, 10 & 11.

SIX-WHEEL COUPLED SIDE-TANK LOCOMOTIVES.

These Engines are built with cylinders 11 inches to 16 inches diameter and for broad or narrow gauge lines. They are very evenly balanced the weight being carefully distributed over all three axles and are suitable for heavy gradients and easy curves.

11, ABINGDON ROAD, VICTORIA STREET, LONDON, E.C.

A Falcon locomotive of the 1880s in later Brush publicity handout



ONE-HORSE OMNIBUS.

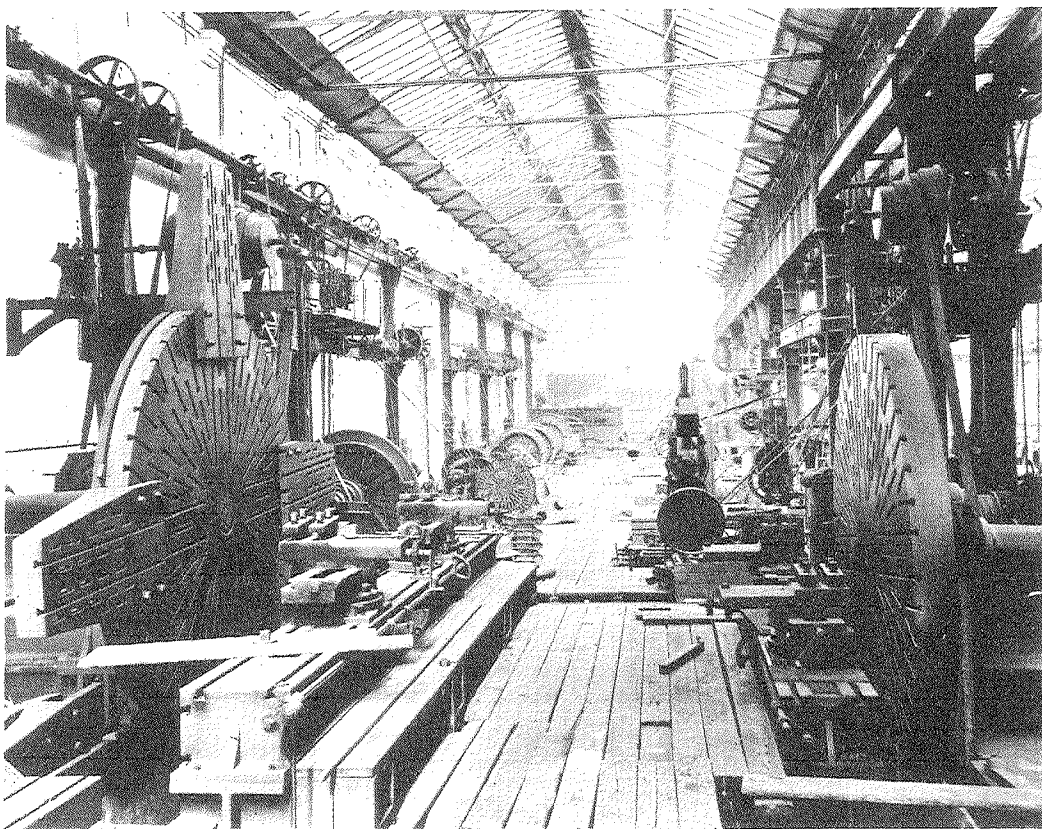
Code Word—"MOTOLITA."

