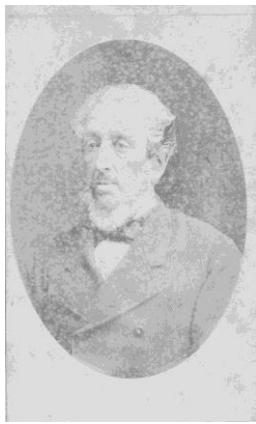
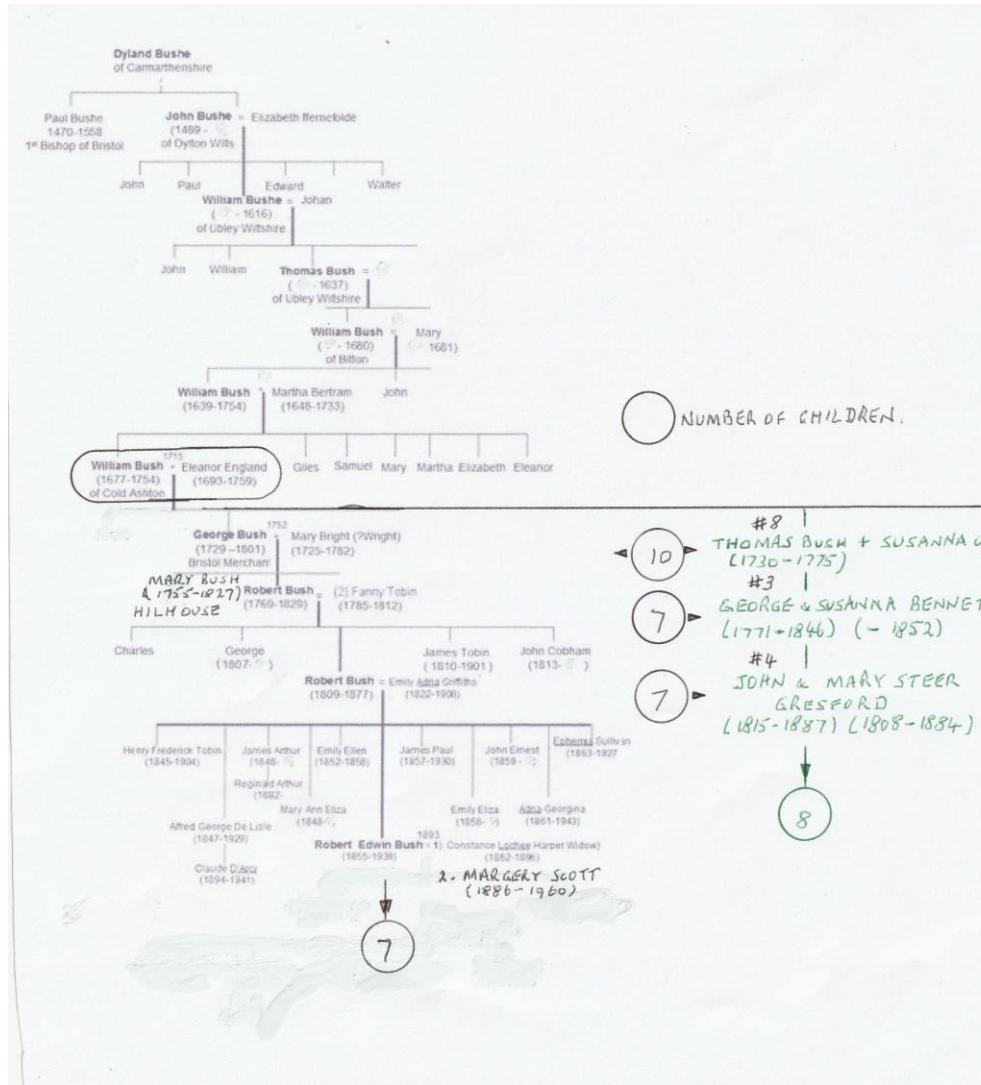


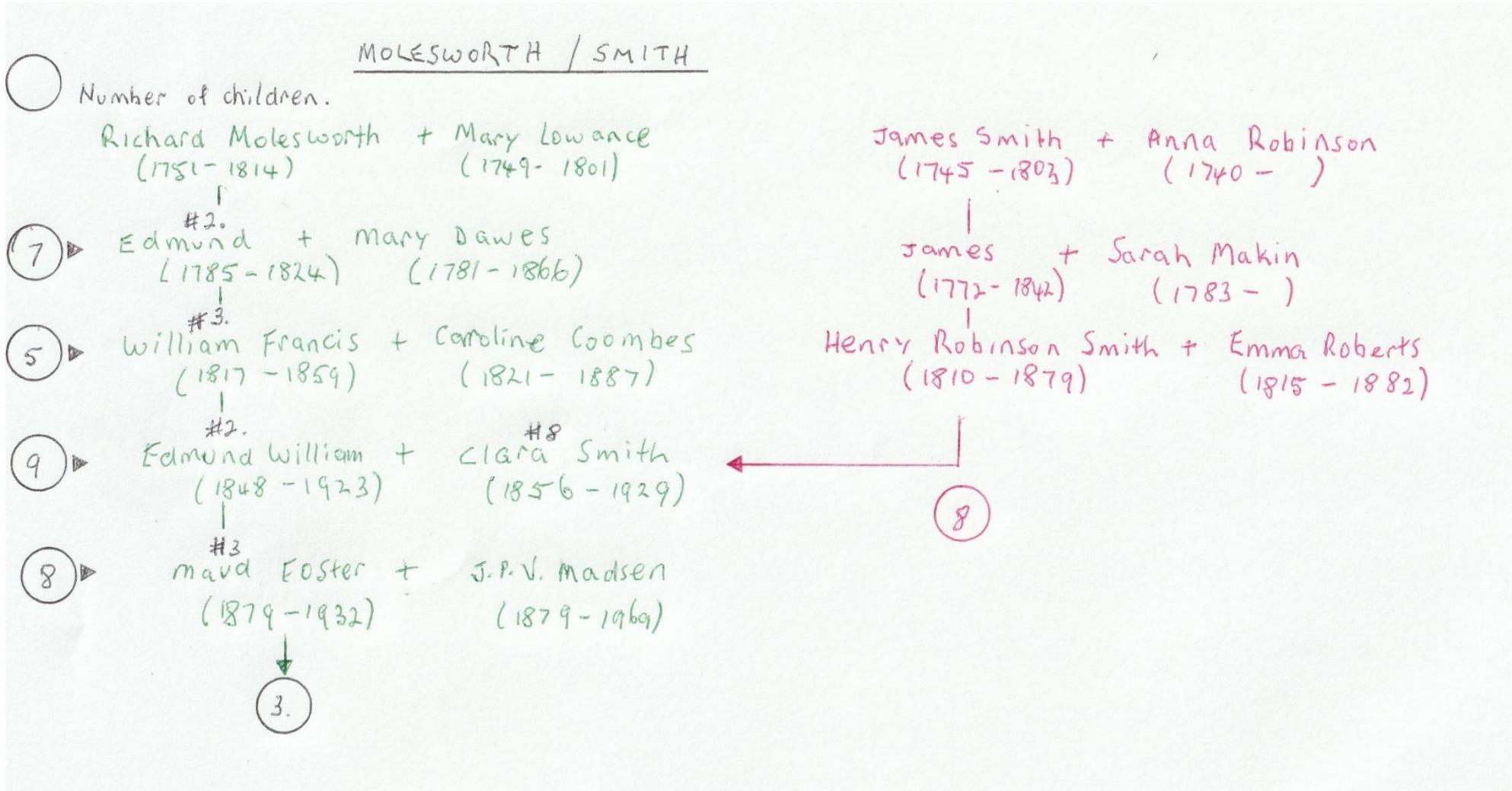
# 1. Bush, Smith, Molesworth Australian Pioneers. A Madsen Legacy.



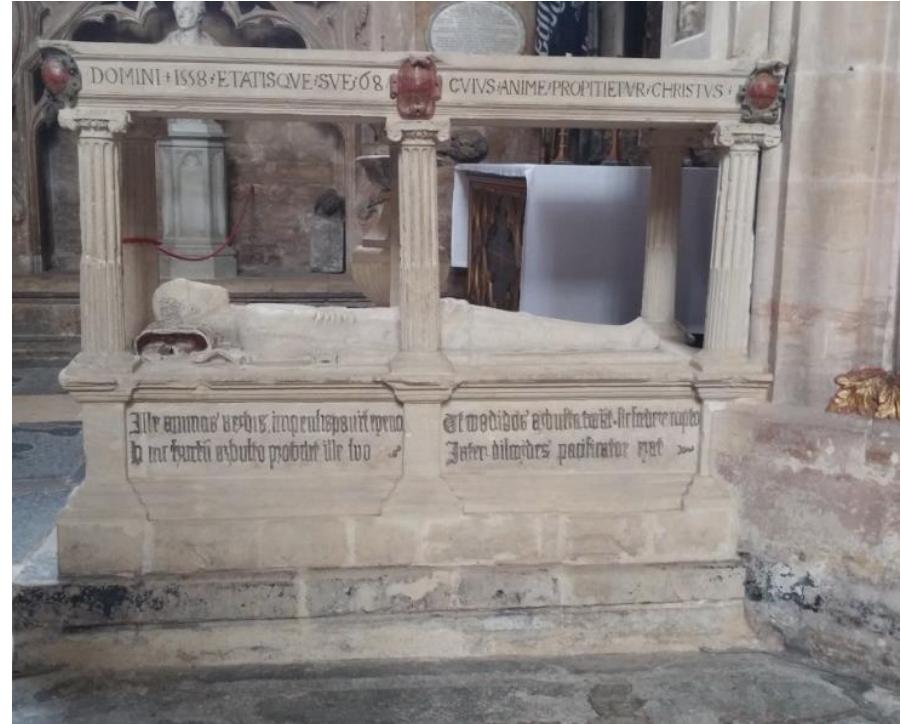
## 2. A Bush family tree.



### 3. Molesworth, Smith family tree.



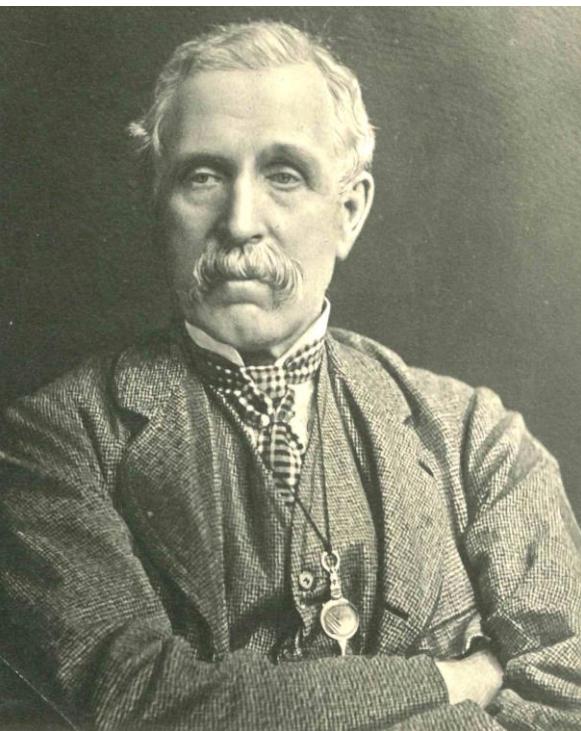
# 4. Native of Bristol.



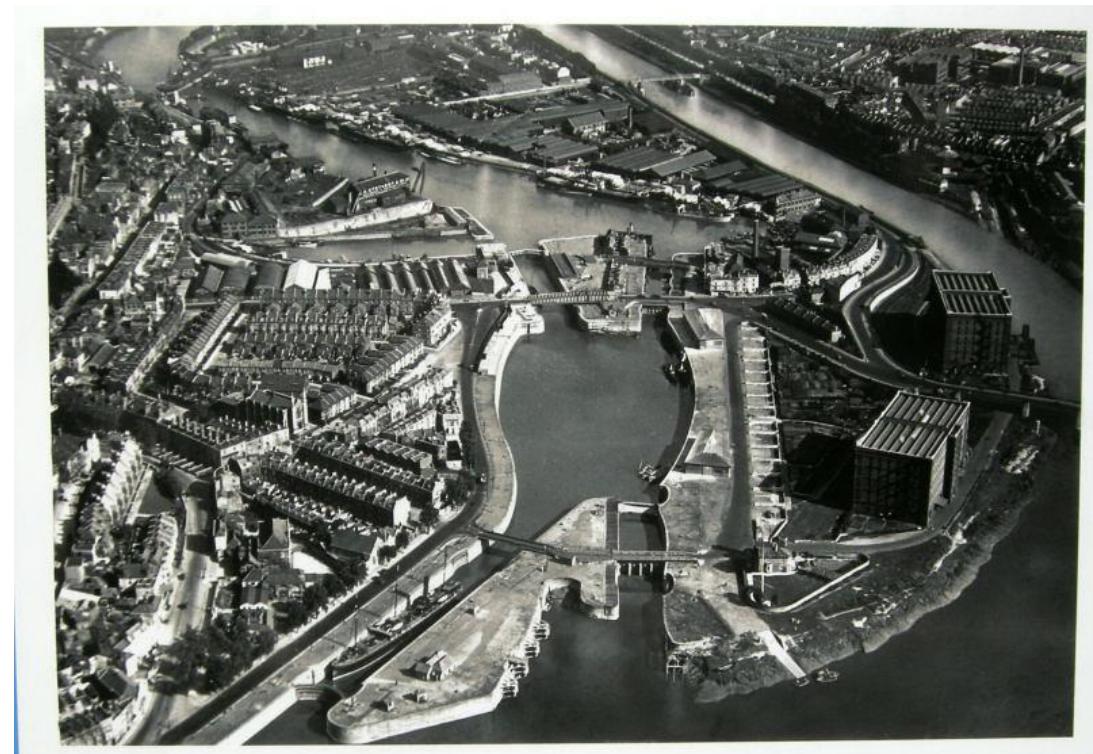
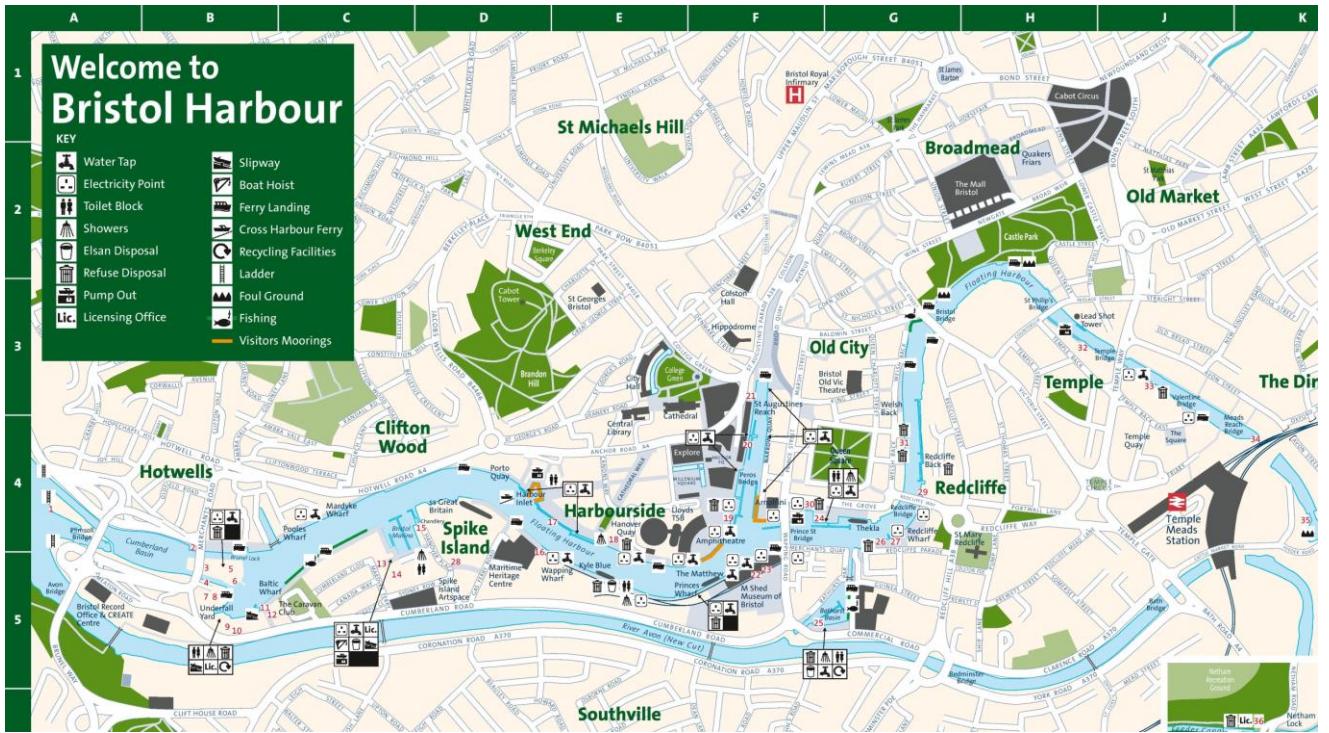
## 5. The Robert Bush's 1762-1939.



Robert Bush 1762-1829



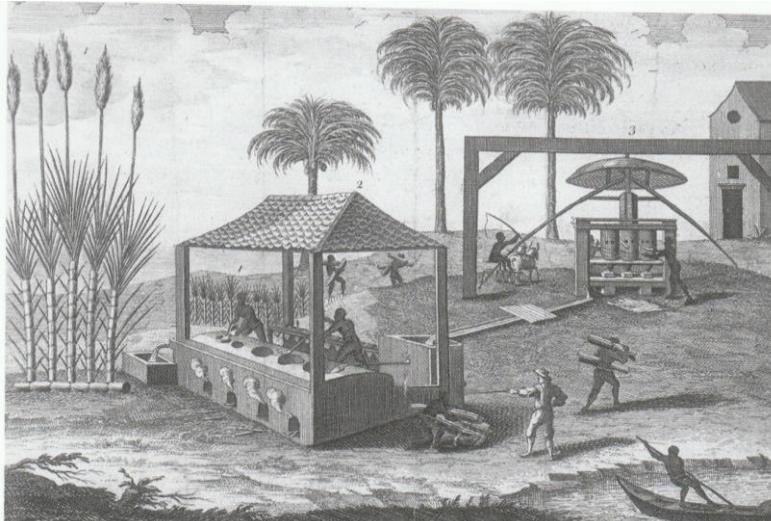
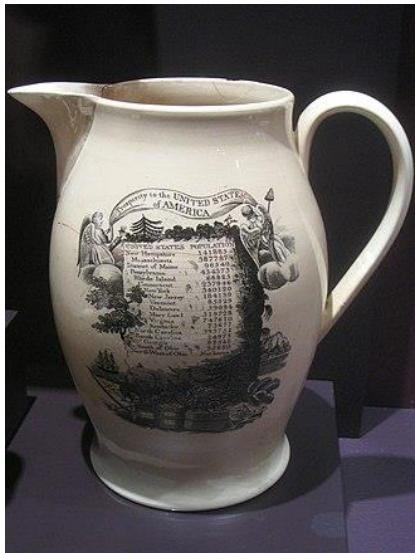
# 6. Bristol Harbour.



