Belfast Cityscape.

HISTORIC CITIES

BELFAST
NORTHERN IRELAND

BRIAN ROBERTS

Cave Hill Castle.

The Parliament Building at Stormont.

HERITAGE GROUP VISITS

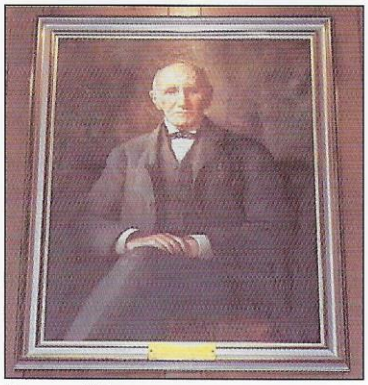
Municipal Technical Institute, Royal Victoria Hospital, Palm House,
The Great Light, Titanic Museum.

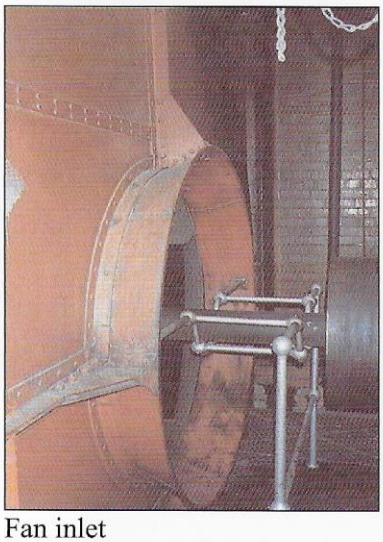
HISTORIC BELFAST

In page order:
Cityscape, Cave Hill Castle, Stormont, Map, City Hall. Cromac, Royal Victoria Hospital,
Palace & Hippodrome, Royal Alhambra, Carlisle Circus, Robb Dept Store,
Victoria Square, City Hall, High Street, Victoria Square, Grand Central Hotel,
Combe Barbour Foundry, Loopbridge Printing, Mays Market, Royal Avenue,
Sussex Street Sewer, Harland & Wolff, Custom House Square,
Short & Harland, Eason & Son, Robinson & Cleaver, Queens Quay Rail, Great Northern Rail,
York Street Mill, Co-op, Brookfield Linen, Blackstaff Mill,
Harland & Wolff, Woolworth, City Hall, Municipal Technical College, City View.

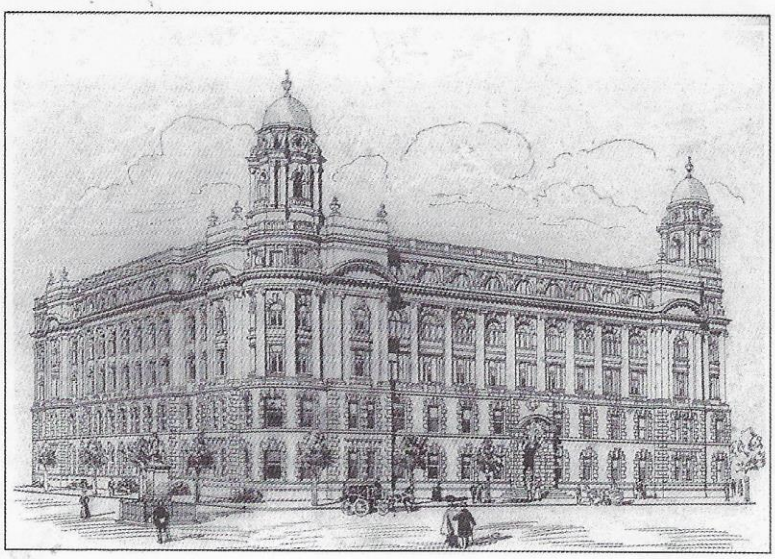
HERITAGE GROUP VISITS

Musgrave "Ulster" fan nameplate


Henry Musgrave


Fan inlet

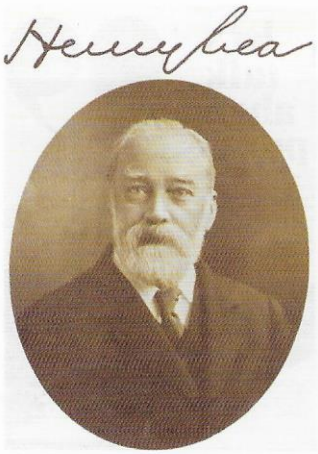
MUNICIPAL TECHNICAL INSTITUTE, BELFAST



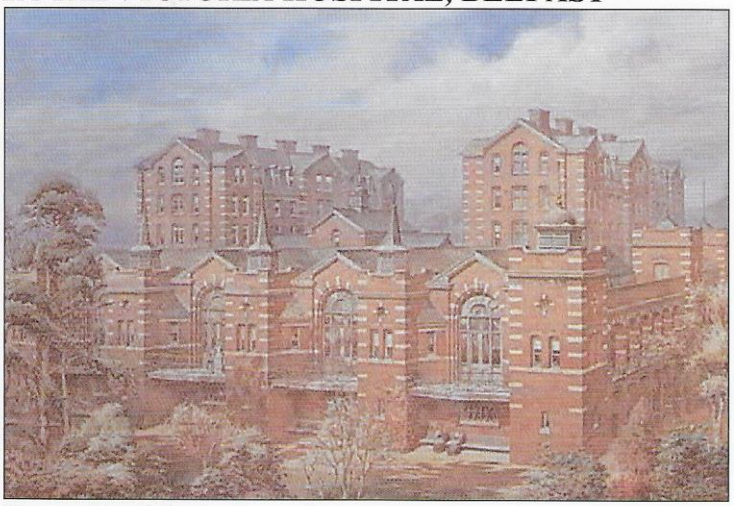
Municipal Technical Institute, Belfast, 1900-7

The choice of architect, Samuel Stevenson, without competition, and the choice of style, provoked much controversy. Stevenson had designed the enormous Gallaher factory. The completed Institute was attacked as a straight crib from the War Office in London, considered by many to be a deplorable building. The Heritage Group has discovered the Estimate for Heating & Ventilating submitted by Musgrave & Co Ltd, dated 14th August 1905. Their main quotation proposed using their "Fan" system, renewing the air within the building up to four times per hour, delivering 140,000 cu ft/min and giving individual control of the temperatures and air volumes to each room. The scheme was based on using a Tempering Coil of 5200 sq ft with a Main Heating Coil of 4000 sq ft, both supplied with hot water by forced circulation. Two Musgrave "Ulster" centrifugal fans with 11 ft diameter wheels would be driven by a single horizontal steam engine with alternative provision for driving from a 42 or 50 hp electric motor. The scheme included 60 air inlet gratings, 150 extract gratings, 4 main dampers and 128 patent "Curtain" air regulating valves. The Musgrave Tender amounted to £2660. Various options were offered, including a Musgrave Patent Rainbow Washer for £220. This was actually a 9ft diameter spinning disc humidifier, of the type supplied to Glasgow Technical School. An alternative bid, using steam for heating, came to £1570. Much of the original installation survives, including fans, the steam engine, the washer, gratings and heating apparatus.

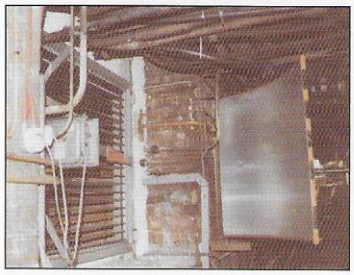
ROYAL VICTORIA HOSPITAL, BELFAST



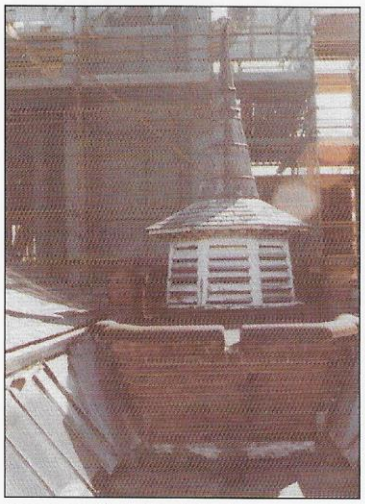
Henry Lea



Henman's original perspective



Branch duct to ward

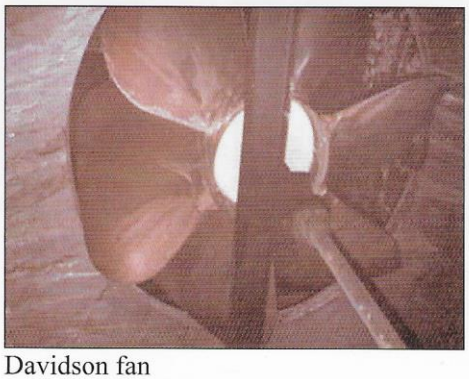


Louvered extract lantern

Royal Victoria Hospital, Belfast, 1898-1903

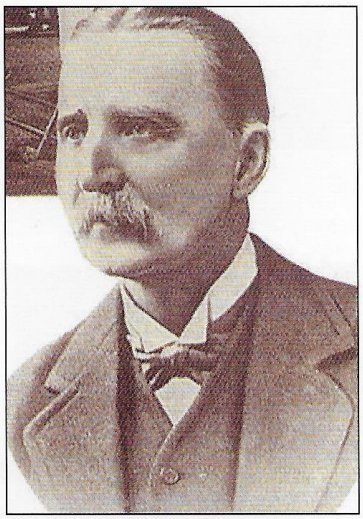
The architect and engineer for the Birmingham General Hospital of 1893-97 were William Henman and Henry Lea, assisted by the Glasgow engineer William Key, a pioneer of plenum ventilation. In 1898, Henman and Lea were appointed for the new Royal Victoria Hospital in Belfast. Both knew there was scope for the improvement of environmental systems. Operating theatres and 17 wards were provided under a continuous roof. A very large brick lined air duct 9 ft wide and 433 ft long ran beneath the main corridor. Lea determined this size was necessary to provide 7 air changes/h in winter and 10 in summer. Two fans, each of 9 ft 2 in diameter were provided, driven by a steam engine, with the exhaust steam used to heat domestic hot water. The local engineer Samuel Cleland Davidson played an important role. The Davidson Works was producing some of the world's most advanced centrifugal fans and was responsible for designing, installing and maintaining much of the central plant. A sprinkler system, used to moisten the fresh air filters, was regulated on the basis of regular readings of wet and dry-bulb temperatures, a very early example of the conscious control of humidity. Much of the central plant remains in place, including the steam engine which is still operational.