Falcon horse-drawn omnibus of the 1880s

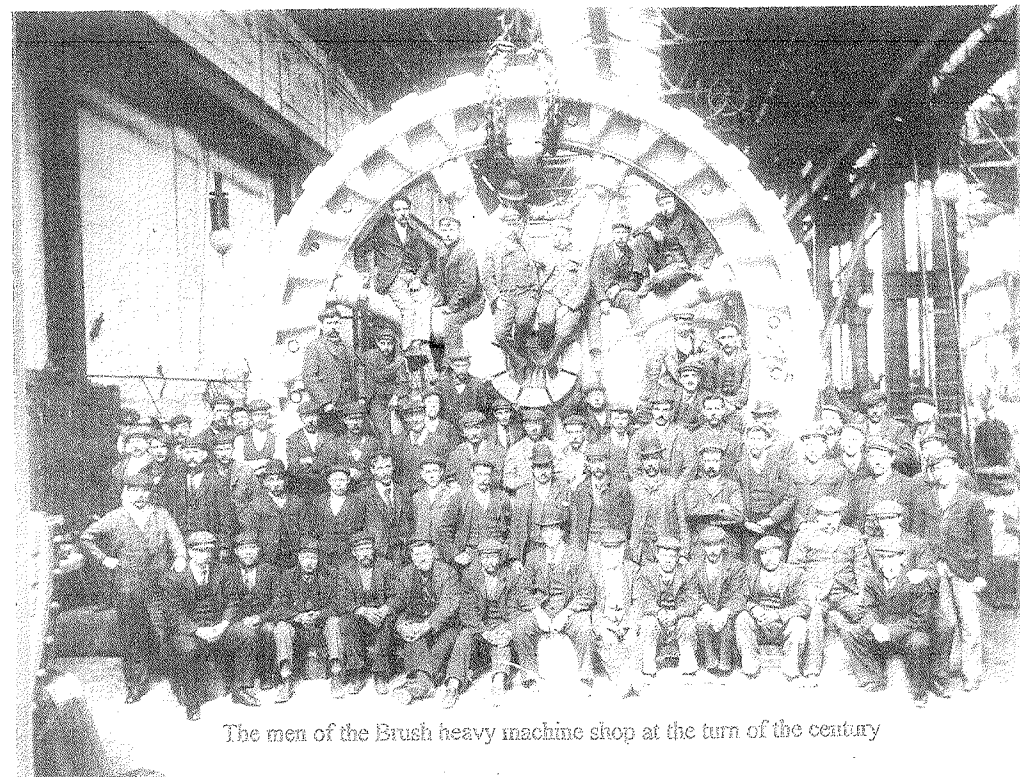
Equally keen was Brush desire to enter the tramcar business, to adapt its electric products to the new mode of urban transport. There were other reasons of course, including the wish to use Falcon steam engines to drive Brush electrical machines.

New buildings were erected at the Falcon Works in 1889/90 for producing heavy machines, not possible at the Victoria Works, indeed there was a

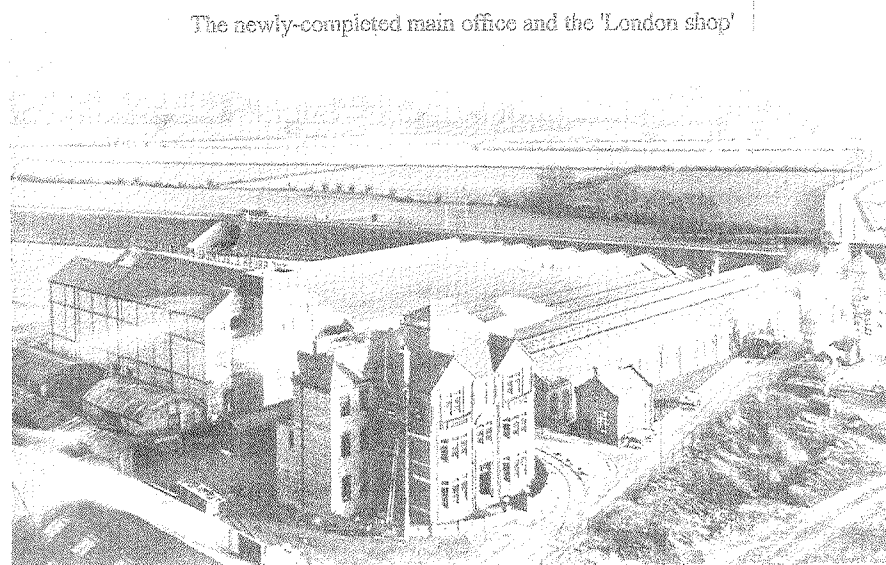
gradual transfer of other production from London to Loughborough during the first half of the 1890s. By the turn of the century there had been great expansion at the Falcon works, seeing many of the smaller buildings of the 1860s disappear and replaced by more modern shops. There was a brand new and stylish office and extensive tramcar shops were in the course of erection. By 1905 Brush was at the forefront of electric tramcar production. Locomotive production, however, was minimal due to severe competition from abroad, notably the USA. Attempts to diversify further saw railway carriages, electrical railway rolling stock, steel wagons, railcars, motor cars and motor omnibuses being produced. The ever-developing electrical machines side continued apace, the machines differing considerably from those in the 1830s. Brush engineers in Britain since the mid 1880s had outstripped the original ideas of Charles Francis Brush, who incidentally, had transferred his talents to other fields during the 1890s.