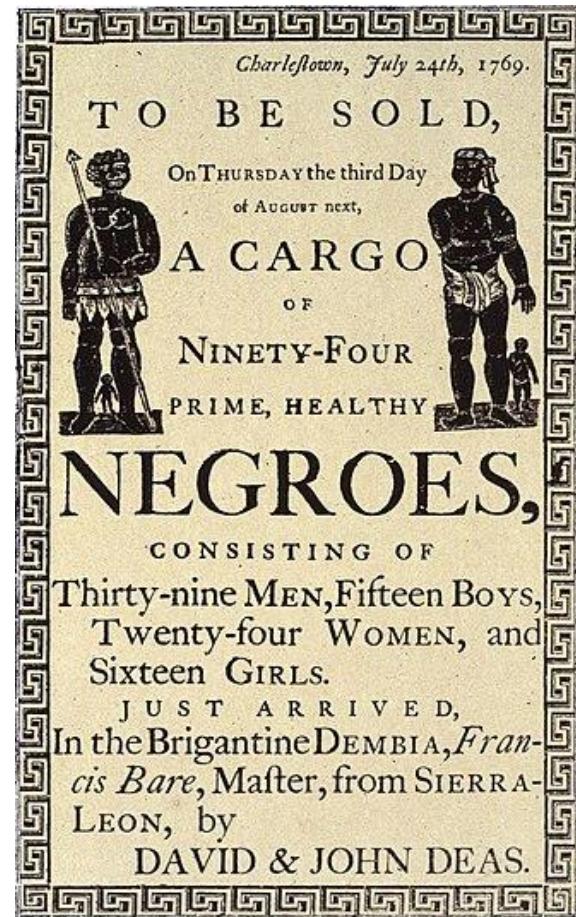
# 7. Society of Merchant Venturers.



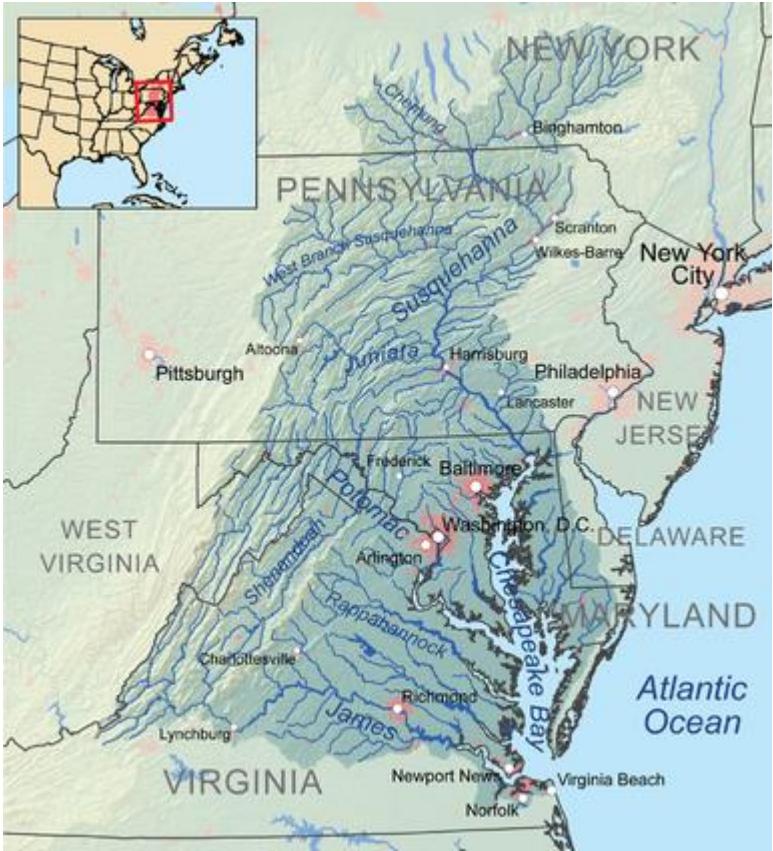
## 8. North America Tobacco, Sugar & Cotton.



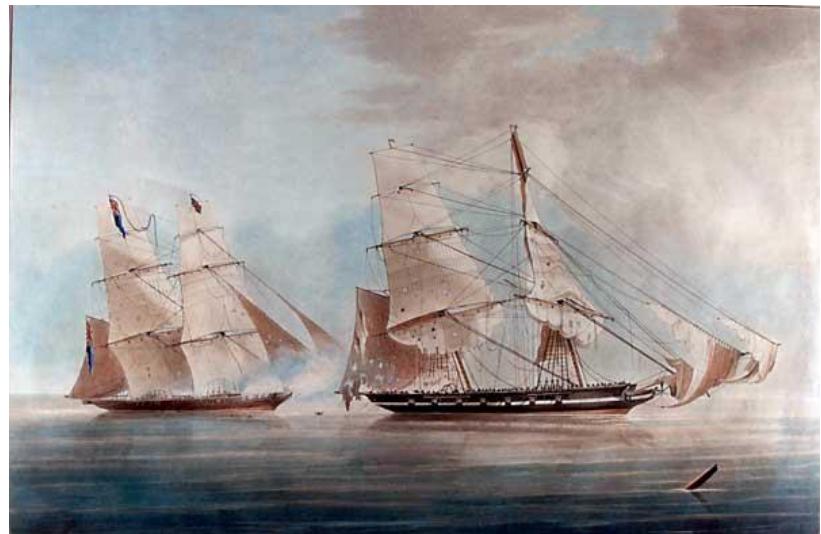
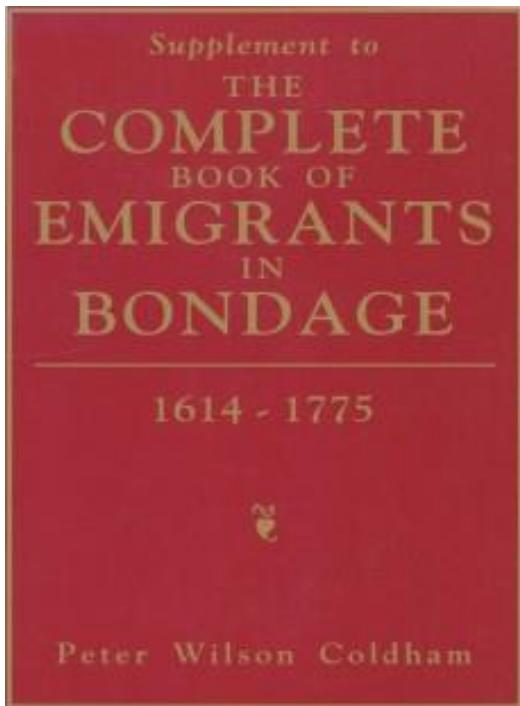
# 9. Slave trade from Africa.



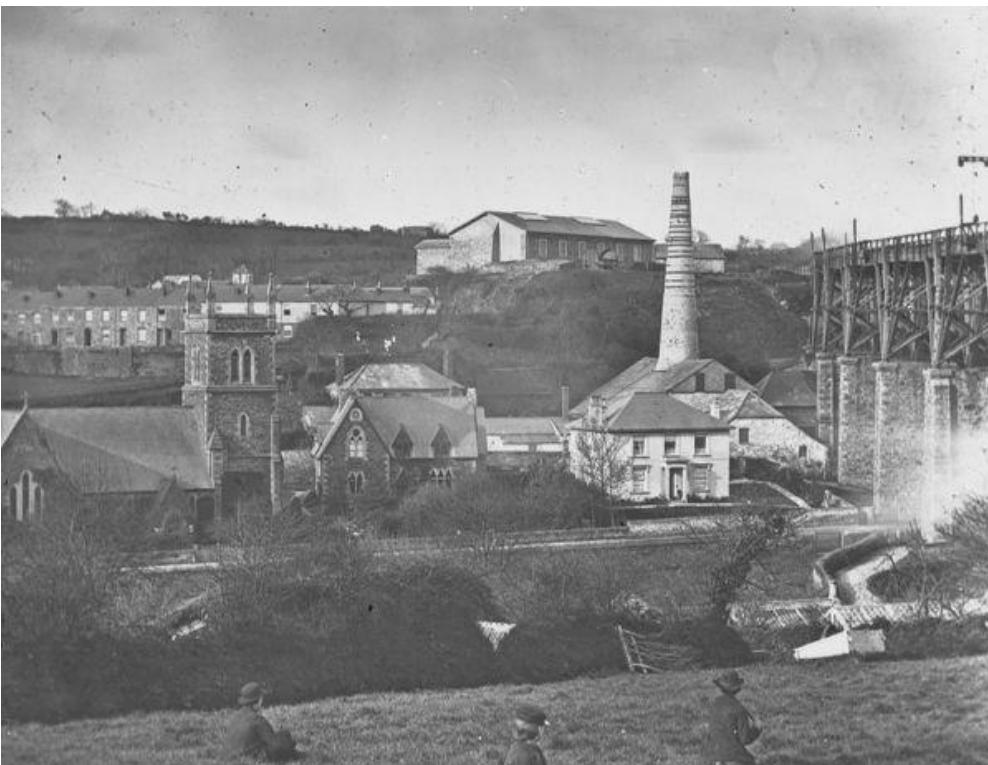
# 10. Chesapeake Bay & the “White Slaves” from England.



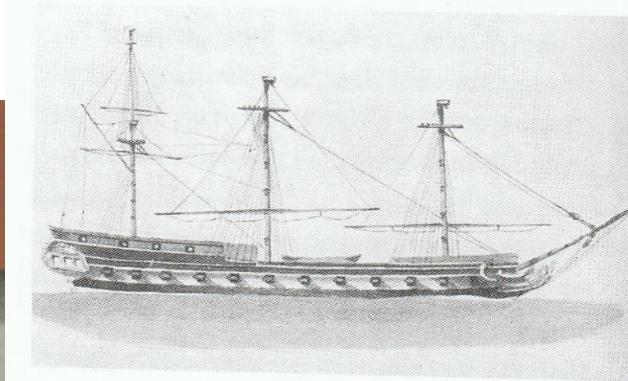
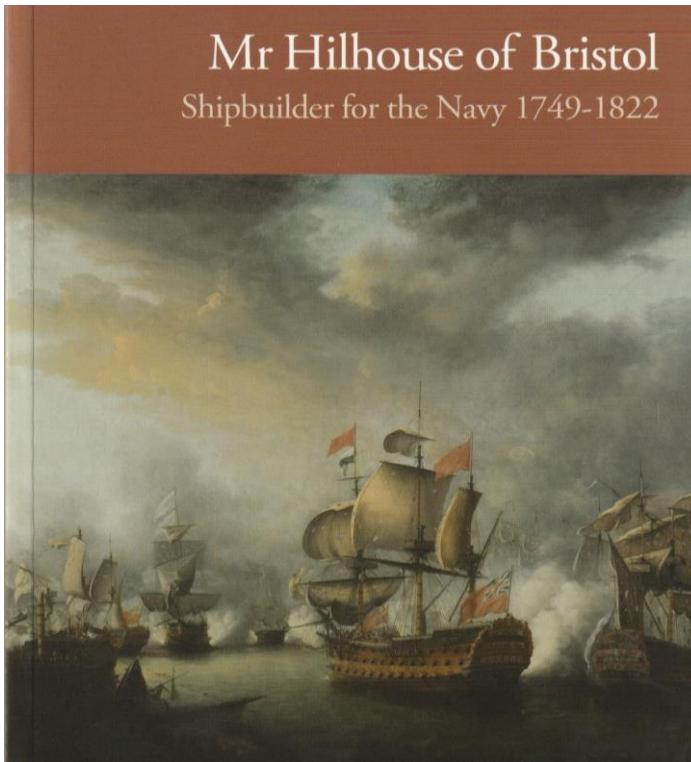
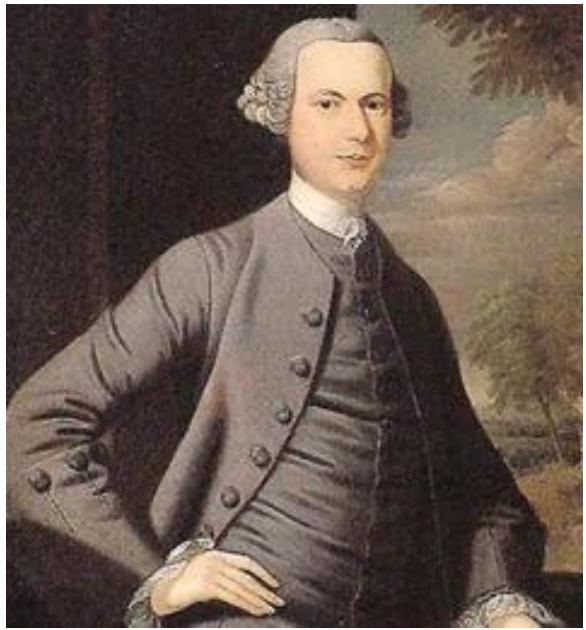
In CONGRESS, July 4, 1776.  
**A DECLARATION**  
By the REPRESENTATIVES of the  
UNITED STATES OF AMERICA,  
IN GENERAL CONGRESS ASSEMBLED.



# 11. Robert Bush & Co- pewterer.

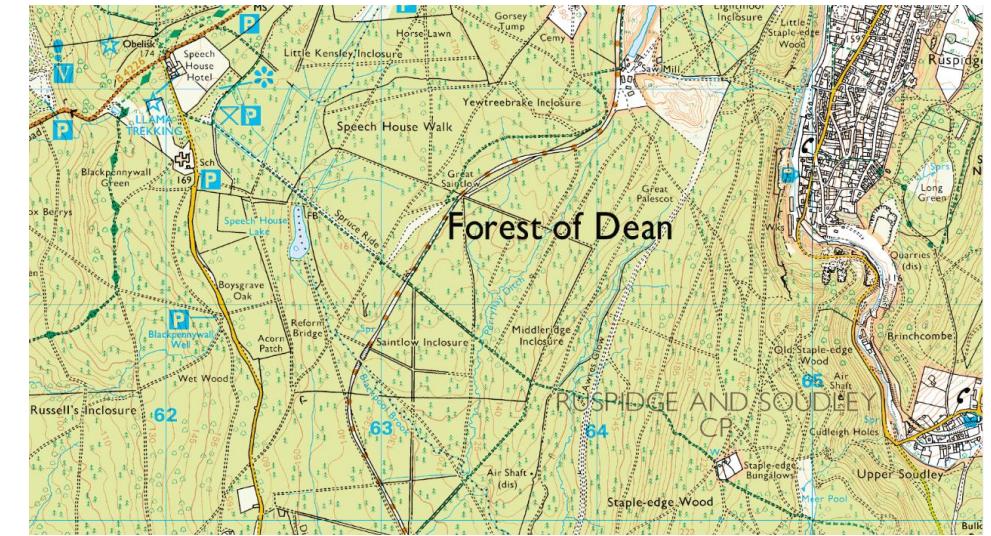


# 12. Mr. Hilhouse of Bristol 1749-1822.

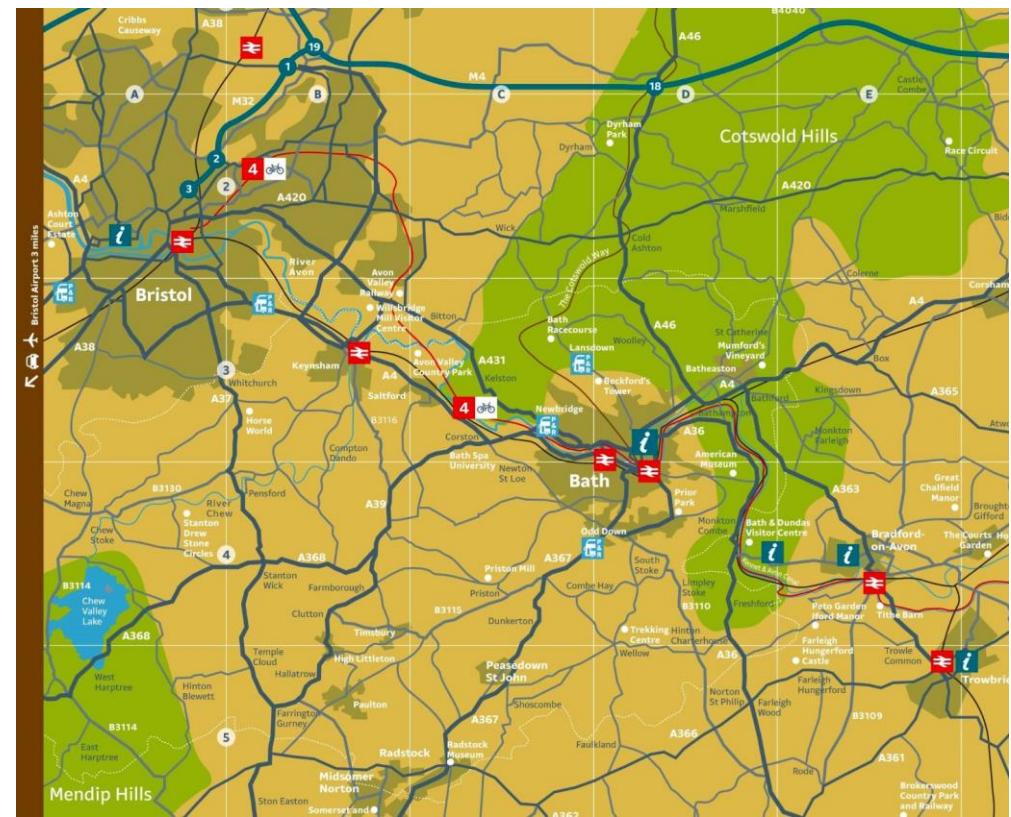


The privateer *Mars*, print after Pocock. Built on the lines of HMS *Ceres* in 1779 by Hilhouse for a consortium including his father-in-law, George Bush, she was lost in a storm off the Azores on her first voyage.