More information is contained in "Henry Lea, Consulting Engineer, 1839-1912," Henry Tovey, Hoare Lea & Partners, undated.

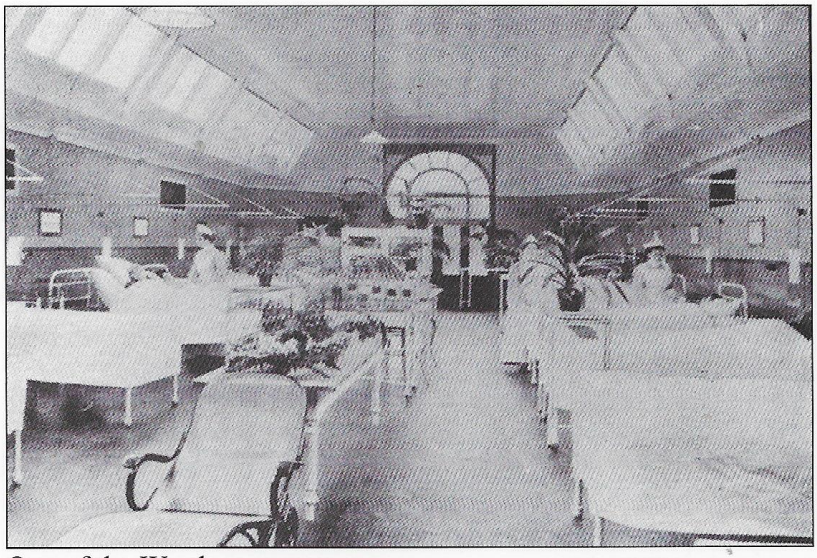


Davidson fan

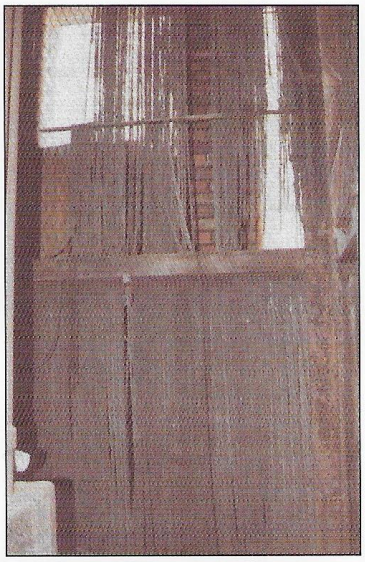
South side of ward block 1903



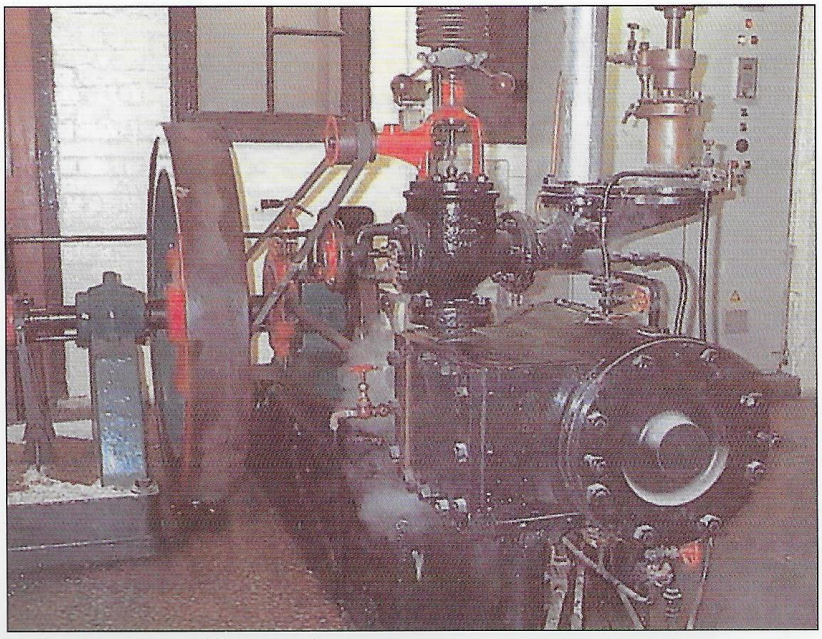
Samuel Cleland Davidson



One of the Wards

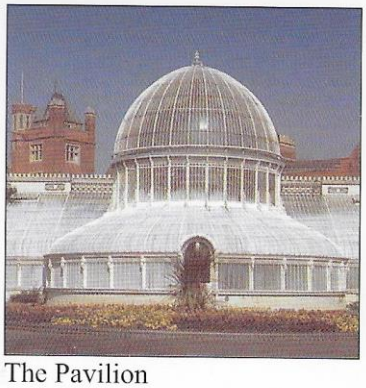


Coconut fibre rope filter
wetted by sprinklers

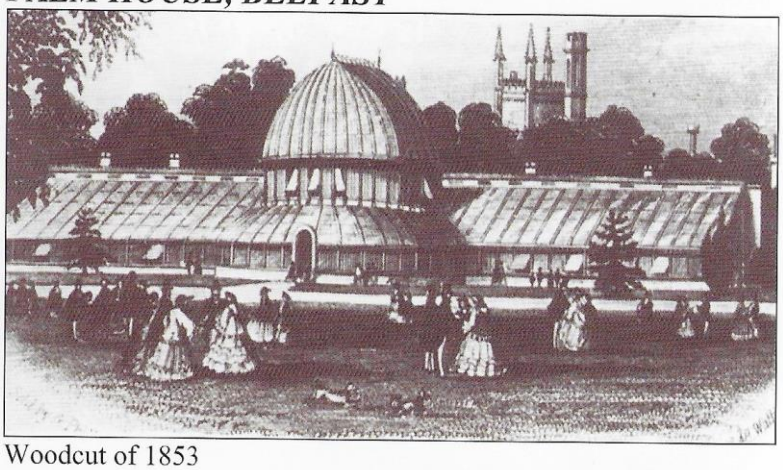


Steam engine, still operating

PALM HOUSE, BELFAST



The Pavilion



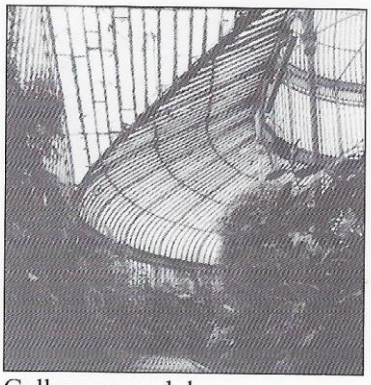
Woodcut of 1853

Richard Turner

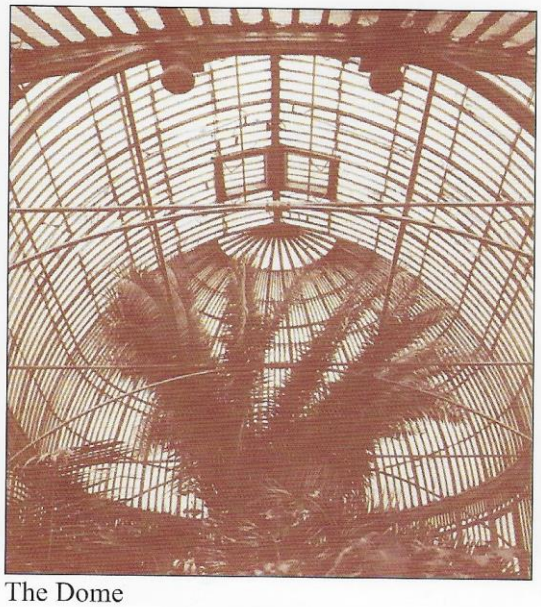
Palm House, Belfast, 1839-40

The architect for the Palm House was Charles Lanyon, but the design was changed during construction by Richard Turner of Hammersmith Works in Dublin who pioneered the use of curved ribs and curved glass and later took on the building of the Palm House at Kew. The Belfast Palm House was 175 ft long by 46 ft high; the dome was 67 ft wide. In 1862 the heating, effected by two brick flues, was deemed unsatisfactory. The firm of Musgrave Bros was engaged to provide a new boiler and hot water heating system. It is recorded that the boiler was *Cockey's Patent*. In severe weather, the old brick flues were also utilised. It is said that new boilers were installed in 1871 and 1881. Also, gas lighting was provided in 1881. It is recorded that two Hartley & Sugden boilers were installed in 1892 by John Hall of Queen Street. [One report says these were called *Red Rose* but the most famous H&S boilers were the *White Rose* series.] A new aboveground boiler house was built in 1982.

The Palm House is described in "Houses of Glass," G Kohlmaier & B von Sartory, MIT Press, Cambridge, Mass, 1990, 158-160.]