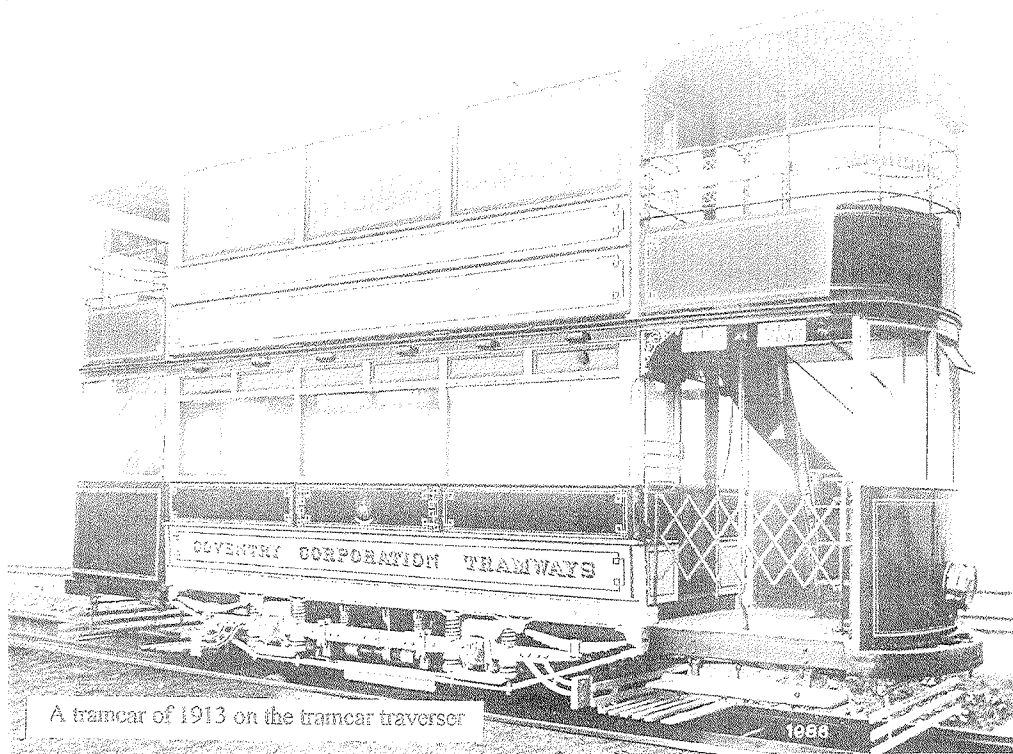
A view of the Brush heavy machine shop of c1905, later 18 shop



The men of the Brush heavy machine shop at the turn of the century



The newly-completed main office and the 'London shop'