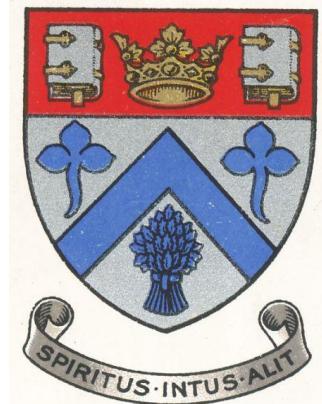
© Bristol's Museums, Galleries & Archives



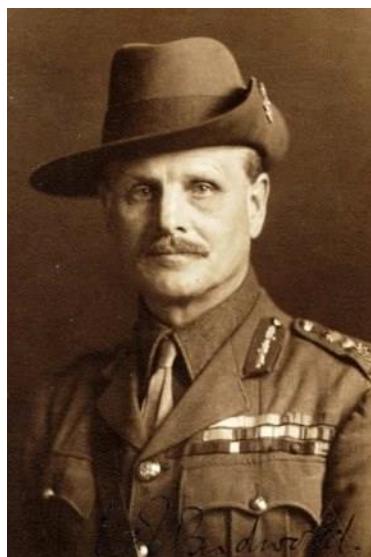
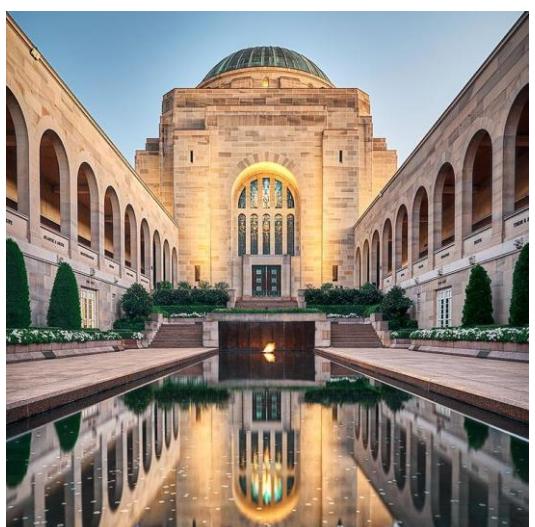
# 13. The Bush's of Beach, Bitton near Bath.



# 14. Clifton College, Bristol.



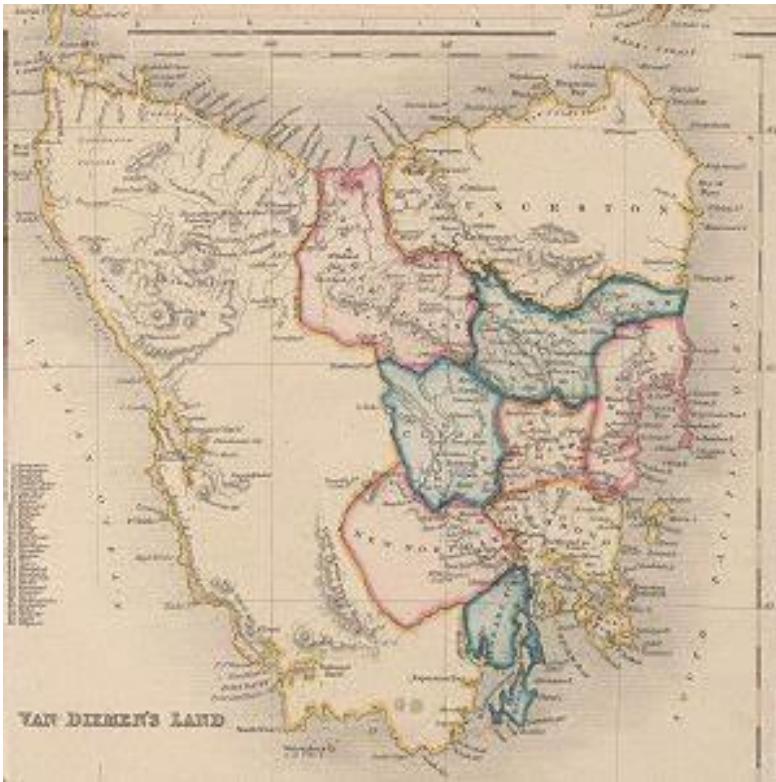
# 15. Clifton College Students & Sport.



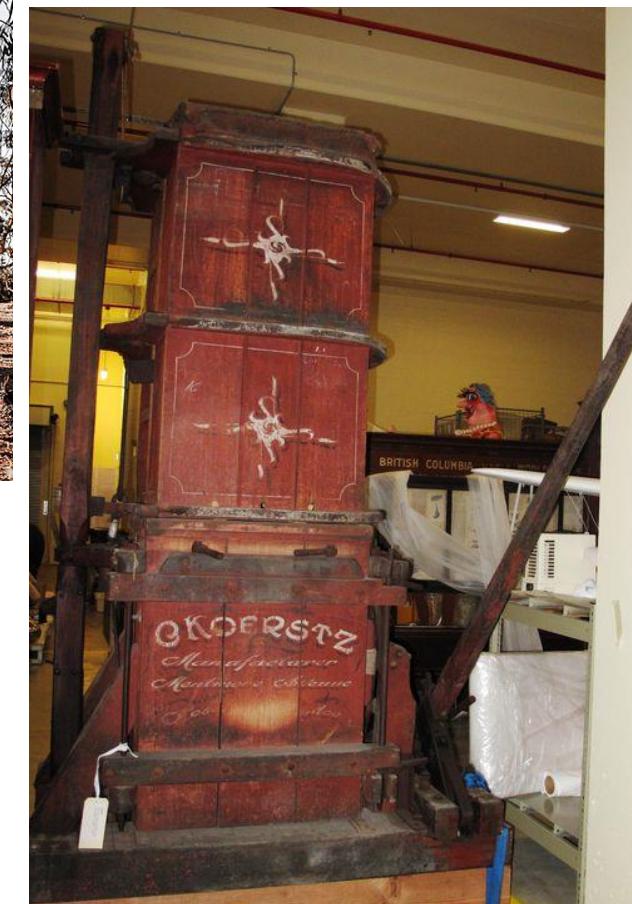
*Clifton Rugby Team 1875 - 76*

Here is an interesting group of Clifton Rugby Club, of 1875-6, referred to in "Sporting Memories." The players are:—  
Top Row: W. Fairbanks, J. Curtis, W. Strachan, J. H. Dunn, J. A. Bush, A. C. St. Paul, E. P. Warren, E. Phillips, F. Morris and J. G. Thomson. Middle Row: W. Gribble, W. R. Webb, C. Strachan (captain), J. D. Miller, W. S. Paul, M. Curtis. Bottom Row: E. J. Taylor, R. E. Bush and H. Nash.

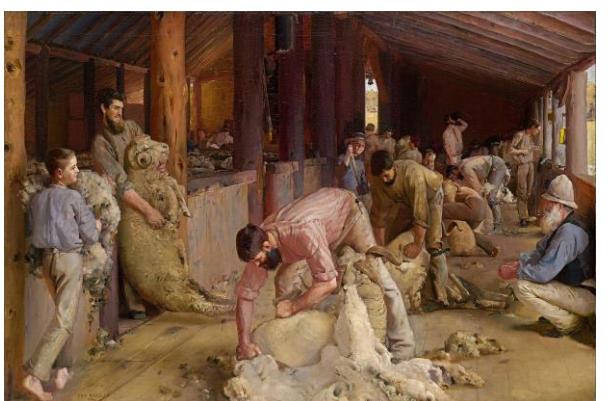
# 16. Major Robert Bush to Swan River Colony 1849.



# 17. Robert Edwin Bush in W.A. at “Bidgemia”.



# 18. The wool trade.



# 19. Robert Edwin Bush in Perth.



## THE AUSTRALIAN CONSTITUTIONS ACT, 1850.

(13 & 14 Vic. c. 59), ss. 6, 34-36.

(Imperial.)

AS AMENDED BY

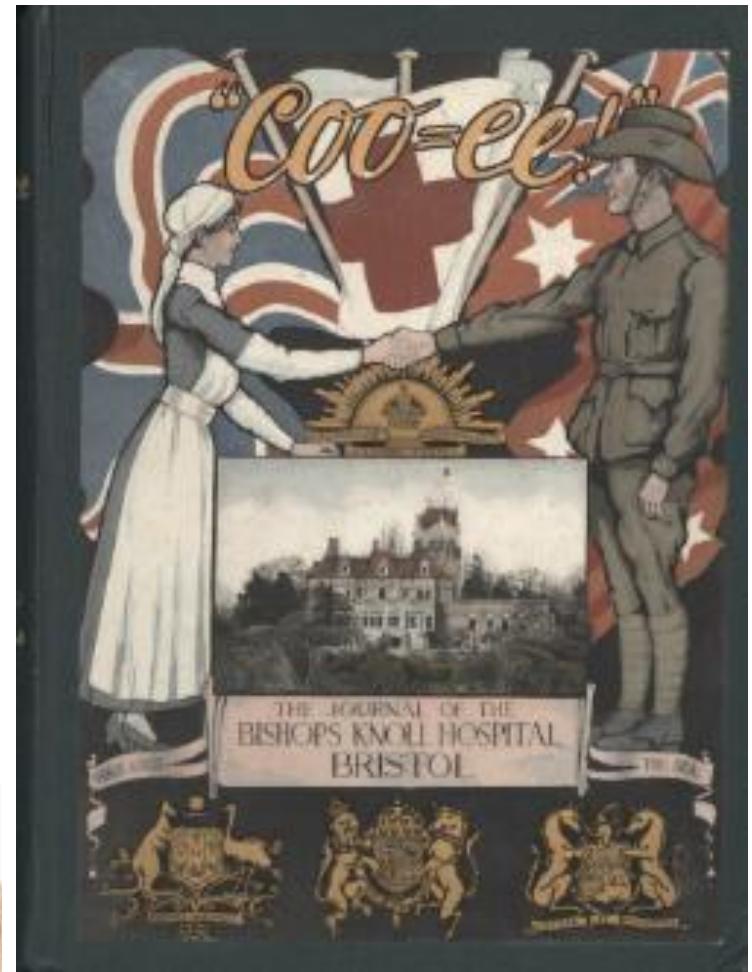
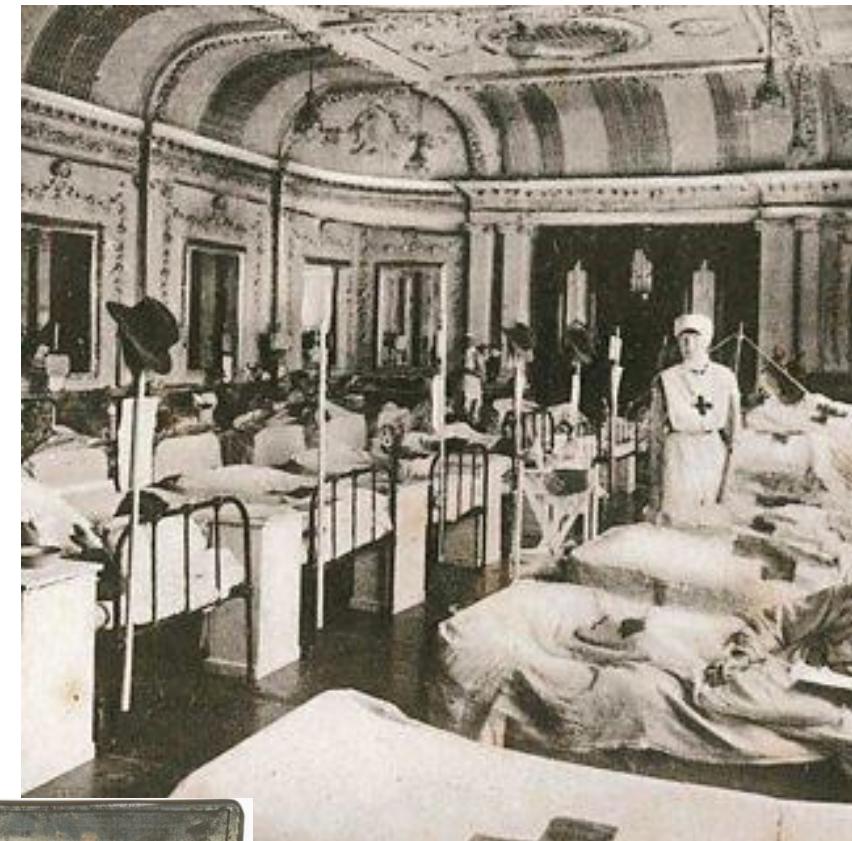
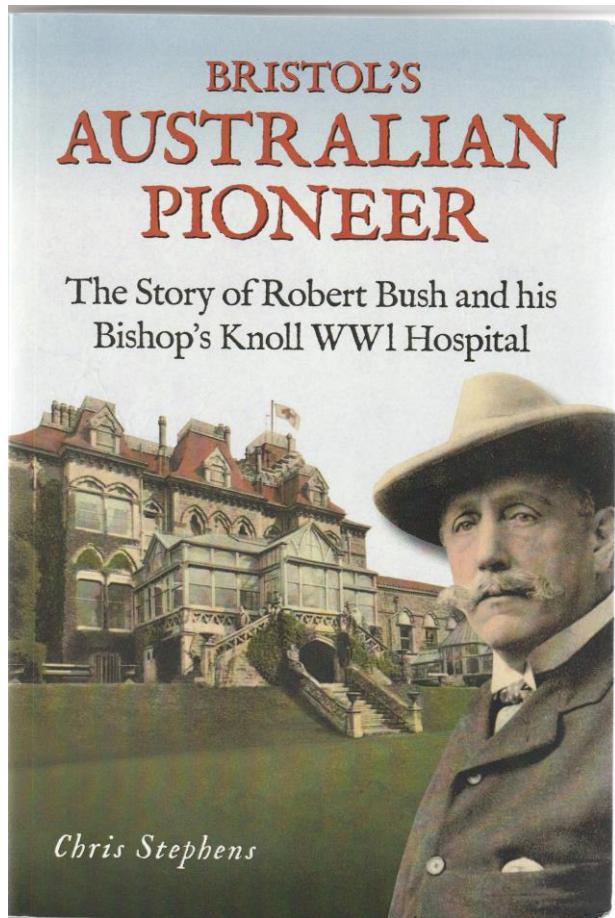
The Statute Law Revision (No. 2) Act, 1893 (56 & 57 Vic. c. 54).

An Act for the better Government of Her Majesty's Australian Colonies.

[5th August, 1850.]

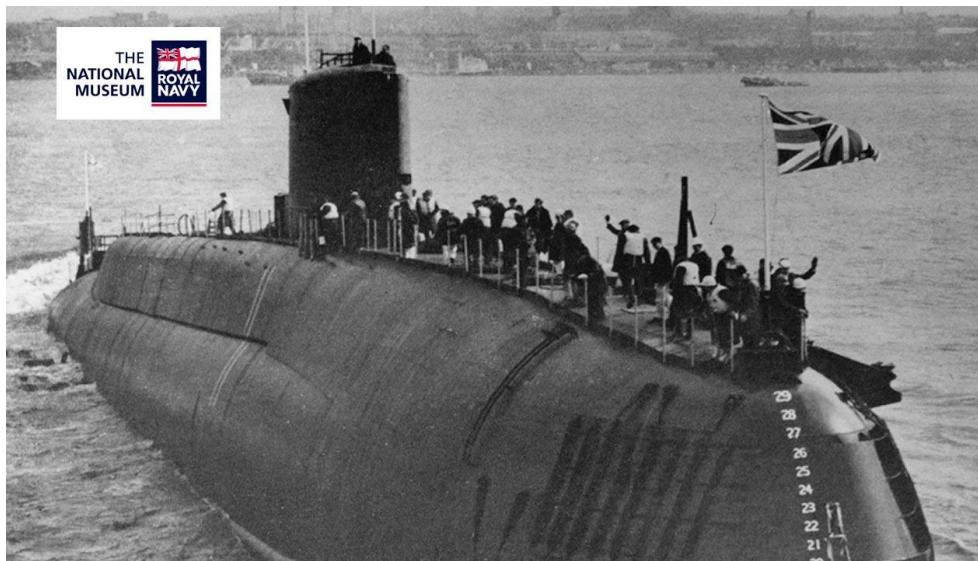
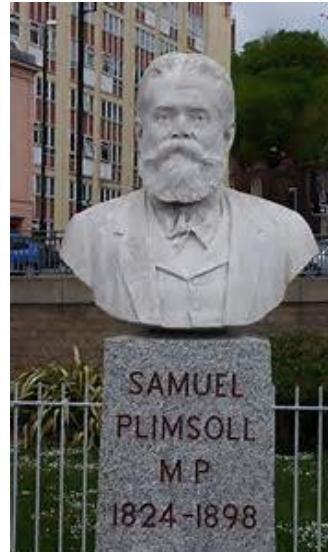
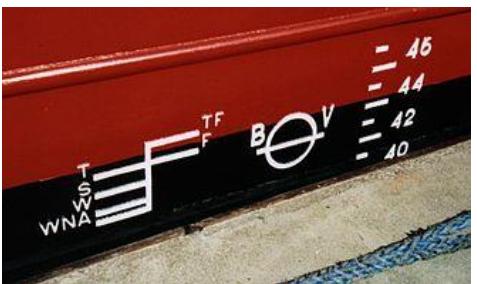