Gallery around dome



The Dome

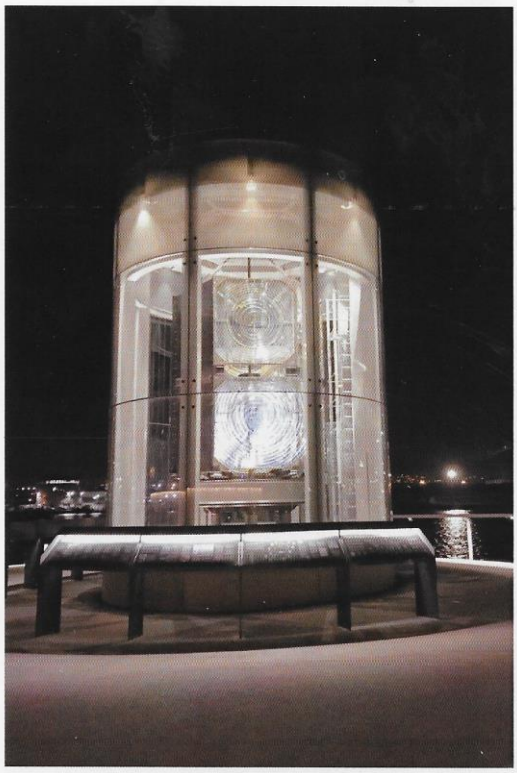
CIBSE HERITAGE GROUP

Newsletter No. 42 December 2019

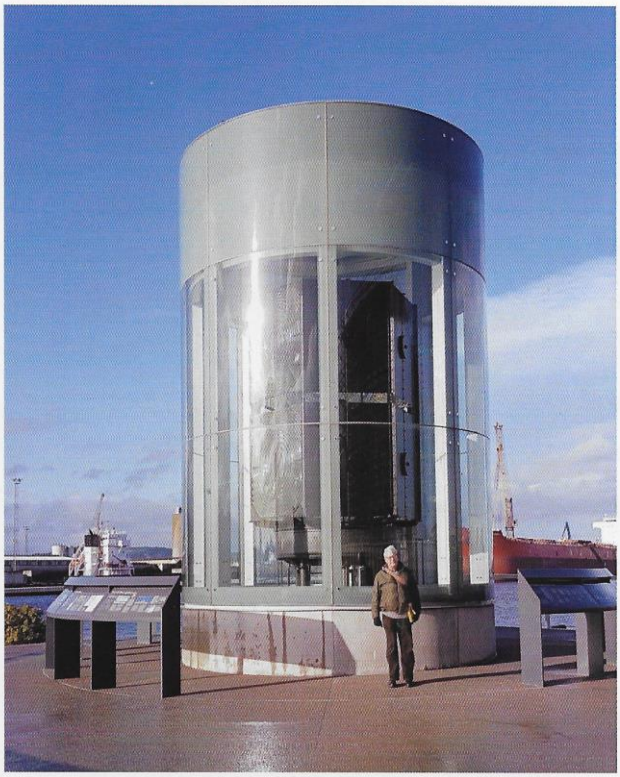
In October Group Member Gary Bennett kindly organised a visit to the Titanic Quarter, Belfast, Northern Ireland for Members of the Heritage Group to attend a presentation held in the Titanic Hotel. The talk was given by Gary Bennett of BR Design to the CIBSE Regional Group, about the Great Light.

Commiittee Members held one of their regular Committee Meetings during the Belfast visit. They were also able to include visits to the Titanic Museum and HMS Caroline.

THE GREAT LIGHT



Night

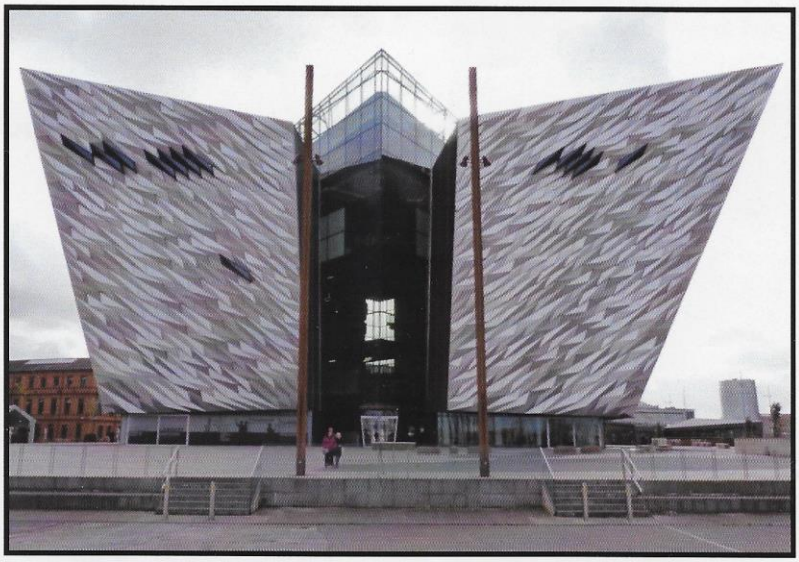


& *Day*

The Great Light was recovered from the Mew Island lighthouse guarding the entrance to Belfast Lough, but was originally housed in the lighthouse at Tory Island off the North Coast of Ireland, the lighthouse having first come into operation in 1832. The Tory Island lantern was then upgraded to a rotating 3 storey (tri-form) hyper-radial Fresnel optic (the largest lighthouse optic ever made) in 1887 and which was powered by coal gas generated on site

The Mew Island Lighthouse was first established in 1884 to replace a smaller lighthouse on an adjacent island. Originally the Mew Island lighthouse operated a coal gas fired burner with a First Order tri-form optic but in 1929 the Great Light's Fresnel Lens was installed. To achieve this, the Tory Island tri-form hyper-radial Fresnel optic was converted to two bi-form optics to be shared between the two lighthouses.

TITANIC MUSEUM



In 1912, the RMS Titanic, built by Harland & Wolff in Belfast, was the largest and most modern passenger liner in the world. Titanic was 882 feet 9 inches long with a maximum breadth of 92 feet 6 inches, 104 feet from base of keel to top of bridge, displacing 52,310 tons. Titanic was equipped with two reciprocating steam engines (total 30,000hp), a steam turbine (16,000hp), powered by 29 steam boilers and a sophisticated electrical system.

RMS Titanic - White Star Line (hit an iceberg on maiden voyage and sank in 1912)

The so-called Drawing Room (once the Harland & Wolff Drawing Office) in the Titanic Hotel