A tramcar of 1913 on the tramcar traverser

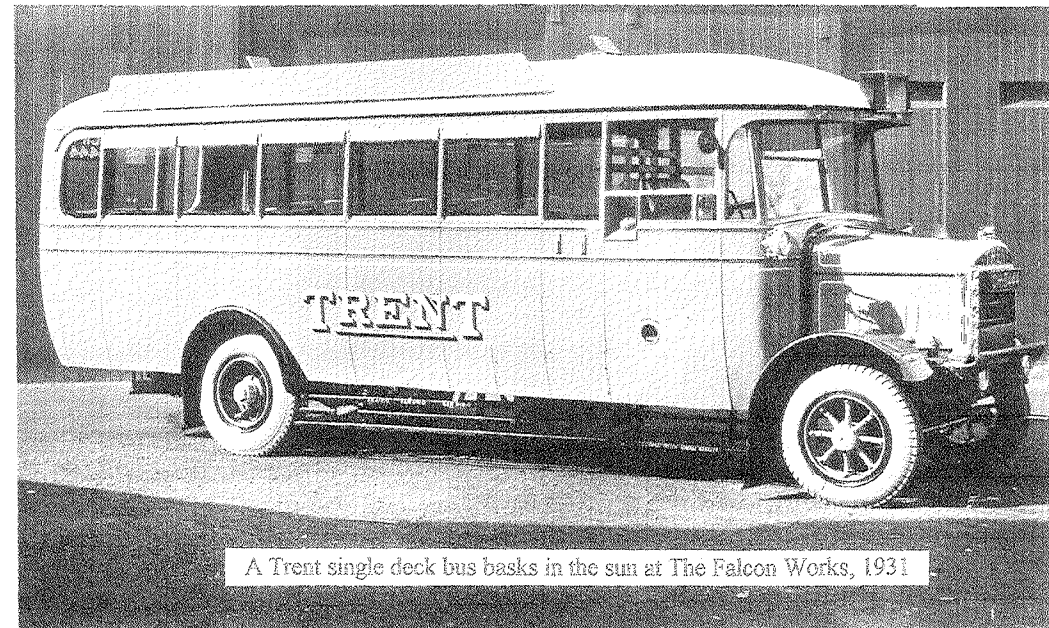


A single deck motor omnibus of 1914

From 1906 to the outbreak of the Great War in 1914 the Brush Electrical Engineering Company Ltd witnessed varying fortunes and saw the introduction and development of steam turbines as a means of driving electrical machines, an alternative to reciprocating steam engines.

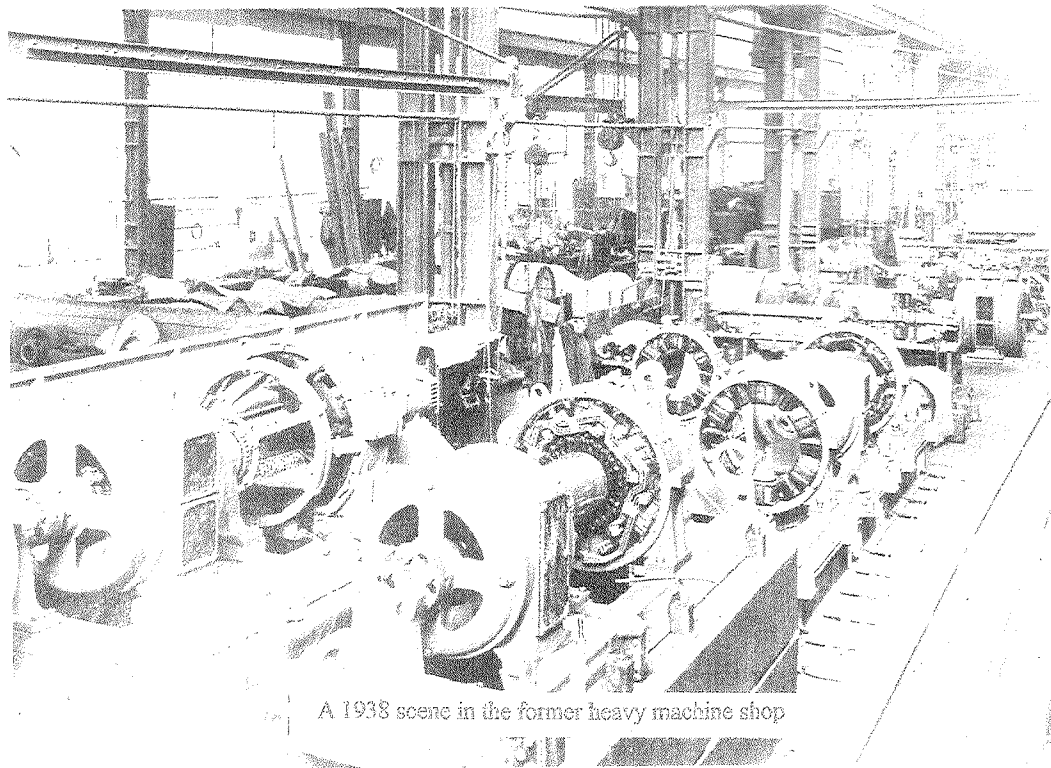
The war changed everything. It saw a gradual changeover to a war footing and all this entailed, including extensive use of female labour as men went into the armed forces. Production of tramcars and omnibus bodies were curtailed, though not stopped as there was still a requirement. Aircraft production was introduced and special narrow gauge rolling stock for the networks of railways behind the war front and home armaments factories was built.

Following the armistice of November 1918 the Government cancelled or cut back many orders and Brush moved quickly to return to peacetime production.