# 20. Bishop's Knoll Hospital Bristol 1914-1918.

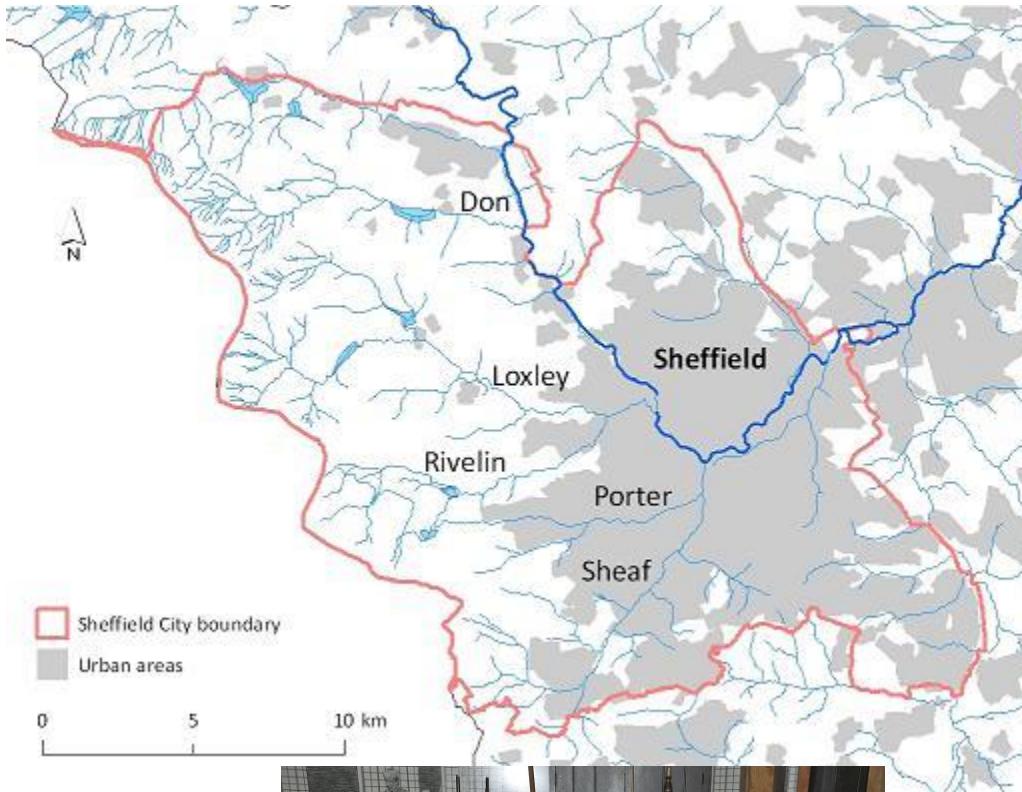


# 21. Admiral Sir John Fitzroy Duyland Bush

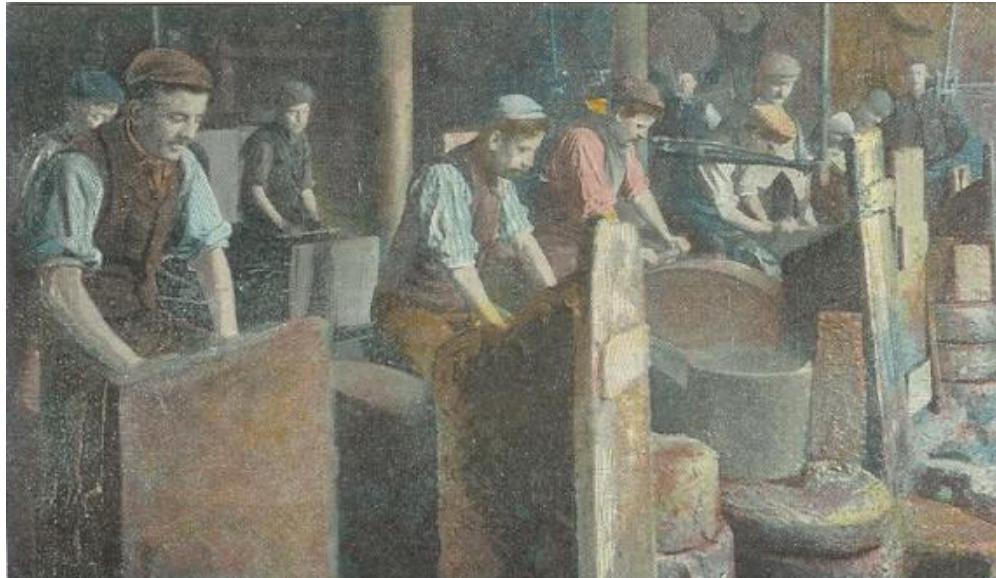
## 1914-2013.



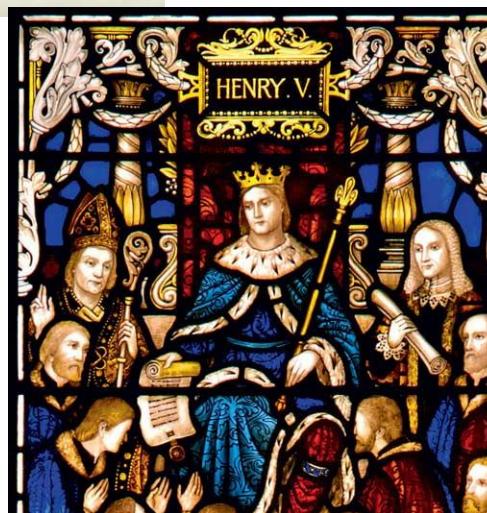
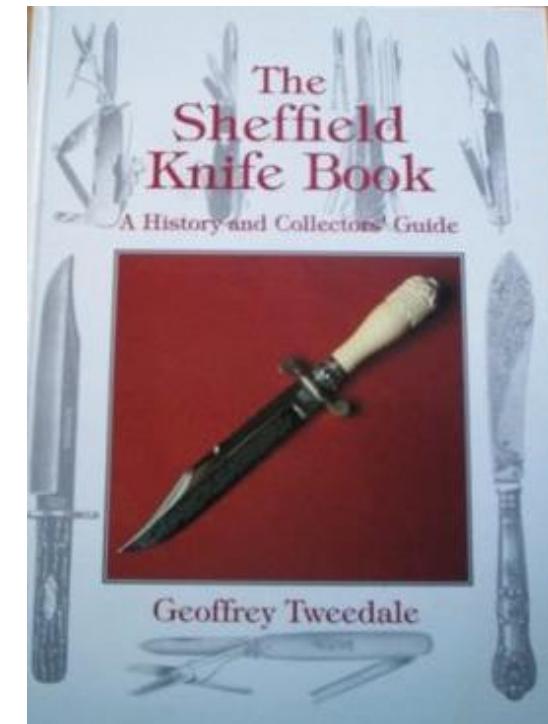
## 22. The Smith's of Sheffield 1745- 1842.



# 23. Sheffield cutlery.



Reproduced by permission of Beads, Ltd., Sheffield. Cutlers at Work, Sheffield.



# 24. Sheffield early industry.

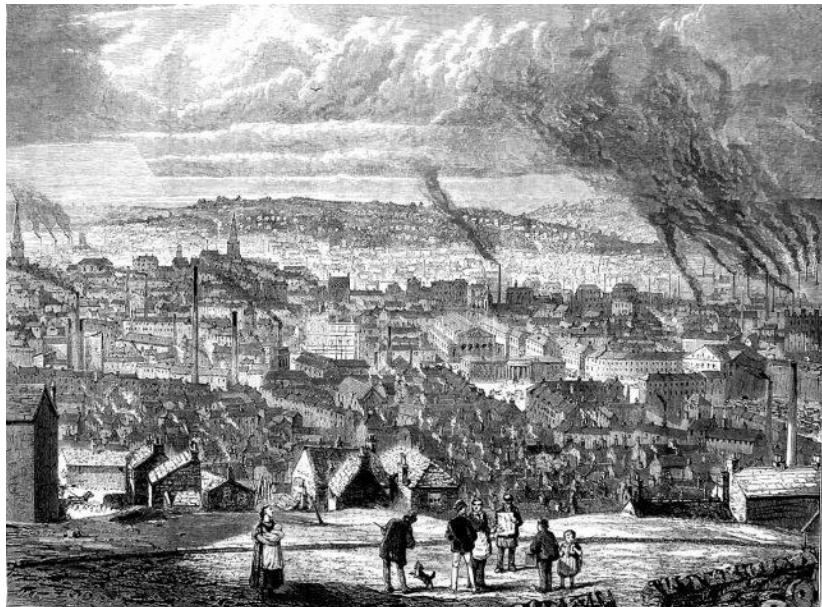
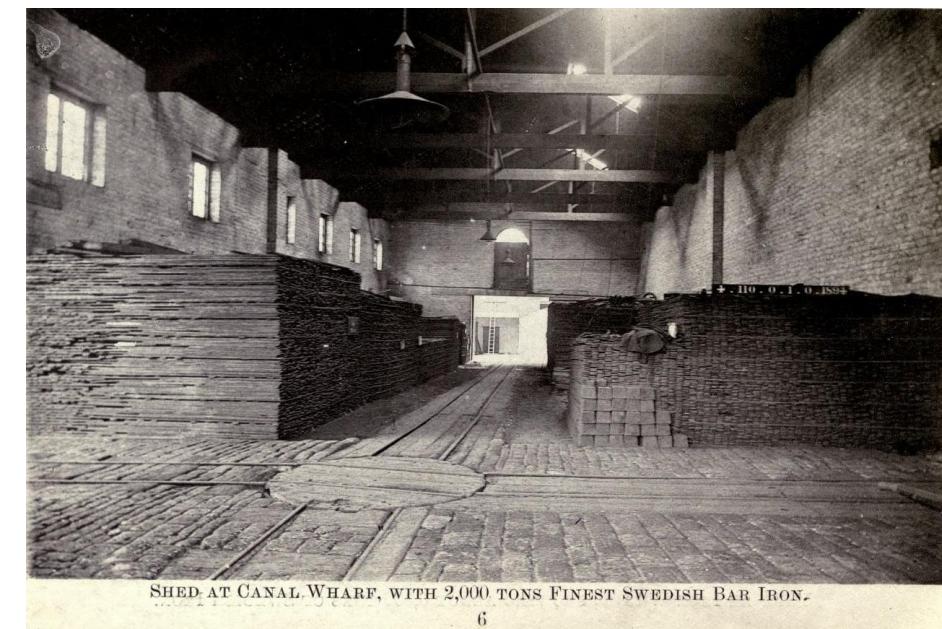
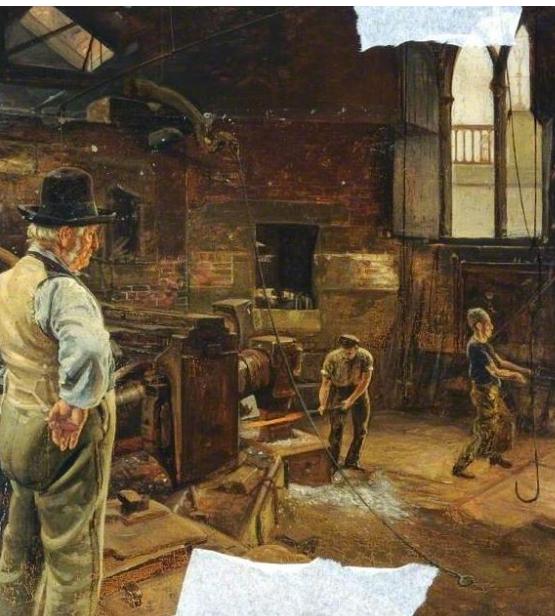
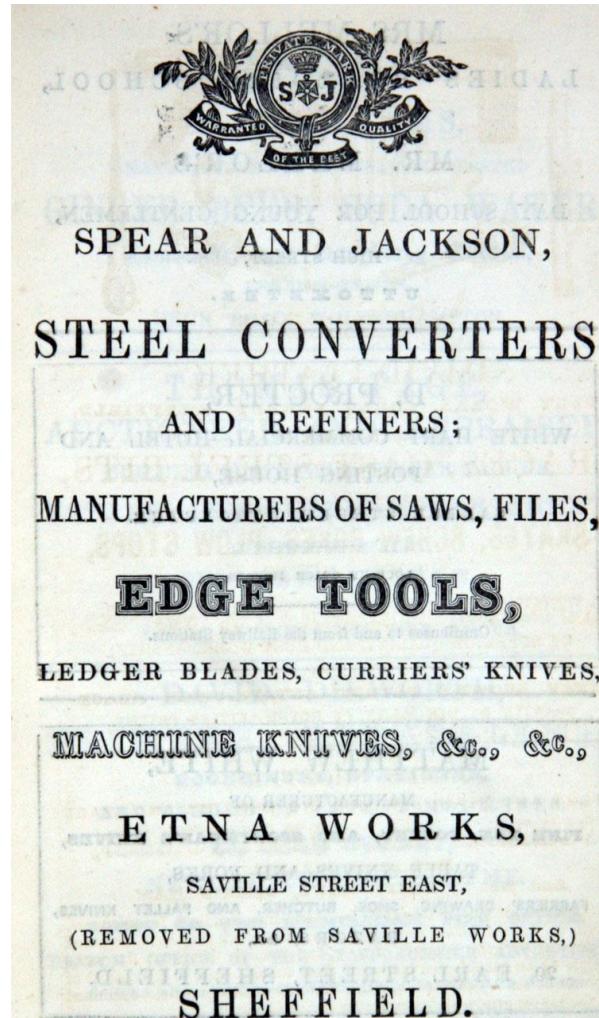


PLATE 29. The Last Melt at Shoreham Street, Whit-week, 1953.

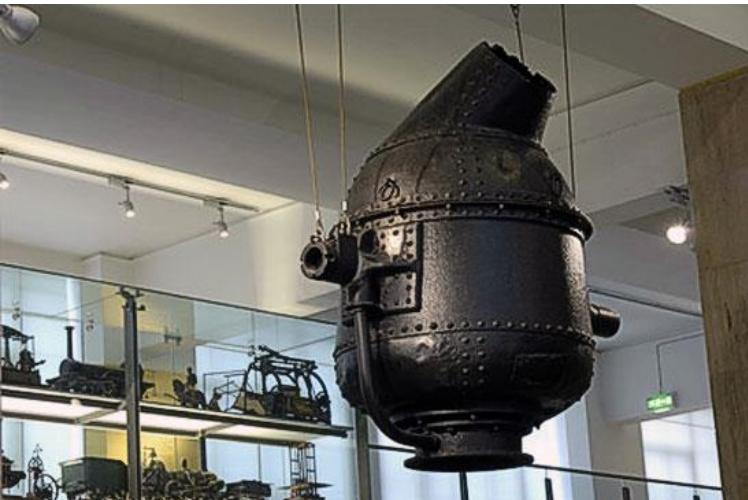
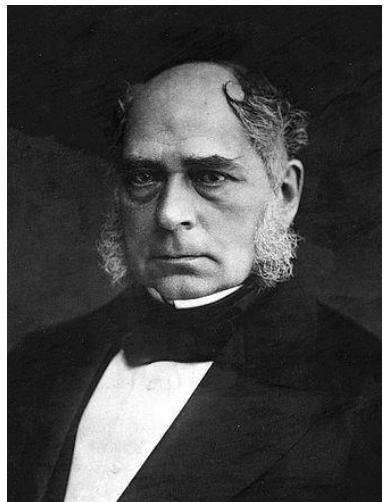


SHED AT CANAL WHARF, WITH 2,000 TONS FINEST SWEDISH BAR IRON.

# 25. Bowie knife & other Sheffield cutler products.



## 26. Bessemer & Sheffield heavy industry.



# 27. Sheffield steel industrialists.

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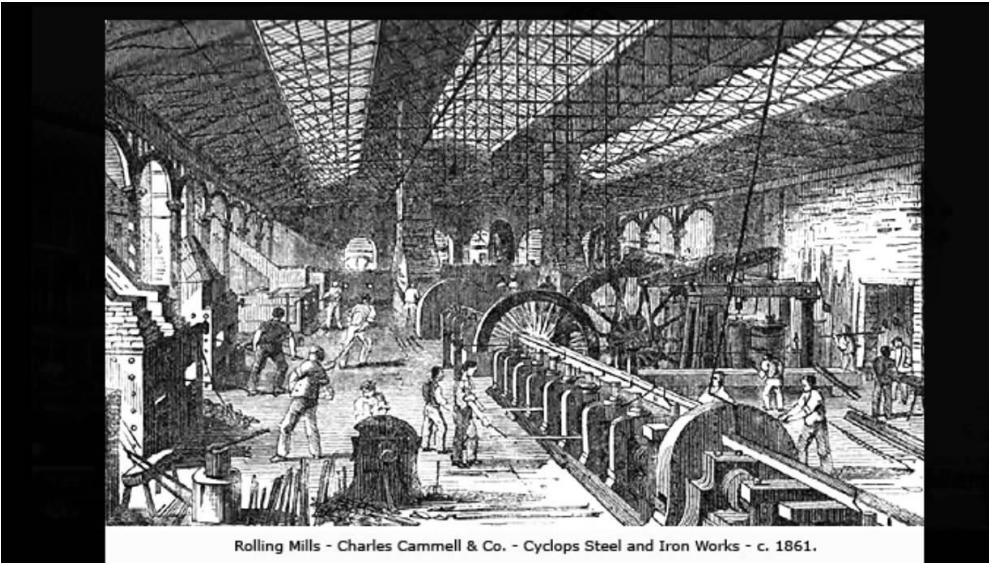
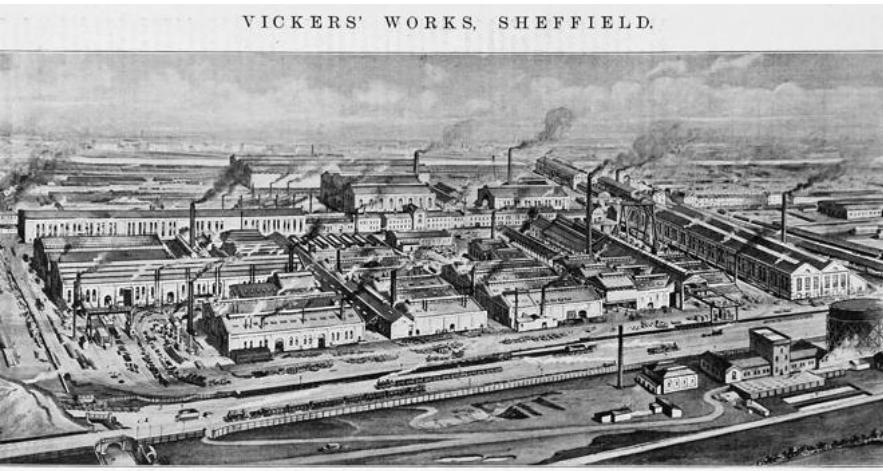
**ATLAS SELF HARD HIGH SPEED TOOL STEEL,**

*As used by H.M. Arsenal and Principal Shipbuilding and Engineering Firms.*

**MARINE BOILER FURNACES.**

**ROBERT STEEL CASTINGS.**

VICKERS' WORKS, SHEFFIELD.



Rolling Mills - Charles Cammell & Co. - Cyclops Steel and Iron Works - c. 1861.