BELFAST

MAP c.1865

BELFAST CITY HALL c.1908

Belfast City Hall, Donegall Place, *c.* 1908
NATIONAL LIBRARY OF IRELAND

CITY HALL ROYAL VISIT 1903

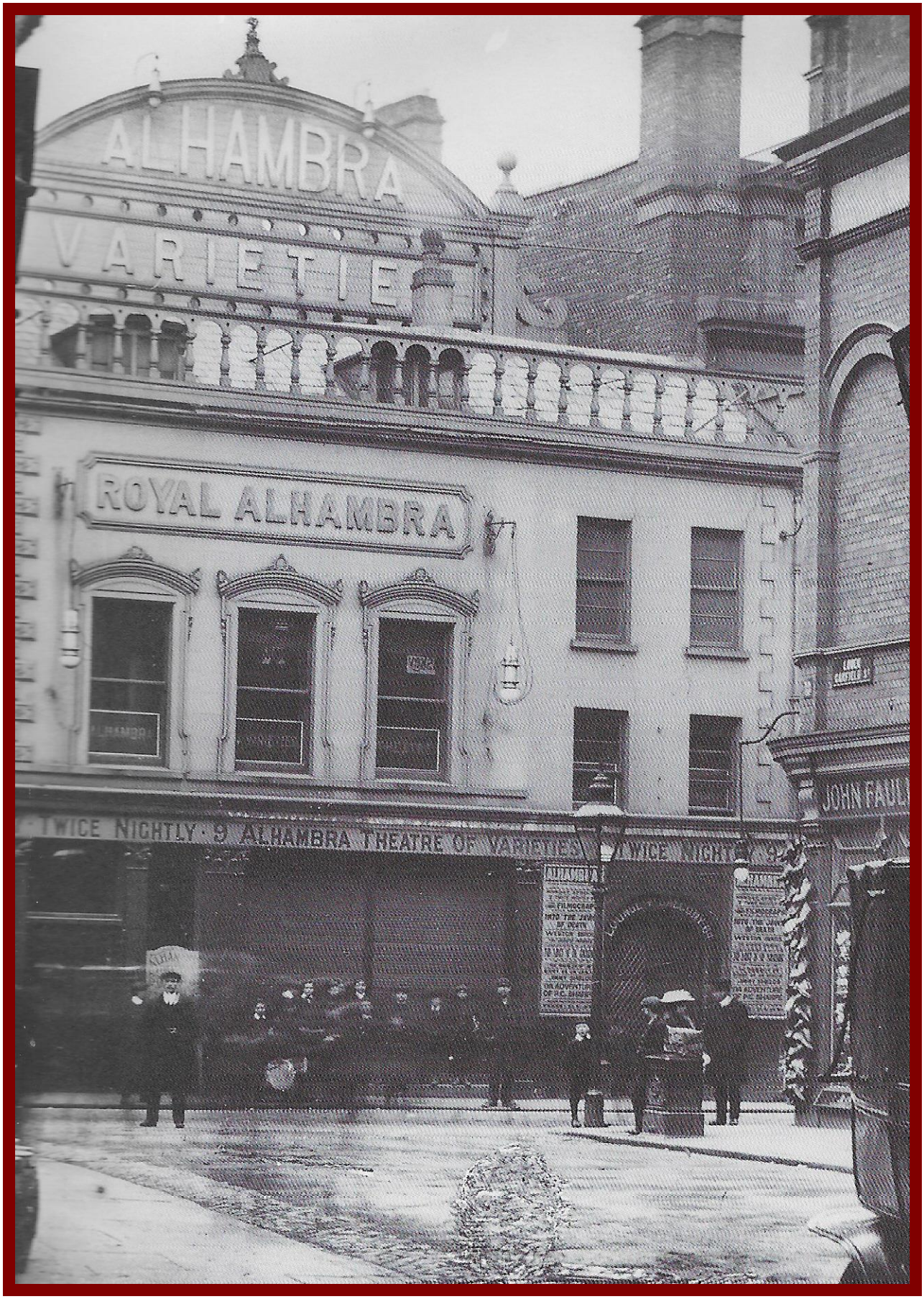
FERRY AT CROMAC c.1900

STEAM TUG ON THE LAGAN 1903

ROYAL VICTORIA HOSPITAL c.1905

PALACE AND HIPPODROME 1895

ROYAL ALHAMBRA THEATRE



CARLISLE CIRCUS

ROBB DEPARTMENT STORE

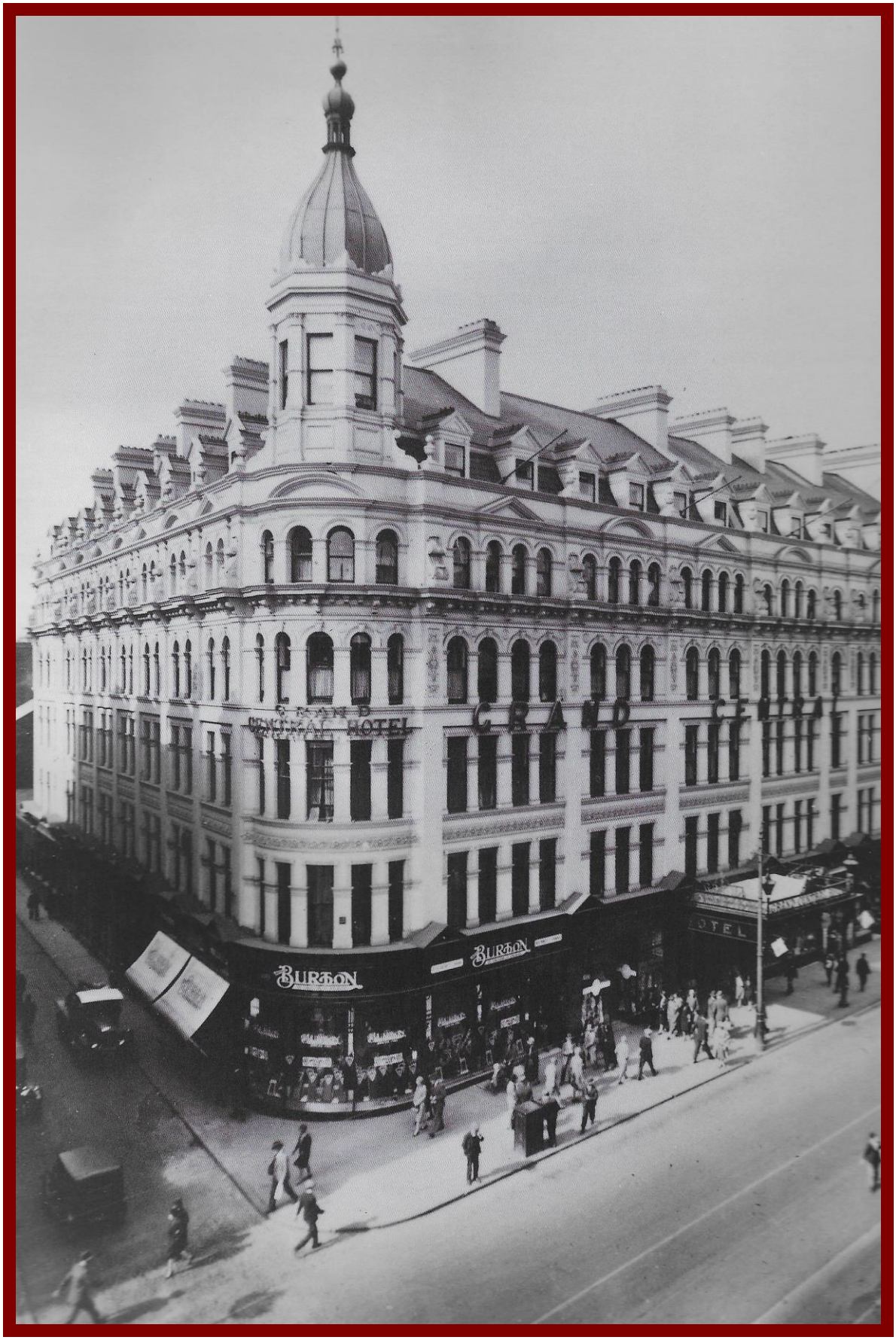
VICTORIA SQUARE

CITY HALL DONEGAL SQUARE 1912