A Trent single deck bus basks in the sun at The Falcon Works, 1931

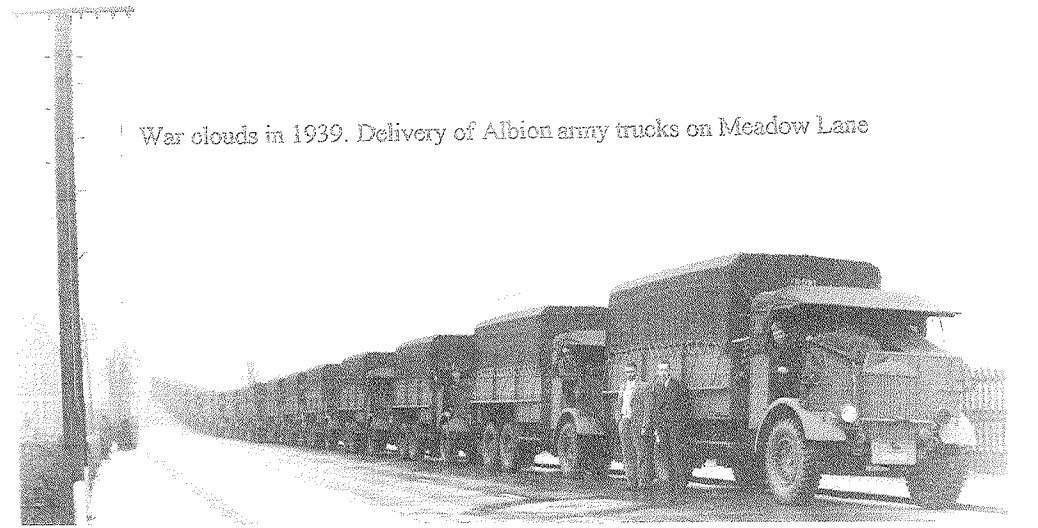
There followed a boom period as customers sought to overcome the problems caused by the war, and for several years the tramcar business was quite brisk. It did not last, and by the end of the 1920s orders for tramcars were few. Conversely, motor omnibuses were produced in ever-increasing numbers and Brush supplied many bodies for mainly home customers. The turbine business made rapid gains after 1919 and a new and imposing shop was built in 1920/1 to cater for it.



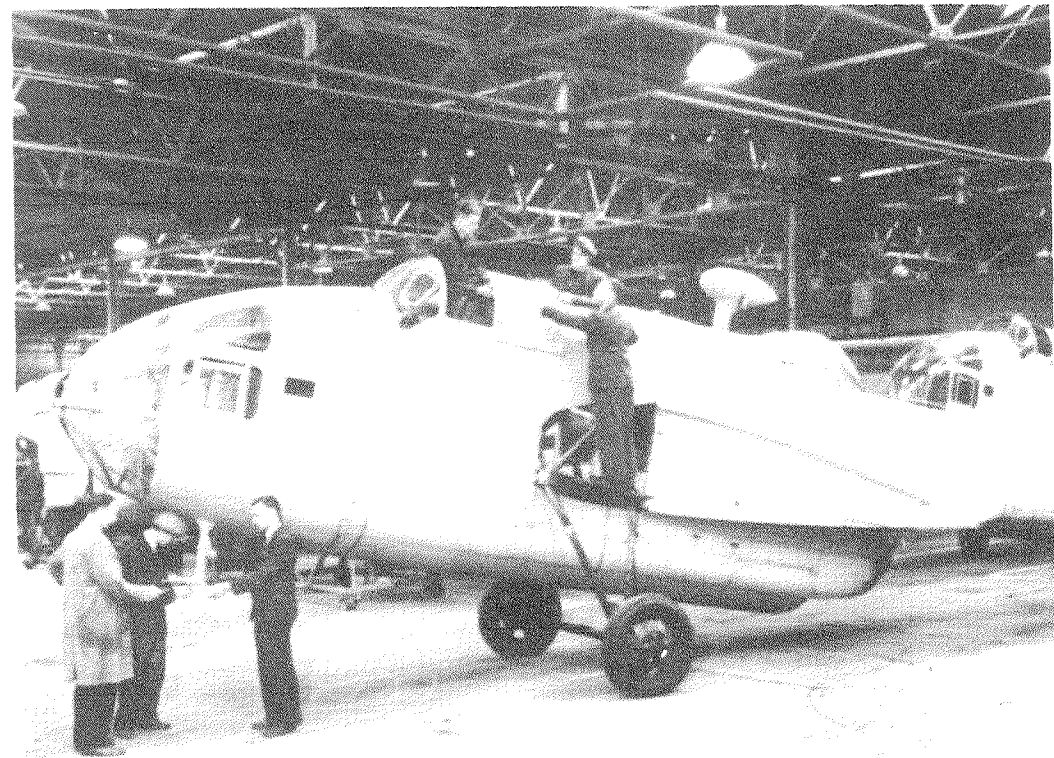
A 1938 scene in the former heavy machine shop