*The Principles of  
Scientific Management*

BY  
FREDERICK WINSLOW TAYLOR, M.E., Sc.D.  
PAST PRESIDENT OF THE AMERICAN SOCIETY OF  
MECHANICAL ENGINEERS



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should figure in every specification. They are adjustable in every specification. They are available for wear and sustain end thrust.

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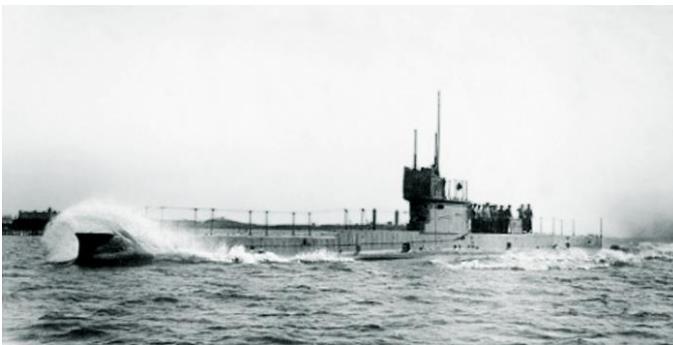
**JOHN BROWN  
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**T**HE extensive works of Messrs. John Brown & Co., Ltd., at Clydebank, are particularly well equipped for the construction of Passenger and Cargo Steamships up to the largest size and power, and the Atlas Works, Sheffield, for the manufacture of Turbine Forgings, Crank Shafts, Alloy and Tool Steels and Corrugated Marine Boiler Furnaces.

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**SHEFFIELD. BIRKENHEAD.**  
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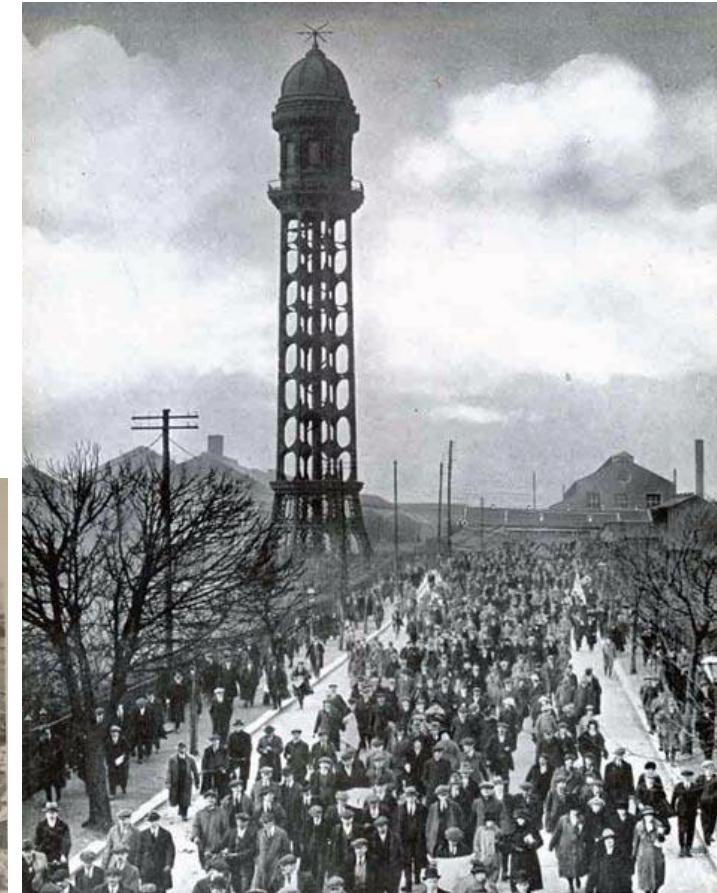
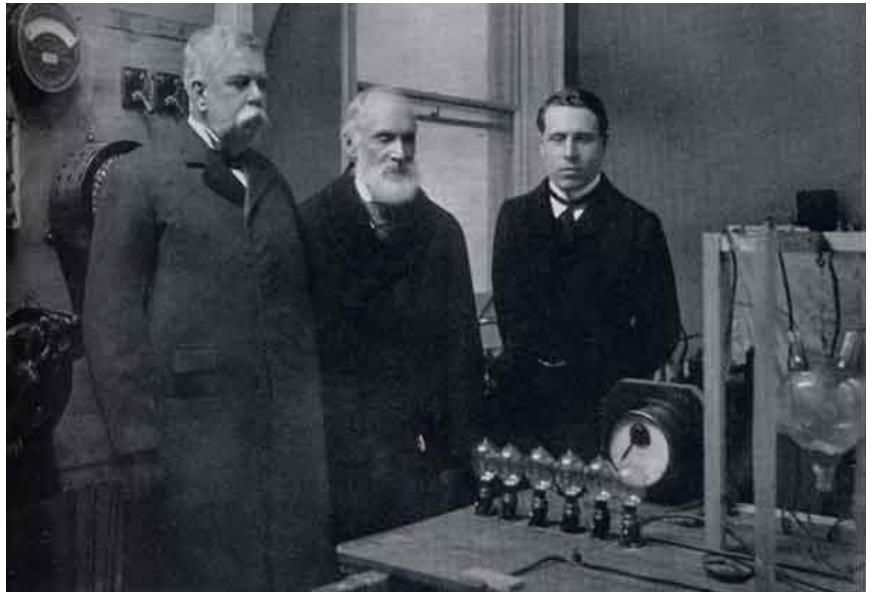


*A Super-Dreadnought in one of the Company's private Graving Docks.*

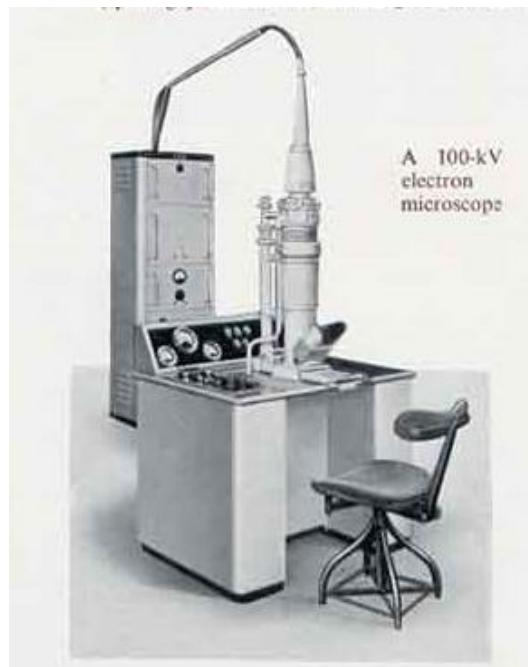
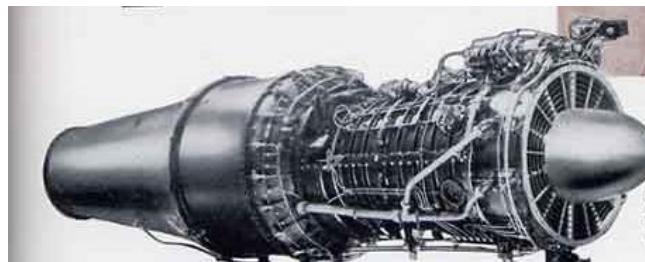


# VSEL

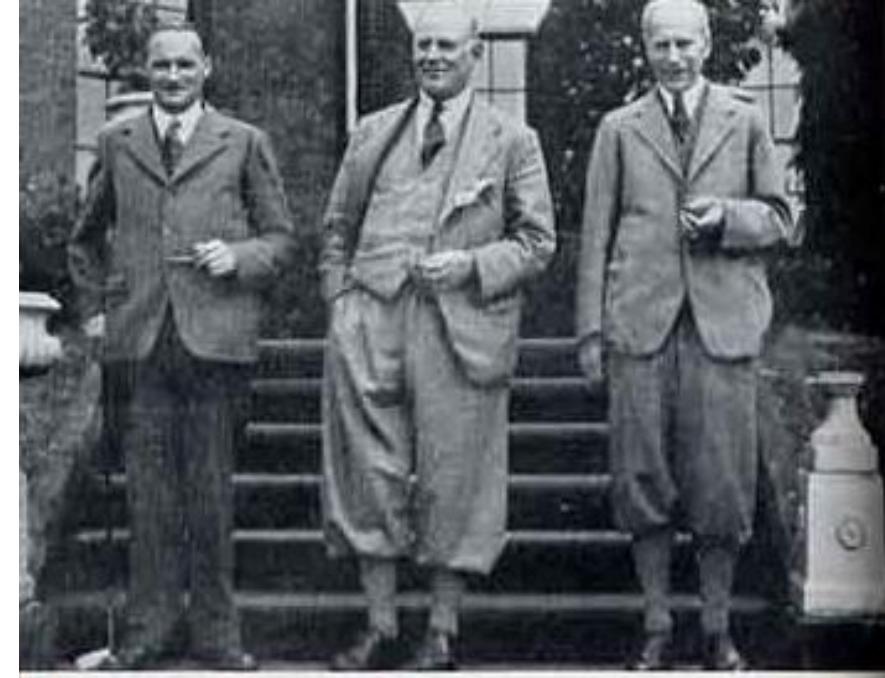
## 29. British Westinghouse (1899-1919). Manchester, Trafford Park.



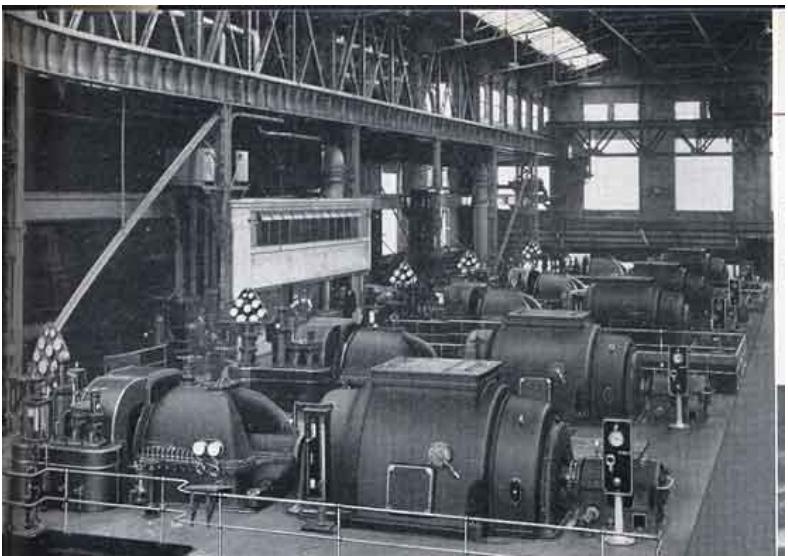
# 30. Metropolitan Vickers: Metro-Vick.



A 100-kV  
electron  
microscope

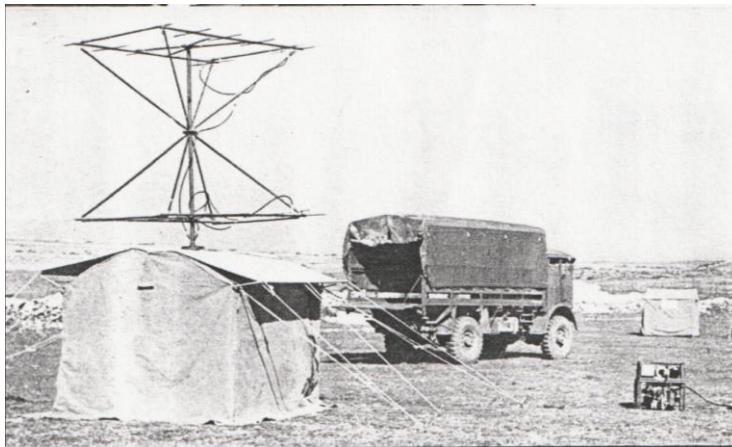
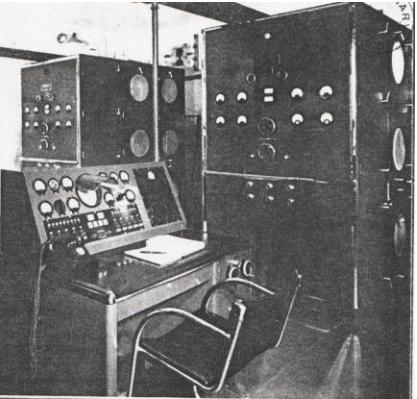
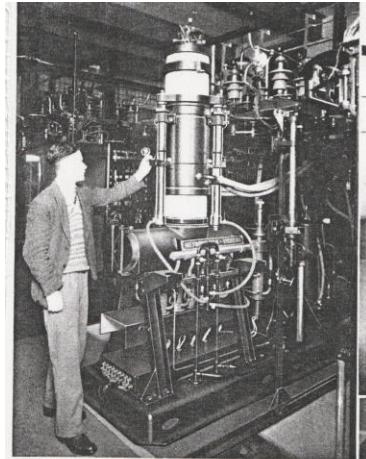


Design and manufacture relax: BAUMANN, BAILEY, and PECK



The M-V aircraft factory:  
the first Manchester bomber  
completed, December 1940

# 31. Metro-Vick Radar.



Above: 500 kW demountable continuously-evacuated thermionic valve installed at Rugby in 1933 for the G.P.O.; the discoveries embodied in this valve made long distance radar transmission possible.

Above, right: Interior of an early CH radar transmitter station, 'East Coast' type, with demountable valves.

Centre, right: CH radar transmitter station of the type in use early in the war.

Below: Aerial towers for one of the early CH stations.

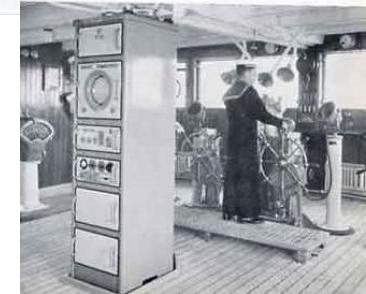
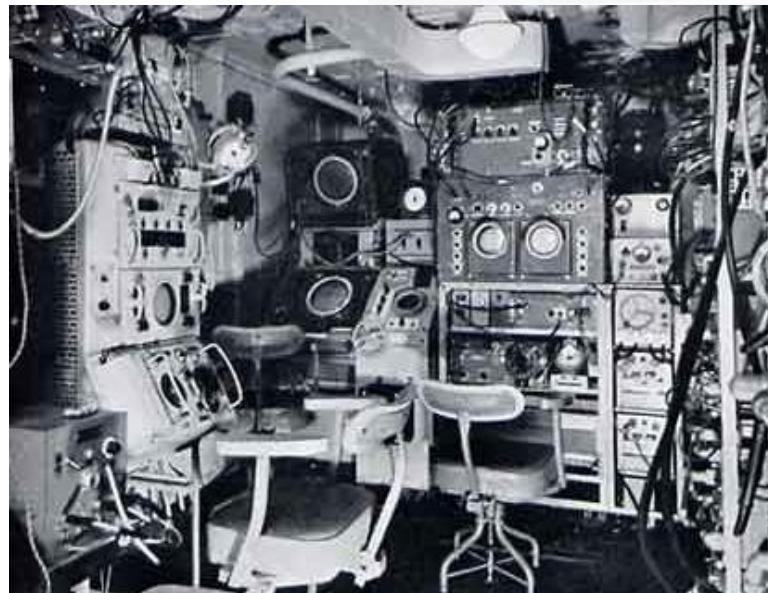
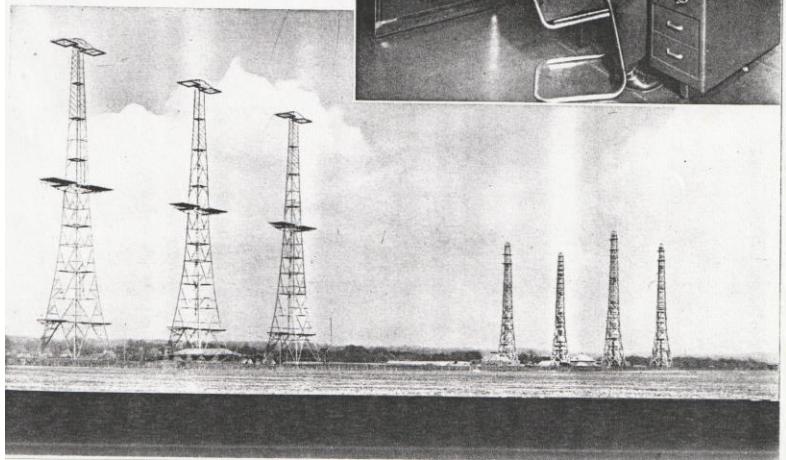
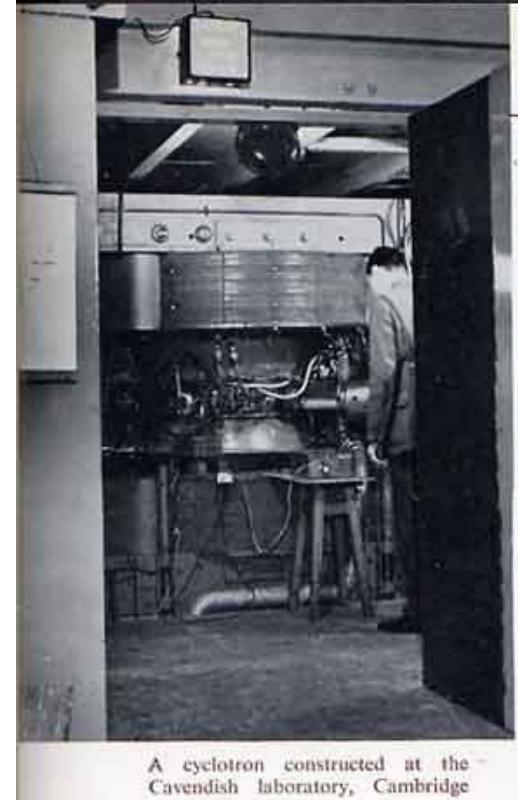


Figure 1. Visit of Lord Rutherford of Nelson on 19 November 1931 to the High-Voltage Research Laboratory of M-V, which he had opened in the previous year. From left to right: back row, R.W. Bailey (FRS 1949), G. McKerrow, A. P. M. Fleming, B. G. Churcher, K. G. Maxwell; front row, C. R. Burch, Lord Rutherford, T.E.A. (Photograph supplied by the Research Department (Metallurgical Section), Metropolitan-Vickers Electrical Company Ltd.)