PARADE AT CITY HALL 1915

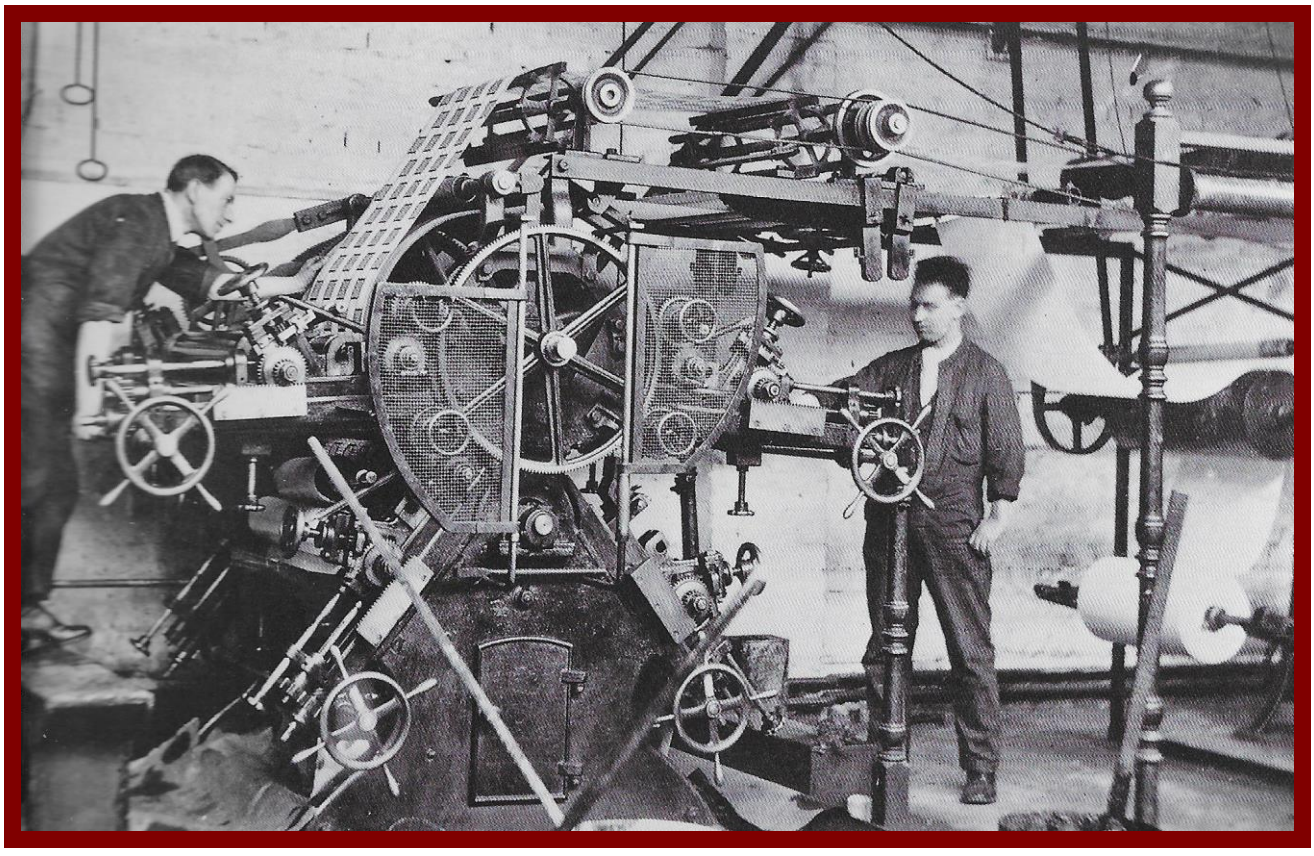
PEACE DAY ON HIGH STREET 1919

GRAND CENTRAL HOTEL 1929



COMBE BARBOUR FOUNDRY 1928

LOOPBRIDGE PRINTING WORKS



MAYS MARKET

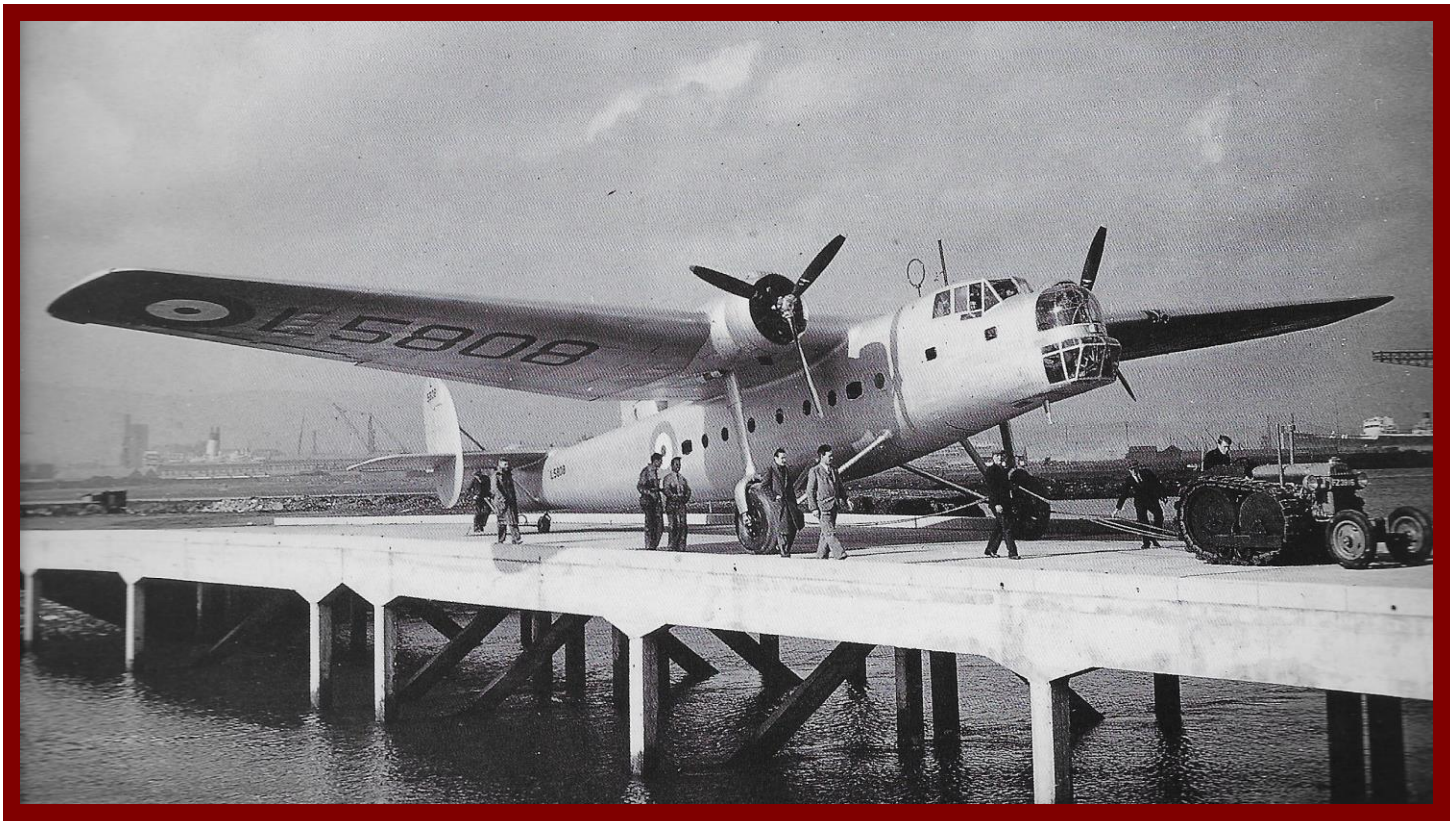
ROYAL AVENUE 1928

LAYING SEWER PIPES SUSSEX STREET

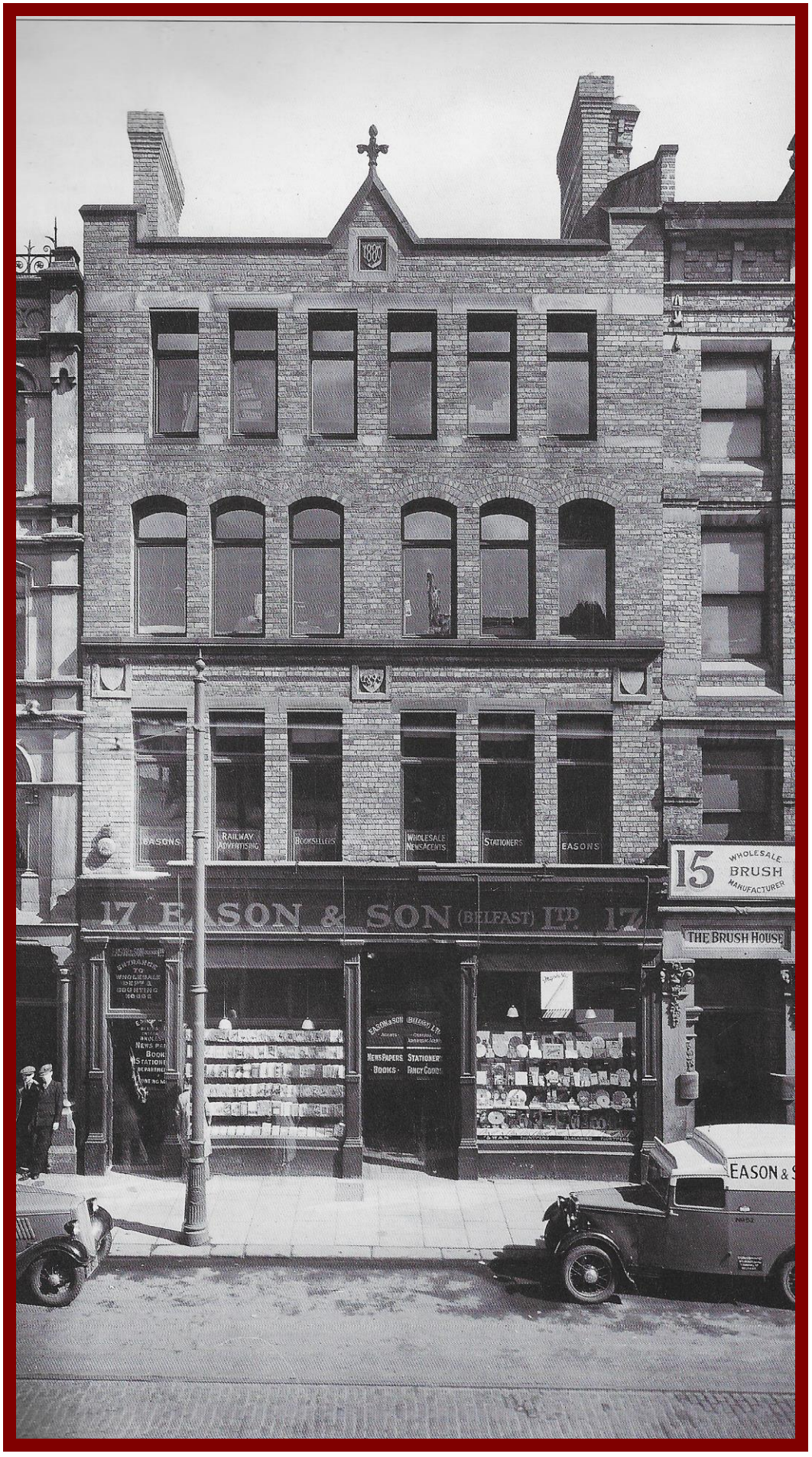
NO WORK AT HARLAND & WOLFF c.1931

CUSTOM HOUSE SQUARE GARDENS

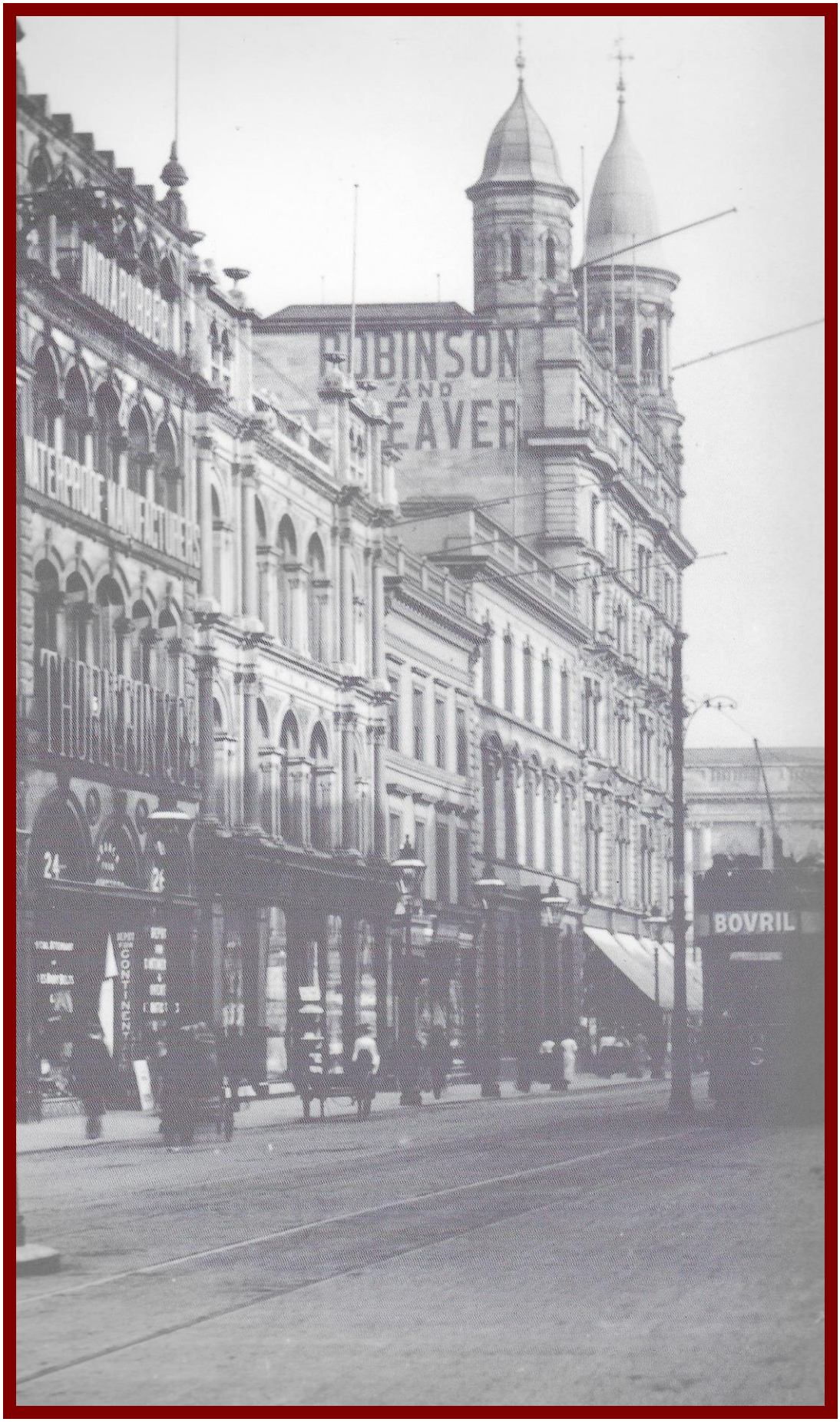