Recession marked the end of the 1920s and the first few years of the 1930s and Brush found itself in an ever-declining financial situation, having used its reserves accumulated during better years. The coachworks was successful in its bus body building, this activity almost totally replacing tramcar building.

During the late 1930s the company was restructured and refinanced, and with the dynamic personality and financial connections of Alan P. Good new work was introduced to the Falcon Works usually from firms acquired or controlled by him. For example, Brush became more heavily involved with the production of diesel engines when Pettters moved from Yeovil to Loughborough in 1939 to supplement the modest resident production. Following the outbreak of war later that year the production lines were busier then ever and generating sets for the war effort numbered thousands. Likewise, the coachworks busied itself with war production and limited bus production. Added to this was the repair and construction of aircraft, the latter being that of De Havilland Dominies. During the war two other diesel engine manufacturers were acquired, J & H McLaren of Leeds and Mirrieles, Bickerton & Day of Stockport. They did not move to Loughborough.



War clouds in 1939. Delivery of Albion army trucks on Meadow Lane



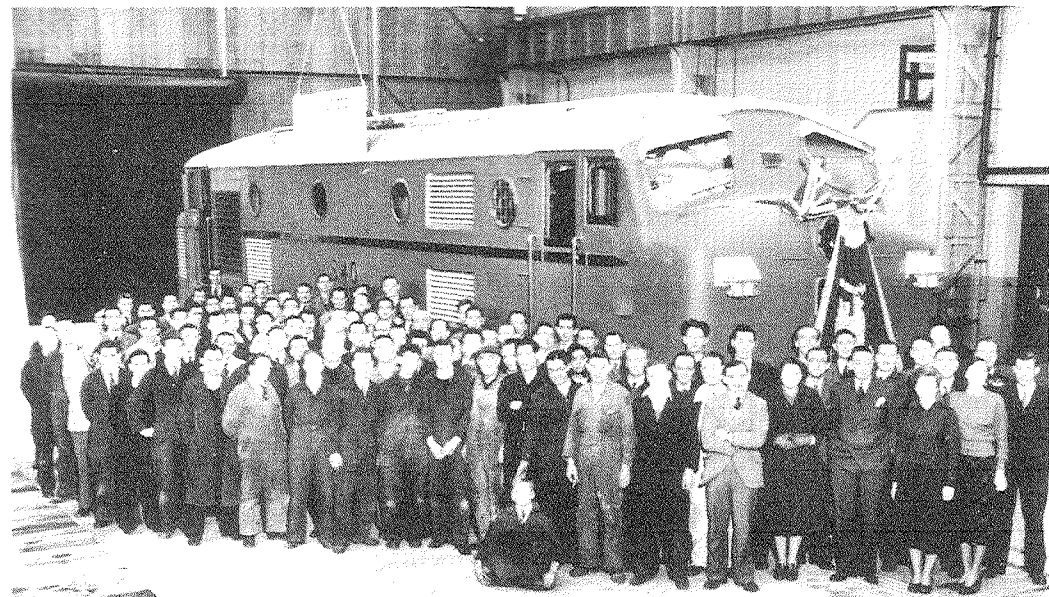
Hampden bombers were repaired by Brush during the 1939-45 war



The former tramcar shops in 1946. Note the elevated Rempstone footpath

After the cessation of hostilities in 1945 the Brush group of companies, as it had become, entered other fields. Diesel electric locomotives and battery electric vehicles were just two of them. Further companies joined the Group in 1950 when the National Gas & Oil Engine Co. Ltd, Hopkinson Electric Co. Ltd and the Vivian Diesels & Munitions Co. Ltd of Canada were taken over. Steam turbines continued to be manufactured, albeit under some technical difficulty due to ever increasing outputs.