## 32. AEI (Metro-Vick & BTH) Research.



A cyclotron constructed at the  
Cavendish laboratory, Cambridge

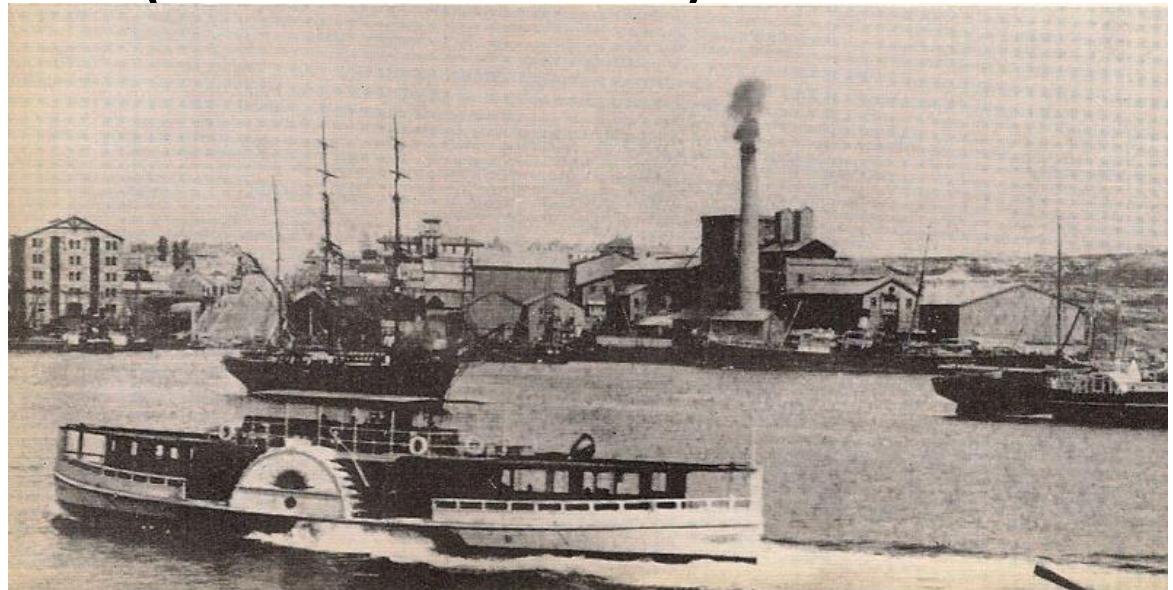
G.E.C.



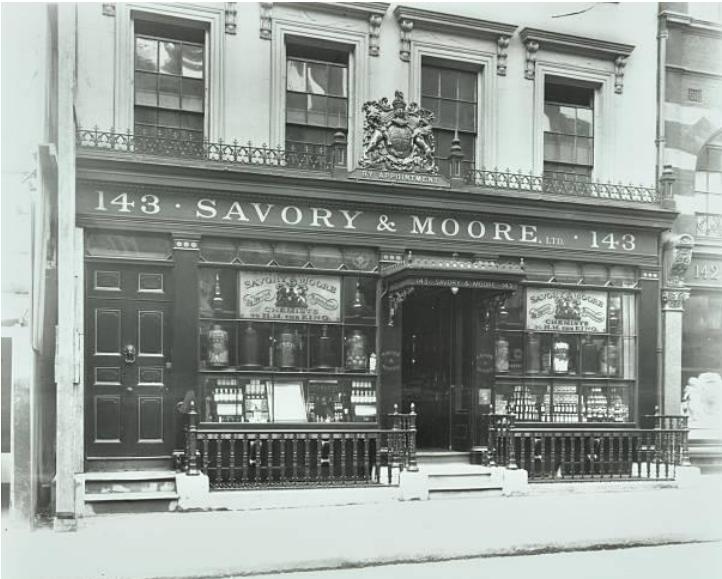
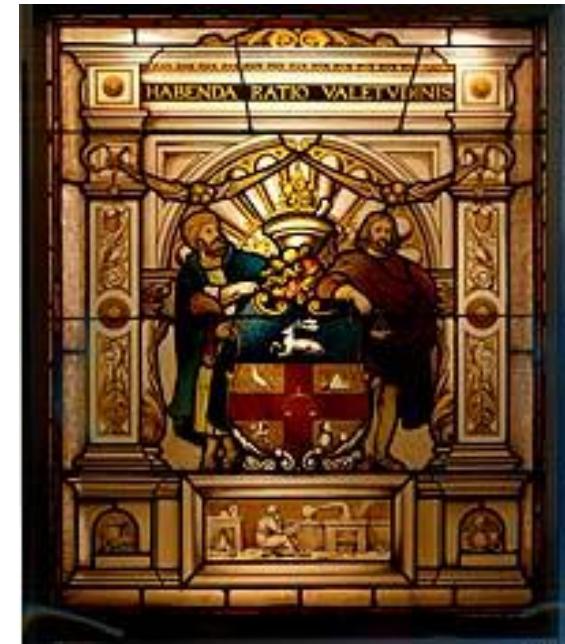
# 33. Vickers Ltd & Vickers-Armstrongs.



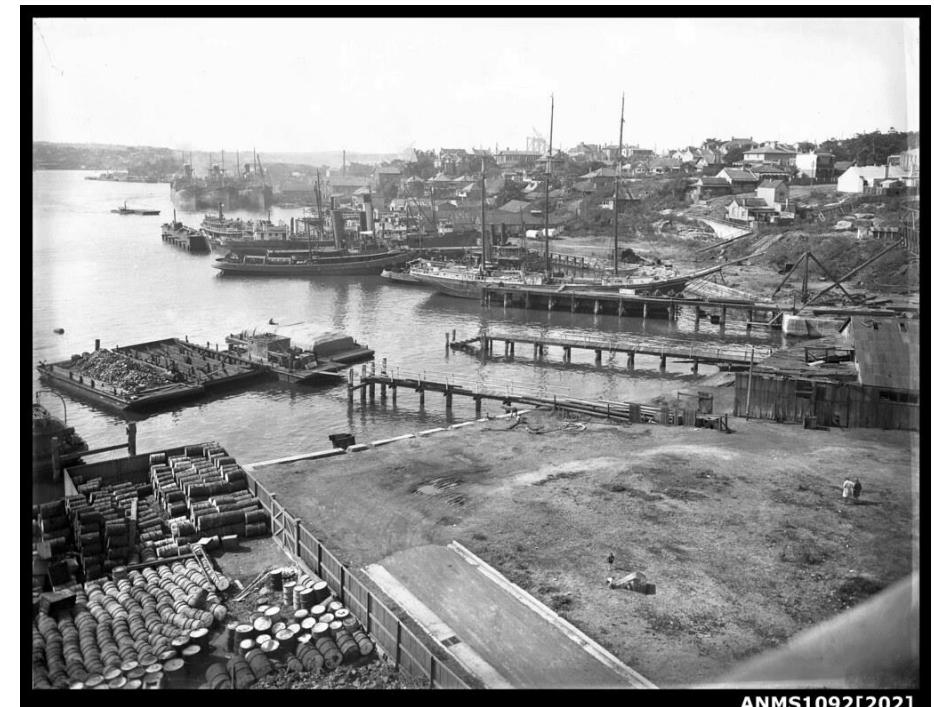
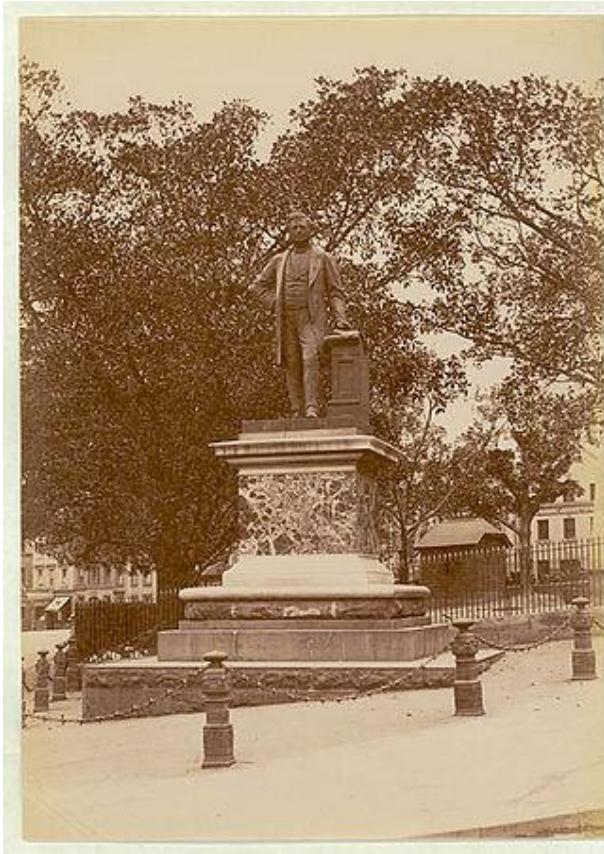
# 34. Henry Robinson Smith (1810-1879).



# 35. William Francis Molesworth (1817-1859) & the RPS (Royal Pharmaceutical Society).

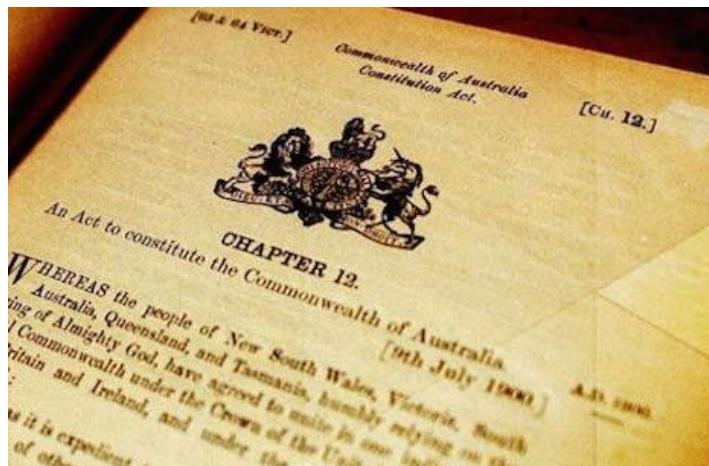
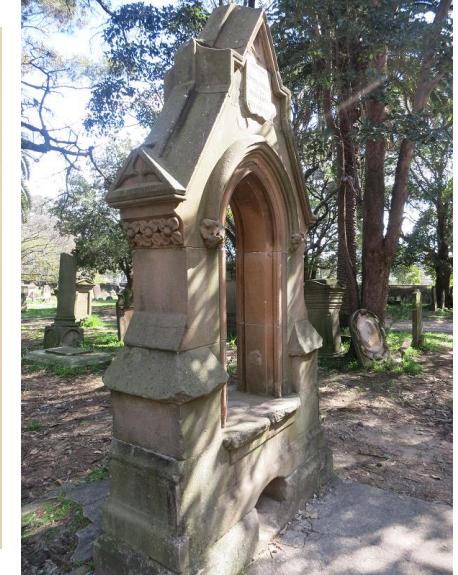


# 36. William Molesworth & Thomas Sutcliffe Mort (1816-1878).



ANMS1092[202]

# 37. Edmund William Molesworth (1848-1923). & Sir George Reid MLA, PM: (1845-1918).

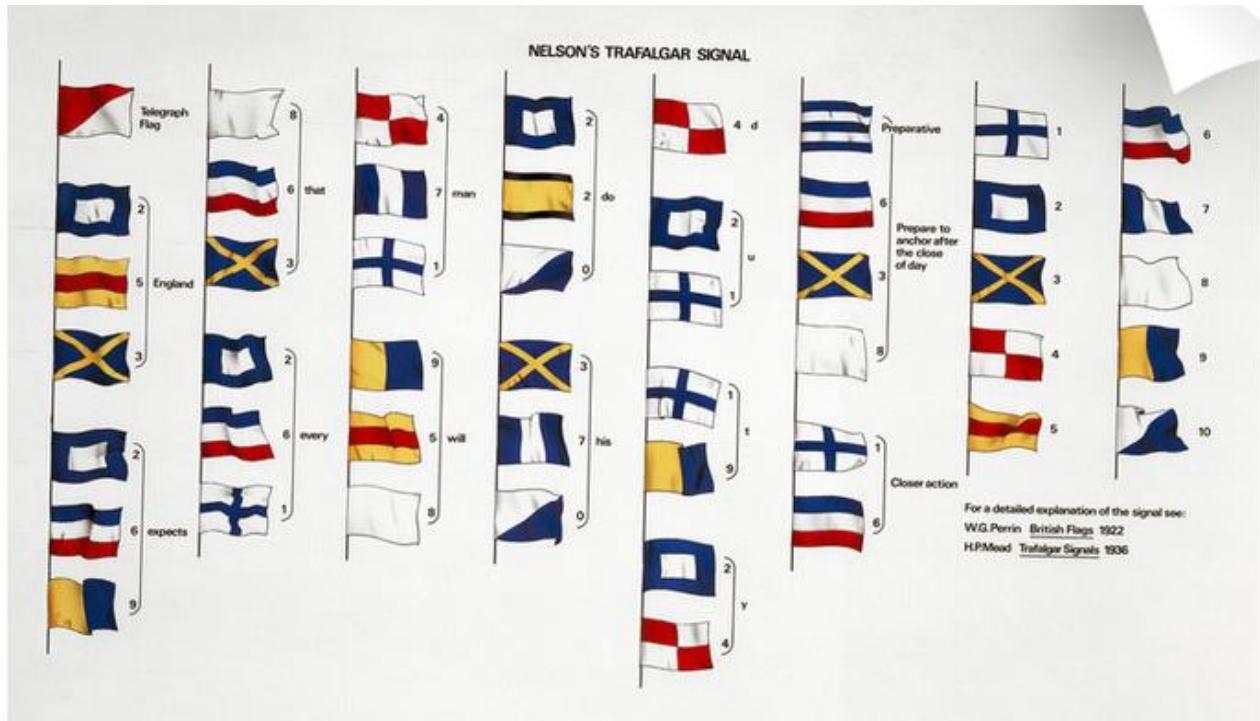


Australia Act 1986

# 38. Richard Molesworth-Trafalgar, 1805.



H. M. S. BRITANNIA  
ENTERING DEVONPORT HARBOUR.



## **Bush, Smith & Molesworth Australian Pioneers: a Madsen Legacy.**

Prepared by: Roger Madsen, November 2021.

### **Introduction.**

Bristol, Sheffield & London in the 1800's were where the English forebears of the Madsen family in the shape of Bush, Molesworth & Smith male relatives had their origins, arriving in Australia as immigrants in the 1840's & came together on the marriage of J.P.V. Madsen (1879-1969) to Maud Foster Molesworth (1879-1932) in 1904 at Newtown in St Stephens Anglican Church.

The Bush family were native to the maritime city of Bristol & the Smiths were from the steel city of Sheffield whilst the Molesworths were from the Oxford region. William Francis Molesworth (1817-1859) had gained experience as a chemist in London before arriving in Sydney & was a member of the newly founded RPS (Royal Pharmaceutical Society of London). Over several hundred years from the 1600's family sizes were quite large (7-10 children) so the family thread back in time is only a thin representation of the circumstances which were encountered with occupations changing with the advance of the industrial era & in many cases showing signs of considerable enterprise & willingness to engage in public life & as "master" of the Society of Merchant Venturers (Bristol) & also of the Cutlers in Sheffield.

In Australia Edmund Molesworth (1848-1923) was elected to the NSW parliament (Legislative Assembly) for some 10 years & Robert Bush (1855-1939) was a member of the Legislative Council in Perth in the 1890's & they had experience in the transition to self-government following the end of transportation to Australia. The transition to end slave trafficking out of Africa had a considerable effect on Bristol & following the American War of Independence (1775-1783) the British "White Slave Trade" (59,000 in the period 1614-1793) there ended leading to the 1<sup>st</sup> Fleet arrival in Sydney in 1788 which continued in Australia until 1868 to the Swan River Colony with a total of 168,000 convict arrivals over 80 years..

In Sheffield during the 1800's the transition from crucible steel used in the very extensive cutlery trade, especially to North America, to heavy industrial steel production, using the Bessemer steel process, used for railways & shipbuilding generated great profits which were used by several major steel makers (Vickers, John Brown & Cammell) to acquire ship building companies & later also to acquire British-Westinghouse, the US Electrical equipment manufacturer started in Manchester in 1899 & which became Metropolitan Vickers in 1919.

These great enterprises especially engaged in naval defence in two World Wars & in the case of Metro Vick had a pioneering role in British radar Chain Home & many other types of radar for WW2 which is quite remarkable. These enterprises typically existed for many years but export competitors from outside Britain eventually led to their restructure & the loss of familiar brand names. Industrial & scientific research played a vital role from an early date both as applied & for fundamental use in industry & many leading scientists obtained FRS (Royal Society of London) membership for their work & at Manchester Ernest Rutherford inspired many researchers at Metro- Vick.

In retrospect, it can be seen that Vickers' role in the Battle of Britain with its development & production of Chain Home radar transmitters & the Supermarine Spitfire was crucial & deserves an enormous amount of credit.

In the field of education in Bristol, Robert Bush (1809-1877) was involved with establishing Clifton College in 1862, built as an impressive Gothic Revival group of buildings teaching along the lines of the Rugby School with an emphasis on science & sport & has produced many notable students

including C.E.W Bean the famous Australian war correspondent in WW1 & founder of the Australian War Memorial.

Reference is made throughout this story of various inventions such as the mechanical Wolseley sheep shearing clippers & the Koertz wool press used from 1890 in the Australian wool industry which was vital to export earnings & used by Robert Edwin Bush (1855-1939) from 1890 at his Bidgemia (Gascoyne) property in Western Australia & from the fortune he made he was able to run a hospital in Bristol during WW1 for Australian casualties, a remarkably generous act.

An interesting story from Bristol in timber ship building for the Royal Navy from 1770 concerns Mary Bush (1755-1827) who was the older sister of Robert Bush (1760-1829) who married James Hilhouse (1749-1822) who inherited family capital & after a very thorough 7 year apprenticeship with the RN at Chatham (1765-1772) commenced timber ship construction using oak from the nearby Forest of Dean in his shipyard on the Avon with its 30 foot tide. At about this same time the Bush family at Bitton near Bath were involved as maltsters & brewers for the London visitor trade.

### **1. Bush, Smith, Molesworth Australian pioneers. A Madsen legacy.**

From the left the photos are John Bush of Bristol & Gresford (1815-1887), his wife Mary Anne Steer (1808-1884) from Cornwall then Clara Smith (1856-1929) & her husband Edmund William Molesworth (1848-1923) & their daughter Maud Foster Madsen (1879-1923) & her husband John Percival Vissing Madsen (1879-1969).