BRISTOL BOMBER SHORT & HARLAND 1939



EASON & SON LOWER DONEGAL ST 1936



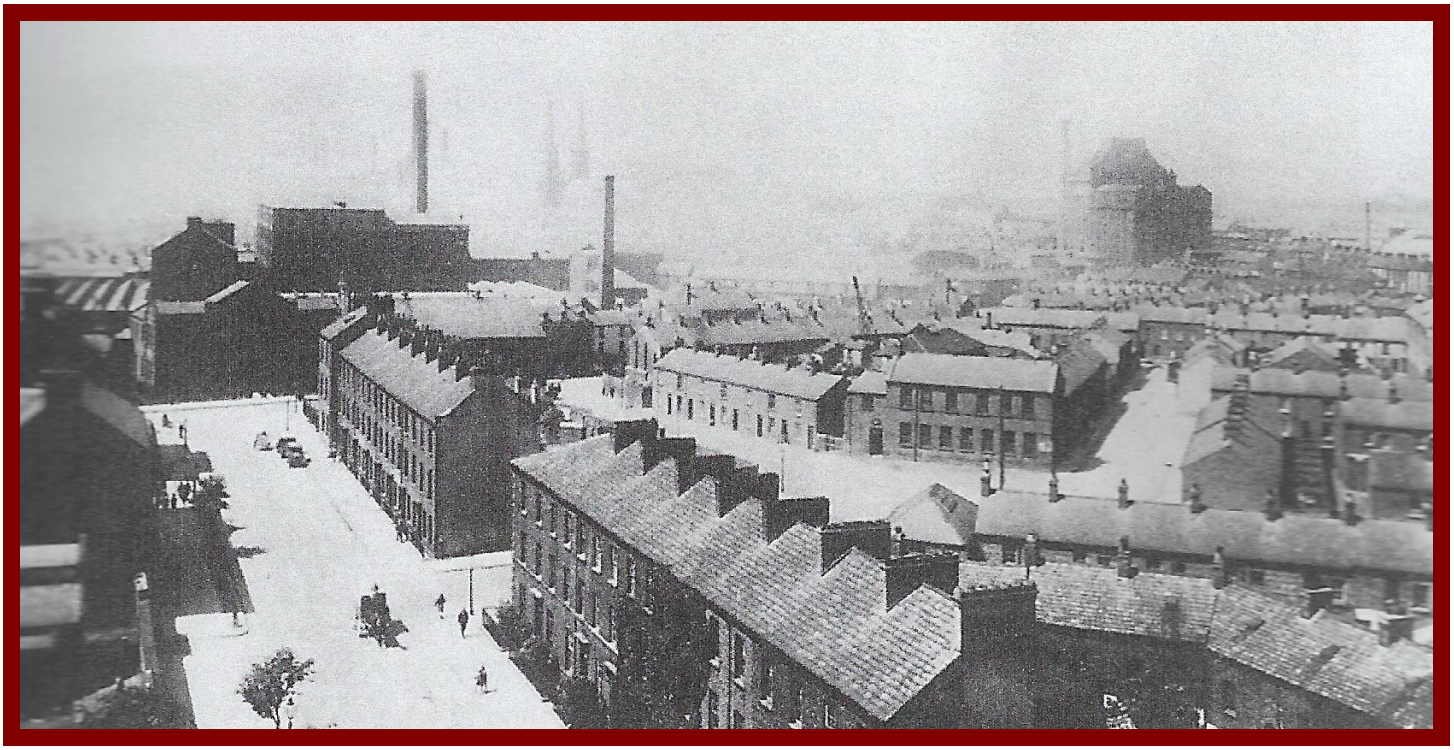
ROBINSON & CLEAVER DEPT STORE



ROYAL AVENUE before 1954

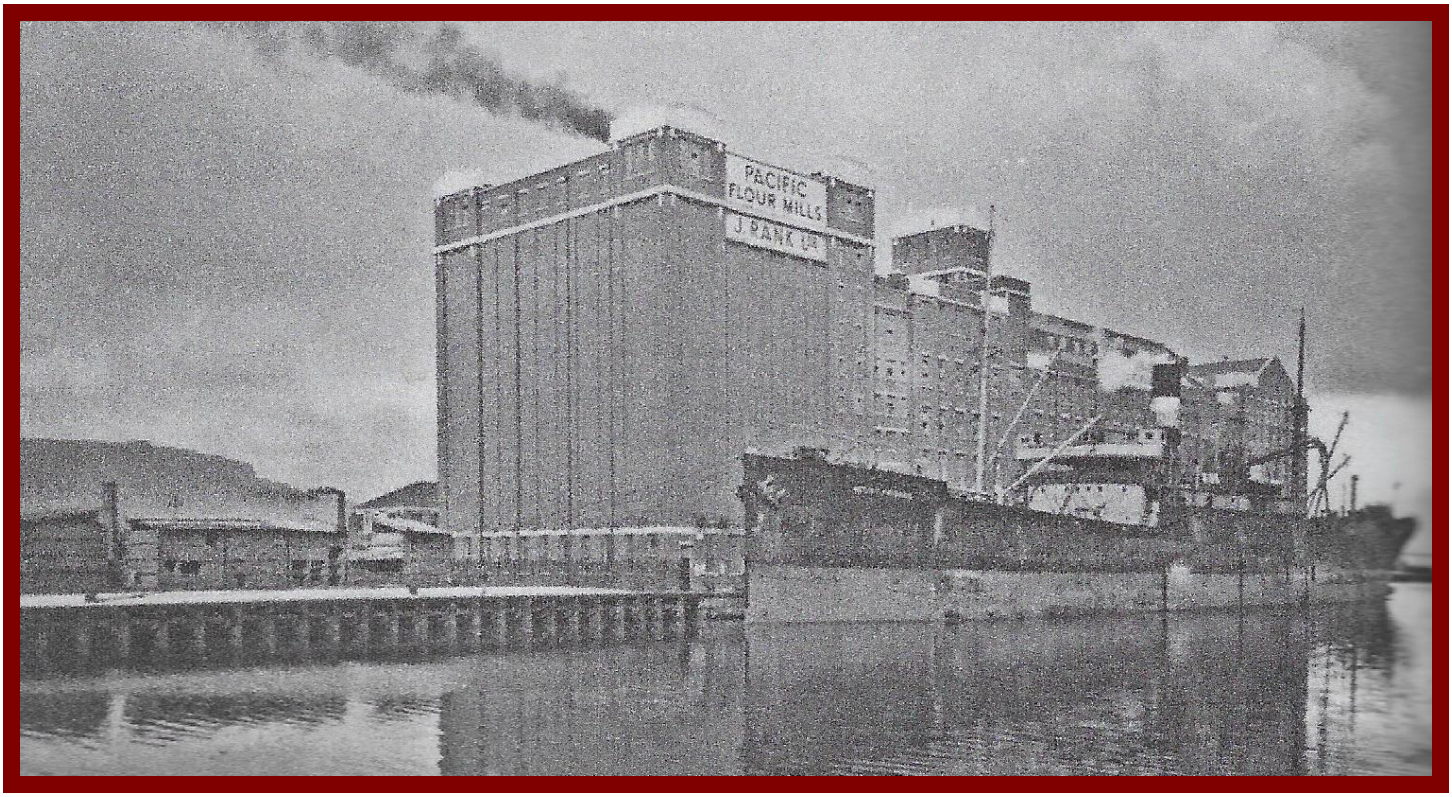
HAYPARK BRICKWORKS 1930

COLLEGE SQUARE EAST 1930



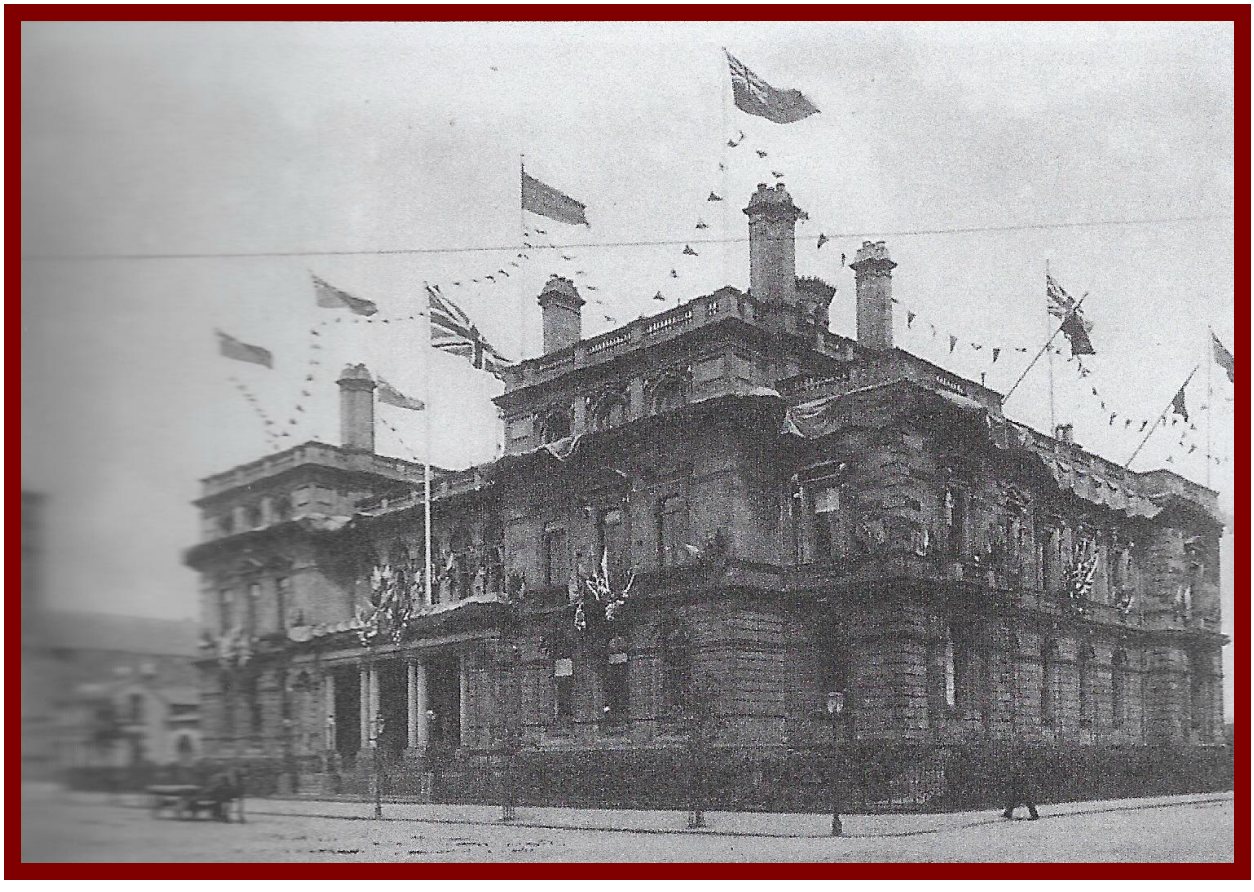
QUEENS BRIDGE c.1910

POLLOCK DOCK FROM THE LAGAN 1935



HOLYWOOD BANK LIGHT I built 1844

BELFAST HARBOUR OFFICE



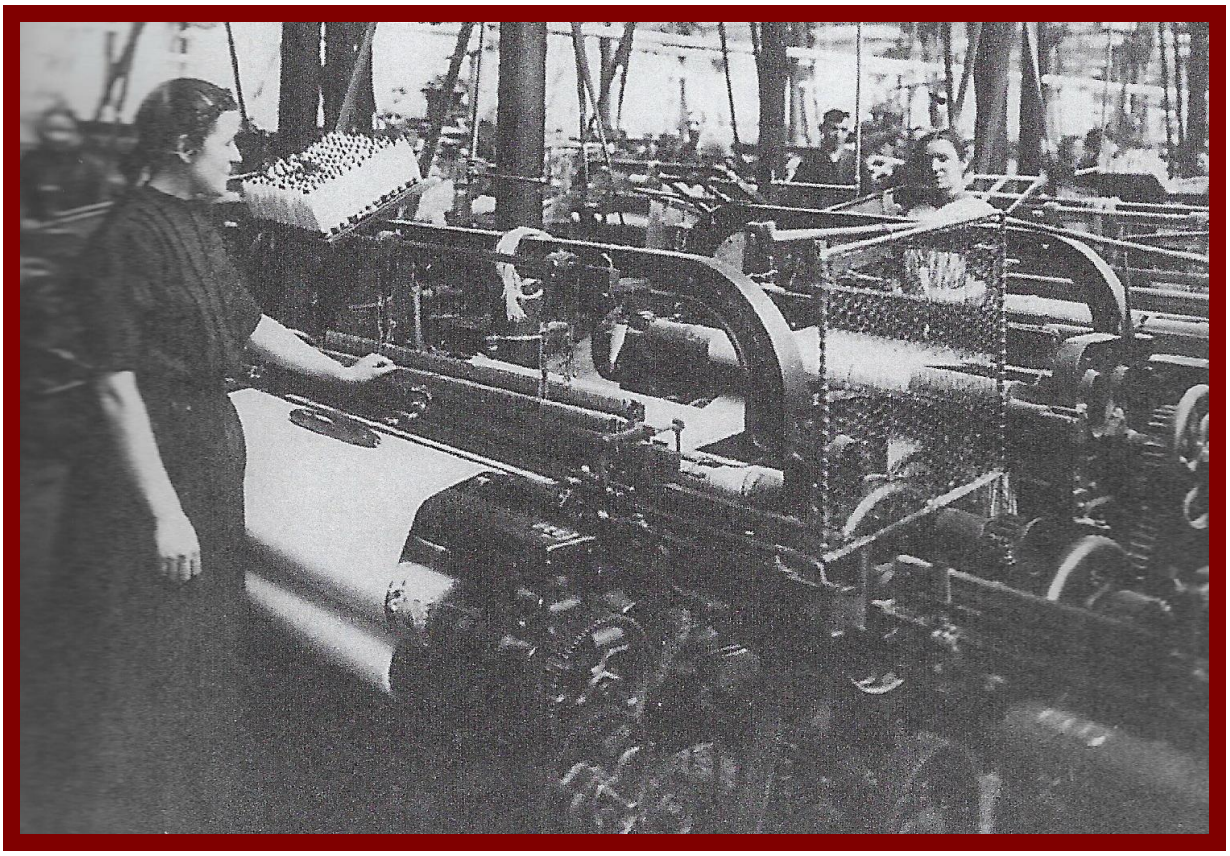