The period of the early 1950s was one of great expansion, partly caused by the Korean war. Despite this, the coachworks business was sold to the nearby Loughborough coachbuilders Willowbrook. It was replaced by an electrical switchgear division. Diesel electric locomotive production, including main line examples, was developed in conjunction with W. G. Bagnall of Stafford under the Brush Bagnall Traction title. Following a boom period the Brush Group experienced financial difficulties which hampered progress, investment and development. Brush Traction Ltd was born out of the Brush Bagnall arrangement and the building of the first Brush Type 2 locomotives as part of the British Railways modernisation plan heralded a new era. To develop this and other aspects required funding, something which was in an acute shortage and in 1957 the Brush Group was acquired by the Hawker Siddeley Group in 1957.



One of the celebrated Ceylon locomotives and the people who made her



The first Brush type 2 and traction employees 1957

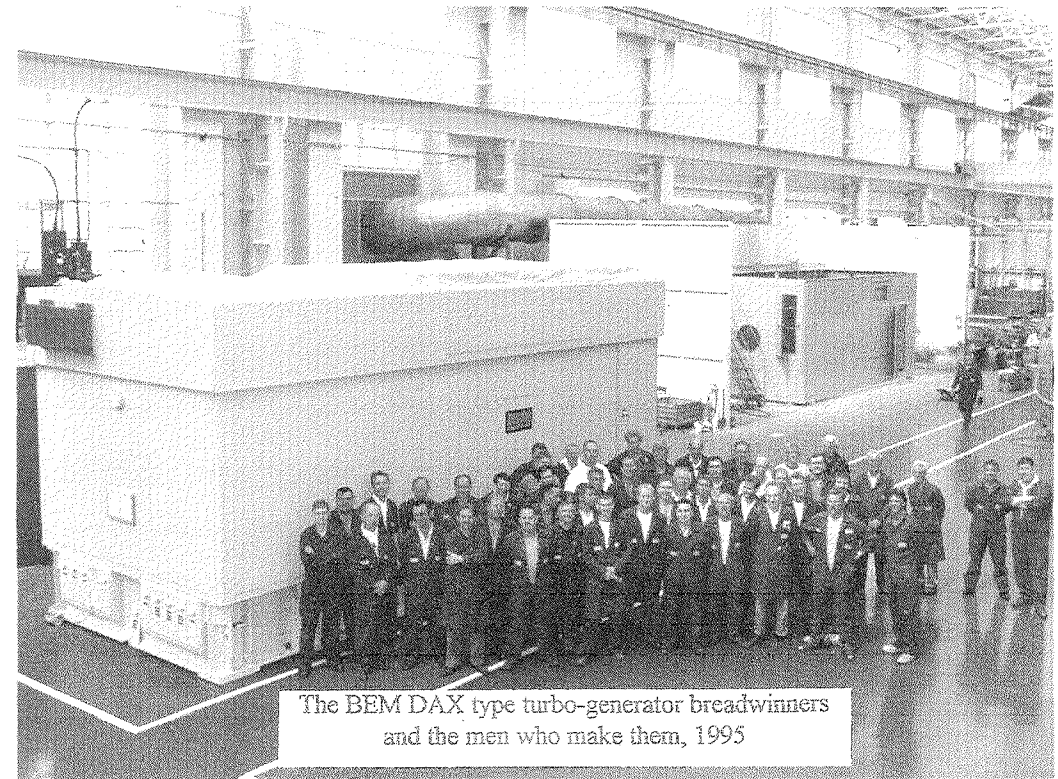
From this time on there followed a steady rise in the fortunes of Brush at Loughborough, although the turbine business was transferred away in 1959. The traction activities reached a peak in the mid 1960s, not only with locomotive building, but also the supply of electrical equipment.



The prototype 'Kestrel' locomotive about to leave the works in 1968

By the early 1970s turbo-generators were in production in the old Turbine shop and a steady stream of DAX generators had been issued from 24 shop over the years, forming the most consistent and 'bread earner' for Brush Electrical Machines Ltd in modern times. This company abbreviated to BEM Ltd, was formed in 1971 out of the former Rotating Machines Division. Concurrently the other two main product divisions were converted into Brush Transformers Ltd and Brush Switchgear Ltd. The following year saw the formation of Brush Fusegear Ltd, based at nearby Burton on the Wolds, where fuse manufacture had been transferred from the Switchgear Division in the Falcon Works.