### **2. A Bush Family Tree.**

The Bush tree starting from John Bush (1489- ) the brother of Paul Bush (1470-1558) the 1<sup>st</sup> Bishop of Bristol leads down to William Bush (1677-1754) & his wife Eleanor England (1693-1759) who had 13 children & the lines of 3 of their sons (George Bush [1729-1801], Thomas, & James [1736-1802]) are shown.

In 1809, at the marriage of George Bush (1771-1846) to Susanna Bennett ( -1852) in Bristol at St.Thomas Church, George is recorded as being a cooper.

John Bush of Gresford is descended from Thomas Bush & Susanna Coates & in the 1890's Catherine Bush (1859-1959) "Aunty Kitt", (a daughter of John Bush & Mary Steer) was in contact with her cousin Fitzroy Bush (1850-1940), a solicitor in England who had taken up the task of recording the Bush ancestry with the Clarenceux of Arms. Fitzroy Bush married later in life & had 3 children the second of which is Admiral Sir John Fitzroy Duyland Bush (1914-2013) who had a remarkable career with the RN.

James (1736-1802) married Susannah Whittington who was descended in family name from Richard "Dick" Whittington (c.1354-1423) the 3 times Lord Mayor of London who was born in the Forest of Dean near Bristol. (The fairy tale of Dick Whittington & his cat is well remembered).

The 3 Robert Bush (1769-1939) descendants from George Bush (1729-1801) had a considerable interest as a merchant trading with North America, with the British army at the Swan River colony & as a pastoralist on the Bidgemia property in the Gascoyne region of Western Australia.

It appears that the 9<sup>th</sup> son of William & Eleanor was Robert Bush (1734-1800), a successful Bristol Pewterer whose 2 sons in turn became pewterers trading as Robert Bush & Co (also Robert Bush & Son) through to the 1<sup>st</sup> quarter of the 19<sup>th</sup> century as major exporters.

From the College of Arms the Bush (alias Duyland) crest is a goats head with sinister horns & the 4 quarters are 1. & 4. a rampant wolf collared & chained, & at qtr 2., 3 boars with a fleur -de-lis between 2 eagles & in the 3<sup>rd</sup> quarter 2 lions. The motto is "Hope Me Encourageth" to overcome adversity it would seem.

The Bush family home in Beach where John Bush lived prior to migrating to NSW is shown.

### **3. Molesworth, Smith Family tree.**

In the Molesworth family tree it is unclear who Richard Molesworth's (1751-1814) parents were but on February 3, 1780 he married Mary Lowance (1749-1801) in St. Thomas' Church (Cathedral) in the naval base port of Portsmouth. Richard was in the Royal Navy as a midshipman & served with Nelson at the Battle of Trafalgar in 1805 on HMS Britannia. From 1810-1814 he was in the naval hospital at Greenwich. Richard's son Edmund (1785-1824) was based in Chichester 29 km east of Portsmouth as a draper & possibly benefited from being in a market town hub & near the Portsmouth-London canal. Edmund married Mary Dawes (1781-1866) in Portsmouth in September 1812 & all 5 of their children were baptized in St Olav's Church Chichester between 1813-1821, the last 2, George & Edward, appear to be twins.

William Francis Molesworth (1817-1859) married Caroline Anne Coombes (1821-1887) the daughter of a Chichester yeoman in December 1843 in Chichester & it appears they went to Banbury in Oxfordshire north of London by 1848 in pursuit of work & experience as a chemist in another prospering town on the Oxford Canal. After gaining further experience in London with Savory & Moore they migrated to Sydney in 1850.

Edmund William (1848-1923), the 2<sup>nd</sup> son of 9 children was born in Banbury & came to Sydney whilst very young & soon had to find his own way in the world as his father died at the age of 42 in 1859. Edmund became a customs agent near Circular Quay in Sydney & also became an elected member of the NSW parliament 1890-1901 as a Free Trader representing the Newtown area. Edmund married Clara Smith (1857-1925) & they had 8 children (4 girls & 4 boys) the 3<sup>rd</sup> of whom was Maud (1879-1932) who married J.P.V.Madsen (1879-1969) in 1904 in Newtown before JPVM returned to his position in Adelaide with the University. Two of Maud's brothers (Edmund [1882-1950], & Cecil [1888-1943]) became doctors.

In the Smith family tree it appears that James Smith (1745-1803) & James (1772-1842) were Sheffield cutlers specializing in table cutlery including "every description of silver desserts". Sarah Makin (1783- ) appears to be related to either James Snr (Master Cutler 1803) or Thomas Makin making shoe, butcher & cook's knives. Partnerships, family connections & bankruptcy in the Sheffield cutlery business were common. The information on the James Smiths" is very limited (but could include partnership efforts in coal mining leading to plans of steel production around 1800) but by the end of the 1920's, John Eyre (c.1749-1834) was in partnership with James Smith jnr trading under the style of Eyre & Smith, but was dissolved in 1829 on Eyre's retirement. The James Smith business continued using the trade mark "Extra" but the firm failed in 1837 when all the stock & tools were auctioned off from an "old & established file & table knife business".

Henry Robinson Smith (1810-1879) worked as a railway contractor in England before migrating to Sydney in 1847 with his family working as an artist out of rooms in the City teaching & procuring work from prominent Sydney people until around 1862 when he obtained the position of Inspector of Distilleries appointed under an Act of the NSW parliament.

### **4. A Native of Bristol.**

John Bush (1815-1887) of Gresford on his headstone is identified as a "Native of Bristol, England" (Gloucestershire) whose relatives trace back to Paul Bush (1470-1558) the 1<sup>st</sup> Bishop of Bristol (1542-1553) appointed by Henry VIII to whom he had been chaplain. Paul is buried in Bristol Cathedral next to his wife Edith Ashley but there were no children & the family name descends from his brother John Bushe (1489- ) who for many generations lived in the neighbouring counties of Wiltshire & Somerset.

John arrived in the Hunter Valley region of NSW probably in the late 1940's & married Mary Ann Steer (1827-1899) in 1854 who was originally from Cornwall but later living with her parents on a property at Patterson in the Hunter Valley. John's father George (1771-1846) had been apprenticed to his uncle George Bush (1729-1801) a prominent merchant in Bristol (married to Mary Bright [1725-1782]) as George's father Thomas (1730-1775) had died aged only 45. It is probable George's apprenticeship included work as a cooper.

John & Mary probably moved to Gresford around 1868-69 when John became the 1<sup>st</sup> teacher at the Gresford public school with 19 boys & 16 girls, a position he held until 1880 when he became ill & then became the local postmaster. John & Mary had 8 children, 2 boys & 6 girls; Annie (1856-1929) being the eldest daughter who married Hans Frandsen Madsen (1843-1937) in 1878 & their 1<sup>st</sup> child of 6 was John Percival Vissing Madsen (1879-1969) born at Lochinvar in the Hunter Valley, part of the area in which Hans was engaged as a Surveyor with the NSW Lands Department.

The Bristol coat of arms with the motto "Virtute et Industria" [ Virtue & Industry] dates from 1569 & even earlier back to the 1300's & represents a ship sailing from Bristol castle, 2 arms holding a green serpent representing wisdom & scales of justice with 2 unicorns who only pay homage to men of virtue.

##### **5. The Robert Bush's 1762-1939.**

In the Bush family tree ending with Robert Edwin Bush (1855-1939) who went from Bristol to Western Australia in 1877 to start a very successful pastoral business making a fortune out of wool, the line starts with George Bush (1729-1801) who started trading as a Bristol merchant in 1763 mainly in sugar & rum with sufficient money to invest in a privateer venture followed by his son Robert (1762-1829) who became Master of the Society of Merchant Venturers of Bristol in 1823 (Warden in 1807) & was a wealthy & prominent merchant also & in 1793 started manufacturing pewter for a lucrative export trade, mainly to America. Major Robert Bush (1809-1877), the 2<sup>nd</sup> son joined the 96<sup>th</sup> Regiment of Foot & saw service in Van Dieman's Land (Tasmania) in 1843 & then by 1847 Robert was in command of a Detachment in the Swan River Colony (Perth) until moving to Bengal by 1850 & in the following year retired from the Army to Bristol. During WW1, REB with his second wife Margery (1886-1960), converted their Bishop's Knoll mansion in Bristol into a 100 bed hospital for Australian soldiers brought back from France & fully funded all aspects of the hospital's operation for the duration.

##### **6. Bristol Harbour.**

The River Avon at Bristol has a tidal range of around 10 metres & through the efforts of the SMV at great cost, a Floating Harbour was created in 1809 with locks to prevent the tidal water flowing out & with a "new cut" for the River Avon to flow in the normal way up to Avon Gorge. A series of 5 swing bridges starting with the Plimsoll Bridge allow access the floating Harbour. The area of the Harbour is 70 acres but due to the high cost of construction the port costs were much higher than competitor ports & so business suffered.

Isembard Brunel's (1806-1859) "SS Great Britain" from 1843 is in dry dock in Bristol Floating Harbour.

The aerial photo in 1929 of the Cumberland Basin was probably near the time that John Fitzroy Duyland Bush (1914-2013) as a young boy observed 4 RN Destroyers in the Harbour which led him into his career in the Navy.

### **7. Society of Merchant Venturers, (SMV) Bristol.**

From the 13<sup>th</sup> century, guilds in Bristol were active & helped fund the Italian John Cabot (c.1450-1500) in his voyage to Newfoundland in 1497. In the History of the SMV the 1<sup>st</sup> Master is recorded in 1500 & in 1552 a Royal Charter on the monopoly in sea trade from Bristol was granted by Edward VI. In 1689 the SMV promoted trade protectionism & in 1698 successfully lobbied Parliament to open the slave trade to all subjects of the Crown as well as those in London. Edward Colston (1636-1721) was associated with this trade out of London with the Royal African Company (1660-1752) but is remembered in Bristol but is not listed as either a Master or Warden in the Bristol SMV. During the 18<sup>th</sup> century 25% of the members of the SMV were directly involved in the slave trade -in 1789 Robert Bush was appointed to an influential SMV Committee to go to Westminster & defend the slave traffic to the West Indies & although the trade was not then abolished, ships from Bristol declined .

The SMV has been involved in a number of major projects, as well as the Floating Harbour, for the benefit of Bristol including Brunel's Great Western Railway running from London to the southwest which ran for the 1<sup>st</sup> time in 1838. Merchant Hall was built in 1868 & was converted after WW2 for SMV use as the original Hall was destroyed during the Bristol Blitz. At special functions at the Hall, the SMV has the use of its gold dinner ware.

Bristol Harbour in 1785 is shown with the Cathedral & a typical West Indiaman in the foreground.

### **8. North America, Tobacco, Sugar & Cotton.**

The need for slave labour to work the cash crop plantations of tobacco, sugar & cotton in the principal locations of Virginia, Jamaica & Barbados & South Carolina fuelled the slave trade from the 1600's.

The Staffordshire jug exported to America in 1790 shows the American population at that time (presumably based on the 1<sup>st</sup> US census of 1790 required under the Constitution in force at 1789) with Virginia at 747,810 & Pennsylvania 434,373 for a census total population of 3,928,384. The population of England & Scotland at this time was 10.2 mil.

European colonists showed an enormous interest in the tobacco leaves being used as a trade item by East Coast Indians & the legal structure for holding black families in permanent slavery was introduced in 1667-1686 & a huge number of slaves were imported after 1700 to work the plantations.

Sugar was 1<sup>st</sup> introduced into the Caribbean in the 1550's by the Portugese & generated great wealth for them which was noticed by the English who started plantations further north. Rum from sugar cane juice was soon introduced, distilled from molasses.

Cotton growing by native Americans was 1<sup>st</sup> noticed by Europeans by the early 1540's.

### **9. Trans-Atlantic Slave Trade from Africa.**

It is estimated that between 1525-1866, 12.5 million slaves were shipped from West Africa of whom 10.7 million survived reaching North America, the Caribbean & South America. It is thought 388,000 arrived directly in North America to be auctioned off as indicated in the 1769 Charlestown (Massachusetts) auction notice of slaves from Sierra Leone.

By the 1730's there were 39 slave ships from Bristol with 245 slave voyages between 1739-1748 (est. 37% of the whole British trade). An estimated 500,000 slaves, & possibly more, were shipped by Bristol merchants from an estimated total of 3.3 mil on British flag ships from London & Liverpool as well.

The Portuguese (5.9 mil slaves) started the slave trade in the 1500's followed by the Spanish (1.0 mil), French (1.4 mil), English (3.3 mil), Dutch (0.6 mil) & Danish(0.1Mil) mainly going to Brazil (56%) & the Caribbean (34%).

The Danish medal struck in 1792 to mark laws abolishing slavery became effective in 1803 & 5 years later Britain abolished slavery with Royal Navy patrols off Africa to have a measure of enforcement but Danish emancipation of slaves at St Croix in the Caribbean was not forced upon them until 1848, 15 years after the British. (In 1917 the islands were made part of the US as the US Virgin Islands).

#### **10. Chesapeake Bay & the "White Slaves from England".**

Before transportation of convicted felons from England to Australia after the War of American Independence, between 1614 & 1775 some 59,000 UK felons were sent to the American colonies for terms of around 7 years to work as servants & labourers of English colonists. The total number of convicts sent to Australia over 80 years is estimated at 168,000. The destination in America for the UK felons was Chesapeake Bay.

A slave ship is shown being intercepted by HMS Black Joke around 1828 which herself was a captured slave ship in 1827 & used by the RN until 1832 when she had to be destroyed because of rotten timbers. As a slave ship during 6 voyages over 3 years she had transported some 3,200 slaves for a profit of 80,000 pounds for her owners.

A typical apprentice indenture agreement for 7 years is shown requiring strict good behaviour & loyalty to the master.

The American Declaration of Independence was by Congress on July 4, 1776.

#### **11. Robert Bush & Co: Bristol Pewterer.**

Robert Bush (1734-1800) served a 7 year apprenticeship under Thomas Lanyon (1848-1755) & became Free on June 19, 1755. Robert had 24 apprentices (including his son William [1777-]) & ran a large set up but with probably no more than 3 qualified pewterers at any one time trading in his own name up to 1775, then as Bush & Perkins (Perkins was an apprentice who qualified in 1771) & as Bush & Co to 1793. In 1796 his elder son, also Robert [1775-], became free by patrimony (ie. did not have to serve a 7 year apprenticeship) probably at age 21 years & working in partnership they made porringer, plates, dome shaped tankards & drinking mugs, mainly for the American export market.

By 1793 Britannia metal (92% tin, 6% antimony & 2% copper) was probably being used in Bristol having 1<sup>st</sup> been employed in Sheffield in 1770 by James Vickers (-1809). Spun Britannia metal pewter was popular in the American market unlike the English market which from 1750 had preferred ceramics.

Cornwall was the source of tin & copper (tin samples from Redruth & Truro villages shown) with a tin smelter in Truro & an antimony specimen. Bush & Co apparently used a deliberately misspelt hallmark "LQNDON" ("LQNDON" mark is shown with a goats head crest which indicates the connection to the William & Eleanor line)-the logo of the Company of Pewterers with 2 seahorses is shown with the motto "In God is all my trust". Pewter melts at 450-500 degrees Fahrenheit & can be soldered or welded although old pewter is notoriously difficult to repair-modern pewter solder of tin & bismuth melts at 281 degrees Fahrenheit..

Robert Bush (1762-1829), the nephew & cousin of the pewterers, & a prominent merchant in Bristol, is thought to have been connected to the pewtering business possibly with the triangular Africa & North America trade for a few years.

## **12. Mr. Hilhouse of Bristol 1749-1822.**

In November 1776 Robert Bush's (1762-1829) older sister Mary (1755-1827) married James Hilhouse (1749-1822) in Bristol who had prepared himself extremely well during a 7 year (1765-1772) apprenticeship with the Royal Navy at Chatham learning every aspect of the business of shipbuilding for the time he was to inherit a substantial family fortune which he planned to use in ship building yards located on the Avon. The most expensive part of the Navy ship's hulls which Hilhouse built was the oak timber which he obtained from the nearby Forest of Dean & then seasoned in his own timber yard. In addition to the RN , who was well pleased with his work, Hilhouse built commercial vessels including a privateer the "Mars" in which his father-in-law George (1729-1801) was part of the consortium of owners, however she was lost on her 1<sup>st</sup> voyage off the Azores.

In September 1824, Robert Bush's son Henry, married his cousin Eleanor Hilhouse (1791- ).

## **13. The Bush's of Beach (Bitton), near Bath.**

On the Bristol-Bath map a place of interest is Cold Ashton, about 8 miles directly north of Bath where William Bush (1677-1754), a maltster, & Eleanor England (1693-1759) lived. Eleanor came from a maltster family in Batheaston which is on the London Road about 4 miles to the east of Bath. Beach (Bitton) where Beach House (slide 2) is located is half way between Bristol & Bath being 6 miles from each as per the mileage marker.

Wick is a village 3 miles north of Bitton near Tracy Park where Robert Bush (1762-1829) did a major renovation of an old house situated on 240 acres in 1808 giving it a Jacobean style which he sold in 1820 after which more major renovations were done. (In 1920 it was bought by a Director of Imperial Tobacco before becoming a hotel in 1973.) [Bottom right image].

The maltster brewing businesses in the Bath area were very numerous in the 1800's, but later almost eliminated by mass produced beer trained in from London, as the visitor trade to the Georgian (1714-1837) city of Bath from London increased with the railway. At Batheaston a renovated "Maltster House" is shown with hops & also Norfolk barley which were presumably used.

The Campaign For Real Ale aims to revive production of locally produced beers with the 20 variety of English hops available.

James Bush (1736-1813), a son of William & Eleanor & husband of Susannah Whittington of Beach was also a maltster. Susannah Whittington was descended from the famous "Dick" Whittington (c. 1354-1423) the 3 times Lord Mayor of London remembered with his cat. (see slide 21). [Peter Bush

the son of Admiral Sir John Fitzroy Duyland Bush (1914-2013) advises that as of 2021 he is the 6<sup>th</sup> generation to have the chest with a brass plate with Susannah Whittington's name on it].