QUEENS QUAY RAILWAY c.1912

GREAT NORTHERN RAIL TERMINUS c.1895

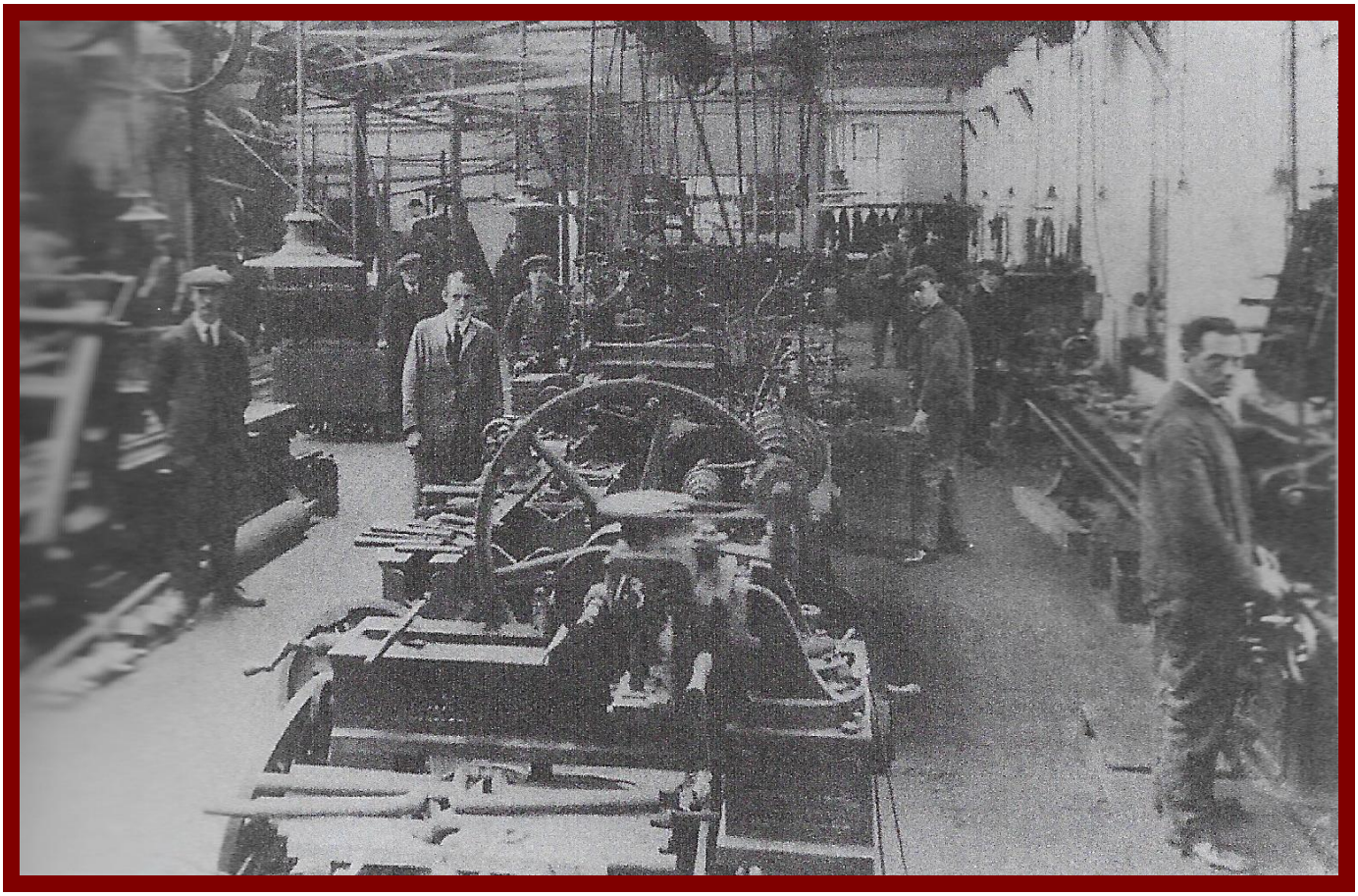
YORK STREET FLAX MILL founded 1828

BELFAST CO-OP YORK STREET

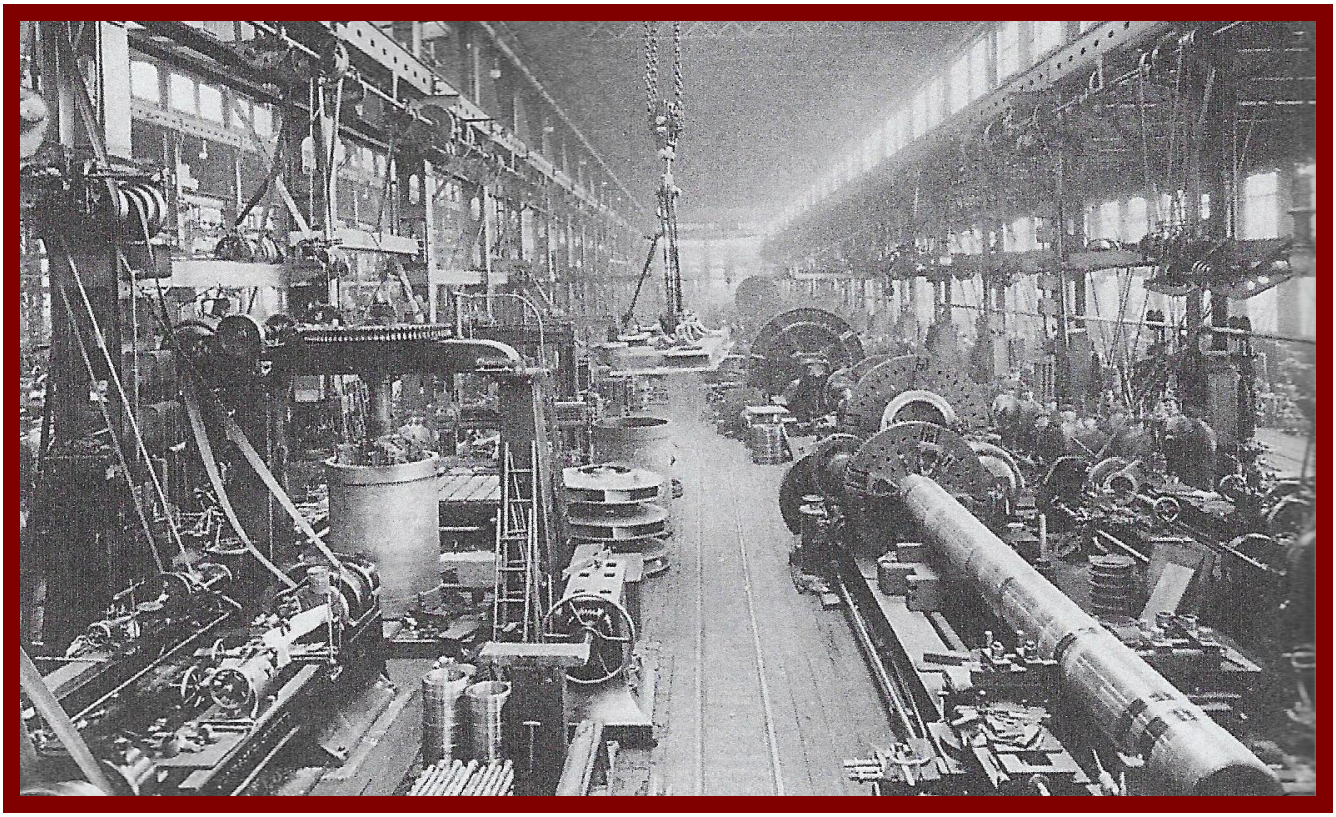
BROOKFIELD LINEN CRUMLIN RD c.1911



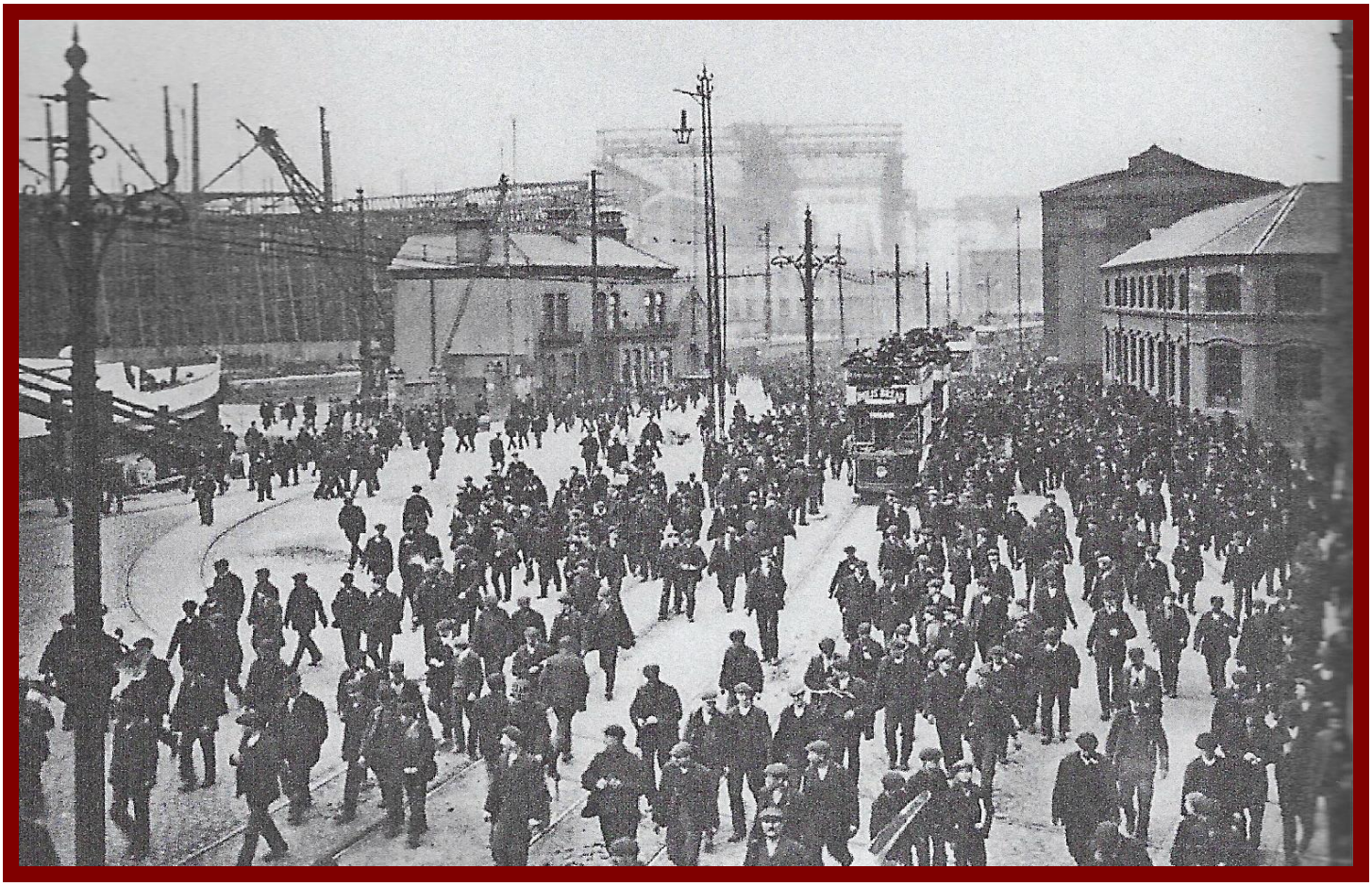
BLACKSTAFF MILL MECHANICS c.1920



HARLAND & WOLFF ENGINE WORKS c.1888



H&W WORKERS TITANIC IN BACKGROUND



F.W. WOOLWORTH HIGH STREET 1929

BELAST CITY HALL 1903 & C.1905

MUNICIPAL TECHNICAL COLLEGE c.1960

BELFAST
NORTHERN IRELAND

REFERENCES AND FURTHER READING

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2010 Belfast: Britain in Old Photographs, Vivienne Pollock & Trevor Parkhill, Ulster Museum, The History Press (Reprint), Stroud, Gloucestershire.

---- A History of Carrickfergus Gas Works, Brian McKee & Helen Rankin, Flame Gas Museum.

BRIAN ROBERTS, Budleigh Salterton, 2022