BEM Ltd continued to produce electric motors and generators over a wide power range and the associated control gear side of the business expanded considerably.

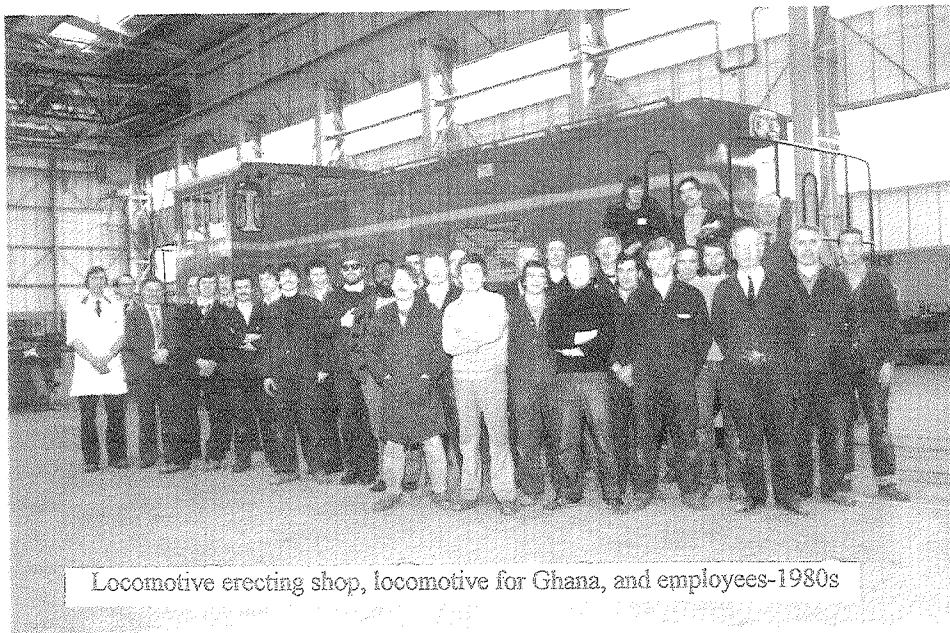


The BEM DAX type turbo-generator breadwinners and the men who make them, 1995

A revival in locomotive building commenced in the early 1970s with the supply of shunting locomotives to the Nigerian Railway Corporation. Orders for similar units for other railways followed and in 1980 new facilities were completed to the rear of the works. These became most useful when larger locomotives and orders were obtained during this decade. Great expansion occurred during the Class 60 era which reached into the late 1990s.



Class 60, the 100-locomotive order of the 1980s



Locomotive erecting shop, locomotive for Ghana, and employees-1980s

In the later 1980s Hawker Siddeley decided to instigate radical changes within the group to ensure a competitive edge. These changes were slow in application as BEM entered the 1990s and before reorganisation could take effect a hostile and successful takeover of the Hawker Siddeley Group by BTR plc occurred in 1991.



Class 60 locomotive overhauled and repainted in the 1990s



The Brush Euroshuttle locomotive for the Channel Tunnel

Class 92 electric locomotive for through services to the continent

A reorganisation of a different nature followed, with BEM Ltd forming part of a BIR Electric Power Group. During this ensuing period BEM witnessed streamlining and downsizing, which coincided with a steep decline in orders, mainly for the traction industry.

BIR presented a totally new financial philosophy of accountability to its newly-acquired companies and BEM soon conformed. Much capital was invested in Brush and higher returns ensued, but in ever-changing modern times the BTR Group found that its performance was declining. It became necessary to restructure its core businesses by concentrating on six to eight major global groups with leadership positions in their markets. This led to the disposal of some of its member companies in 1996.

Later that year the Electric Power Group was sold to the FKI Group, based in Halifax, and was described as complimentary to FKI activities. The Brush companies therefore found themselves under new owners.

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- Loughborough in Black & White. Vol. 1. Old Postcards and Photographs.
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- Loughborough Grammar School. The Early Years.
- Loughborough Street Directory 1951-52.
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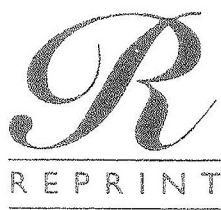
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