#### **14. Clifton College, Bristol.**

Robert Bush (1769-1877), soon after leaving the army in 1851 joined the Clifton College Council in September 1860, shortly after its foundation & remained on it until his death in 1877 during which time his sons James (1850-1924), Robert (1855-1939) , James Paul (1857-1930) & James Ernest (1859-1930) attended the College. Clifton College was built as a Gothic Revival set of buildings in 1862 designed to emulate the success of the Rugby School founded in 1567 whose most famous headmaster was Dr. Thomas Arnold (1795-1842) [left image] appointed in 1828 whose reforms to the curriculum centred on religious & moral principles combined with academic performance & gentlemanly conduct. At Clifton College the emphasis was on the teaching of science (rather than the Classics) & involvement with sport involving a system of competitive "houses". The College's 1<sup>st</sup> Headmaster was John Percival (1834-1918) from 1862 to 1879 [photo on the right] who for a short while had been a Master at Rugby & later, in 1887, became the Headmaster there. The photo of Arnold is in 1863 along with the College's 1<sup>st</sup> crest used until 1895 & then followed by its replacement.

#### **15. Clifton College Students & Sport.**

Clifton College since its inception has produced a remarkable list of outstanding students who progressed to the best Universities & Colleges such as Sandhurst for the military & achieved at the highest level. Two students concerning great contributions to Australia are C.E.W. Bean (1879-1968) the famous WW1 war correspondent & founder of the Australian War Memorial & Lt. General William Birdwood (1865-1951) who was in command of the ANZAC Corps when it formed in Egypt in December 1914 & led the Australians through the Gallipoli campaign & for some time on the Western Front. Birdwood attended Sandhurst after Clifton College.

Charles Bean was born in Bathurst where his father Rev. Edwin Bean (1851-1922) was the headmaster of a college & taught in the "Arnold tradition" which he had learnt at his alma mater, Clifton College. Edwin returned to England where Charles also attended Clifton College & in 1898 developed an interest in literature & served there with the Volunteer Corps & subsequently at Oxford University.

Cricket & Rugby figure highly in the sporting curriculum of Clifton College & Dr W G Grace the famous batter for England played at Clifton College & toured Australia in 1873-74 with James Bush, Robert's brother, in the team. Robert Edwin Bush (1855-1939) was in Western Australia at Perth & was also interested in cricket & a founder of the WACA. The Clifton Rugby club team in 1875-76 includes the 2 Bush brothers ,James Arthur & Robert Edwin.

#### **16. Major Robert Bush to Swan River Colony.**

Robert Bush (1808-1877), born in Cold Ashton, enlisted as an Ensign (equivalent to a 2<sup>nd</sup> Lieutenant) with the 96<sup>th</sup> Regiment of Foot in April 1826 probably at a commission purchase cost of 400 pounds. Typically 3 years service was required before becoming a Captain (1,800 pounds) & 7 years to become a major with 2 years as a captain. (On leaving the army in 1851 the likely commission paid back would have been 3,200 pounds).

The 96<sup>th</sup> Regiment was active during the Napoleonic Wars (1798-1818) & returned in 1824-1881 for service in Halifax (Nova Scotia) & Bermuda until 1835 before returning to England & between July 1840 & August 1841 provided detachments for convict sailing ships to NSW, Van Diemans Land &

Western Australia. In 1843 a detachment was sent to NZ North Island in response to Maori tensions. (In 1849 the Regiment embarked for India & returned to England in 1855).

In 1843 while serving in Tasmania, Robert married Emily (1822-1908), the daughter Lt Col Griffith the commander of the 96<sup>th</sup>, & they would have 6 sons & 5 daughters the 1<sup>st</sup> of whom was born in Tasmania in 1845. Robert was in command of a detachment guarding the Swan River Colony (established in 1829) where Alfred (1847) & May (1848) were born. The 1<sup>st</sup> colony in Western Australia was established in Albany in 1826 as an outpost of NSW with Major Edmund Lockyer (1784-1860) [of the highly experienced 57 th Regiment] in charge of 20 soldiers & 23 convicts & given 6 months supplies as a blocking measure against expected French plans.

Under the Australian Constitution Act of 1850, signed off by Queen Victoria, NSW, Qld, SA, TAS, Vic & WA were given various arrangements of self government with bi-cameral operation. The Act became effective on July 1, 1851. Queen Victoria's (reigned 1837-1901) coat of Arms with the lion & unicorn is shown.

#### **17. Robert Edwin Bush in W.A. & at "Bidgemia"- (Bidjii grub).**

Robert Edwin "Eddie" Bush (1855-1939) in late November 1877, 4 months after his father's death sailed for Fremantle with a friend, Tom Lodge (1853-) who had learnt some farming in Norfolk but who had an open mind as to finding a business opportunity in the Swan River colony. Bush evidently had some money & showed considerable scientific skill in recording data on the "Lady Elizabeth" voyage taking 3 ½ months & on arrival promptly met & established local contacts some of whom had been known to his father. In 4 expeditions over the next 2 years involving gold mining, pearl fishing, horse trading & sheep production he passed through some very good country between the Gascoyne & Murchison rivers & in April 1880 Bush bought a pastoral lease on the banks of the Gascoyne 100 miles east of Carnarvon, which he called "Lower Clifton Downs" & later after the local aboriginal "Bidgemia". [Bidgemia station & the 1897 Carnarvon "one mile jetty" are shown]. It appears that Bush was greatly assisted through some very difficult times by Dalgetys & in 1890 was able to buy 2 more stations in the Upper Gascoyne –"Upper Clifton Downs" using aboriginal shepherds on the now 2,000,000 acres leasehold) Around 1904 Bush & his family left to live in England leaving a manager in charge & in 1927 "Bidgemia" with 80,000 sheep was sold to a Melbourne syndicate consisting of the Catholic Archbishop Mannix & 2 others for 95,000 pounds.

In 1890 Bush mechanized the shearing with a 32 stand shed powered by a steam engine supervised by an engineer whom he employed & with a new wool press soon after. The Wolseley shears & Koerstz wool press, both recently developed in the east of Australia made Bidgemia the best equipped station in the Colony. Frederick Wolseley (1837-1899) 1<sup>st</sup> demonstrated his shears at Sir Samuel McCaughey's woolshed "Dunlop" near Louth in the Walgett region of western NSW in 1888.

Christian Koerstz (1847-1930) was a carpenter & inventor originally from Denmark who made a number of types of presses for the pastoral industry at a factory in Sydney.

Bidgemia station is approximately 200 kms north of the CSIRO Murchison Radio Observatory as part of the Square Kilometre Array facility.

John Macarthur (1767-1834) from an early date in the NSW colony promoted the Merino as a very suitable cash earning source of fine wool which by the 1820's was winning awards in England as equal to the best available in Europe. (Spain & Saxony).

#### **18.The Wool Trade.**

It is not clear how Bush got his wool bales from Bidgemia 100 miles to Carnarvon & loaded them for shipment to Fremantle, then to London for auction & eventually receive payment. Most likely by shipment down the Gascoyne River. Typically a sheep had 4.0 kgs of wool & there were 45 fleeces per bale. (By 1870 Australia was the No.1 world producer of wool [in 1850- 19 mil kgs & 1890- 210 mil kgs]). Various means of transport for moving bales were used (bullock, camel, inland river boat, horse & train) throughout Australia & by 1890 steamers travelling via the Suez canal which opened in 1869 had superseded sailing clippers converted from the China tea trade.

The wool auction room in Sydney in 1904 is shown which was one of several in Australia at this time. (In 1901-02 the Sydney auction sold 522,600 bales). The English wool & weaving industry is recognized by the House of Lords Woolsack dating back to the 1300's. The famous Tom Roberts picture of 1890 shows a wool shed using hand shears.

Stud breeding of Merino rams & ewes was an important part of the wool industry & Bush bought some from eastern Australia (most likely the Peppin line from the C. S. Falkiner stud at Wanganella in the Riverina.) The imported American Vermont sheep were not successful in Australia due to fly strike & being too greasy.

#### **19. Robert Edwin Bush in Perth.**

Between 1890 & 1894 Bush held an appointed position in the 1<sup>st</sup> Legislative Council of Western Australia representing northern interests with Sir John Forrest (1847-1918) the 1<sup>st</sup> Premier/Treasurer [1890-1901] {image shown} elected to the Legislative Assembly under the terms of the West Australian Constitution Act 1889 passed in London. The eastern colonies by the Australia Constitution Act 1850 passed at Westminster in London all became separate self-governing states with bicameral constitutions with notably Victoria & Queensland splitting off from NSW.

The discovery of gold at Coolgardie & Kalgoorlie in 1892 made a huge difference to the economy of WA & the Coolgardie water pipeline (526 km, 30 cm diameter, 22.7 mil ltrs per day) opened in January 1903 which was a major engineering feat for the benefit of the goldfields. The trans-continental railway constructed in 1912-1917 fulfilled one of Forrest's conditions of WA joining the Commonwealth.

At one point Bush owed Dalgetys 50,000 pounds at 8% but was convinced to stay on but with a reduced interest cost (7%).& did not go back to England. Bush was a keen sportsman especially in cricket & horse racing & was involved with the formation of the WACA in 1885 ,his brother James having toured in W G Grace's team to Perth in 1873. When he became a member of the Legislative Council & as Vice President of the WACA he was instrumental in securing the land for the WACA ground.

In January 1883 Bush married his first wife, the widow Constance Harper (nee Lochee) (1862-1896) who was the 3<sup>rd</sup> daughter of Mr Francis Lochee, for 40 years the manager of the Western Australian Bank. Constance bore him 2 children, Charlotte (1894-1993) & Robert (1896-1955) a Brigadier in the Royal Artillery.

The famous West Australian business, Wesfarmers, was formed in 1914 as a co-operative company to service the West Australian rural community & by 1919 there were 65 local co-ops acting as agents for the company. In 1984 it became Wesfarmers with numerous subsidiaries including Bunnings, Coles, OfficeWorks & K Mart with a combined annual turnover of approx.. \$30 Bil. & 107,000 employees.

#### **20. Bishop's Knoll Hospital, Bristol, 1914-1918.**

In 1904 Robert Edwin Bush returned to England to make that his new base while still supervising his properties in Western Australia (later becoming a Director of Dalgetys in London) & in May 1907 married Marjory Scott (1886-1960) shortly before buying the mansion property "Bishop's Knoll" in Bristol. The story of how Bush converted & ran "Bishop's Knoll" as a 100 bed hospital for Australian casualties during WW1 has been very well told in the book by Chris Stephens (1942- ) so in very brief summary the 2,000 Australian privates & NCO's who were patients for an average 42 days were accommodated in 13 wards from the converted ballroom, billiard room , bedrooms & other rooms while REB & Marjory as "Commandant " & "Quartermaster" stayed in the small Lodge-cottage. The hospital was run at Bush's expense for 700-1,000 pounds per month (100,000 pounds total for the War) & during the course of 4 years treated by 7 doctors & 82 Nurse-VAD's . The Australians were collected from the Temple Mead railway station which was highly organized (some 417 trains arrived with 31,600 stretcher cases & 37,800 "sitting "cases which in conjunction with hospital ship arrivals at Avon Mouth required over 5,000 hospital beds in the Bristol area.)

The arrangement whereby Bush looked after Australian casualties was organized shortly after War was known in Bristol on August 5, 1914 through the Australian High Commissioner's (Sir George Reid-see slide 37) Office & the Australian War Contingent Fund. Some 152,000 Australian service personnel became wounded casualties during the War (62,000 killed out of 416,800 enlisted). Robert's doctor brother, Lt Col J. Paul Bush (1857-1930), was instrumental in having BKH recognized as a 100 bed facility within weeks of War being declared.

Regular excursions & entertainment for the patients was arranged by Bush & also a 12 issue monthly magazine "Coo-ee" was produced by Archibald Powell from November 1916 & sold at Bristol book sellers for 6 d a copy & was very popular. The Contingent Fund provided amenities to service personnel such as the Fry's Chocolate tin.

During WW2 Bishop's Knoll was used by the Bristol Aircraft Company following a Luftwaffe raid on their factory in Bristol.

## **21. Admiral Sir John Fitzroy Duyland Bush DSC, (1914-2013).**

John Fitzroy Duyland Bush in 2005 provided a lengthy oral record of his Royal Navy career which began in December 1932 & ended in 1970 as Commander in Chief of the Western Fleet & Vice Admiral of the UK, with 4 Resolution (Vickers Armstrong: Barrow on Furness) class nuclear submarines armed with Polaris missiles. {The Polaris programme was in service to 1996 & replaced by the Trident programme in the 4 Vengeance class nuclear submarines. The new RN Dreadnaught Class nuclear submarine is to be built at Barrow-in-Furness in conjunction with the US Columbia Class submarine. Dreadnaught is expected to have a service life of 35-40 years, 25% longer than the previous class.} JFDB first became interested in the Navy when at a young age 4 RN destroyers came into Bristol Harbour & made a great impression on him & in subsequent training was in the top 10% which gave him 3 years seniority. (On his retirement he was on the Board of Governors of Clifton College where he went to school.). JFDB chose to go into Destroyers & served in WW2 in the Mediterranean with distinction on HMS Nubian (1938-1941: Thorneycroft of London, Tribal Class) & HMS Belvoir (1942-1957 : Cammell Laird, Hunt II Class) . In 1962 JFDB was the Commander of the British Naval Staff in Washington involved with the planning & transfer of the Polaris missile system trialled with a live firing from Resolution in February 1968. Twenty RN nuclear submarines are held in storage awaiting disposal. The V bomber nuclear force was withdrawn in 1969 a year after the Polaris entered service with the RN & air dropped nuclear bombs (WE 177) with the RAF out of

service by 1998. The WE.177 replaced “Red Beard” nuclear bomb which had been tested twice at Maralinga (1956-1963). “Red Beard” was in service 1962-1971 & deployed in Canberra bombers & other types.

JFDB’s family remember well their connection to Dick Whittington (c. 1354-1423) [3 times Lord Mayor of London] & his cat, through their ancestor Susannah Whittington (1736-1813).

Samuel Plimsoll (1824-1898), originally from Bristol, is remembered for the maritime “Plimsoll Line” on boats to prevent overloading & wrecking of boats which had caused a great loss of seamans’ lives.

## **22. The Smiths of Sheffield 1745-1842.**

Geoffery Tweedale’s Directory of Sheffield Cutlery Manufacturers (1740-2013) compiled over 40 years to 2019 with references to 1,650 enterprises is a valuable source highlighting Sheffield’s long reputation with cutlery from early reference in 1297 through to 1740 when the natural advantages of the 5 rivers for water power, the milestone grit quarries for grinding wheels & coal- iron ore deposits were able to be exploited.

It appears that James Smith Snr. (1745-1803) did well out of the cutlery business & is recorded as the owner of “Sharrow House” in the well to do part of Sheffield around 1800 however Tweedale’s Directory makes no reference to him. James Smith jnr (1772-1842) was the Sheffield Master Cutler in 1812 & was married to Sarah Makin (1783- ) probably related to James Makin (Master Cutler 1803) & James Makin jnr (Master Cutler 1815). The Smiths around 1800 appear to be involved with a colliery venture in Sheffield but water problems were severe.

There is a reference in Tweedales to a partnership between John Eyre (1749-1834) & James Smith jnr formed after 1818 but dissolved in 1829 on Eyre’s retirement but the business which continued as James Smith & Son (1833) & James Smith & Brother (1837) making tableware failed in 1837 & the stock & tools were auctioned off.(probably due to the “Hunger & Burst” export cycle & before the Great Exhibition of 1851 in London ). Henry Robinson Smith (1810-1879) before coming to Sydney around 1849 was occupied in England as a “railway contractor” & it is not clear if he was ever involved in his father’s cutlery business.

The wife of James Smith Snr, Anna Robinson (1740-) does not have that family name listed as a Sheffield Master Cutler. A water powered lathe in use in America c. 1840 for making rifle stocks is a further example of the use of water wheels.

## **23. Sheffield Cutlery.**

The London Company of Cutlers obtained a Royal Charter from Henry V in 1416 dealing with swords, knives & cutting edge implements. The Company of Cutlers in Hallamshire (Sheffield) has had a Charter since 1624 but is not a Livery Company (The Boywers Livery Company of London dates from 1371: Poitier battle 1356, Crecy: 1346 & Agincourt :1415). The Cutlers Hall site was used in 1638 & 1725 before the current Hall was built in 1832 & repaired after WW2 bomb damage.

The tableware & knives produced in Sheffield with cutlers at work on their water powered grind stones are illustrated including silverplating.

## **24. Sheffield Early Industry.**

Tweedale explains that the crude “blister” steel made by the European “cementation” process having been cooked for a week in charcoal was forge welded using bars which diffused the carbon & made steel which had superb cutting qualities & was known from around 1650 as “shear” steel.

By 1700 the charcoal forests in England had been stripped to such an extent that she had become strongly dependent on imports from Sweden & it was fortunate that in 1709 Abraham Darby (1678-1717) in Shropshire using his knowledge of the maltsters technique of using coke to produce beer without sulphur contamination, found an alternative to charcoal.

In Sheffield in 1740 Benjamin Huntsman (1707-1776) by breaking up “blister” steel & melting it in clay pots could skim off the slag & pour the steel which by then had the carbon thoroughly mixed, into a mould ingot which was ideal for knives & edge tools & better than the “shear” steel.

In the 1730’s England imported 25,000 tons of iron (20,000 tons from Sweden) & the high quality “Oregrund” marks were well known to English buyers (Oregrund was the port 151 km north of Stockholm where the iron was shipped from). The use of waterwheel powered tilt forges in Sheffield prepared the steel before grinding. The last crucible steel pour in Sheffield was in 1953. The 2,000 ton Swedish bar iron at Canal Wharf was probably in Hull on arrival from Sweden.

In 1770 James Vickers, in Sheffield, introduced “Britannia” metal (92% tin, 6% antimony, 2% copper) as a cheaper alternative to silver for pewter use & with electroplating found a wide market.

## **25. Bowie Knife & Other Sheffield Cutler Products.**

The Sheffield cutlers had a very impressive display at the 1851 Great Exhibition & were thoroughly into the American market up to this time including the ubiquitous “Bowie Knife” for the frontiersman. Spear & Jackson is a well known name for hand saws & other tools produced in Sheffield.

## **26. Bessemer & Sheffield Heavy Industry.**

The transformation of Sheffield from a city of “back street capitalists” into the “Steel City” from the 1850’s is remarkable, not only by upscaling cutlery works but more significantly in 1858 by the use of Henry Bessemer’s (1813-1898) oxidation process to quickly produce 3-5 tons of steel with the required amount of carbon (1.6%) & manganese as devised by Robert Mushet (1811-1891). [Bottom photo] Quantities of steel produced in 25 minutes quickly rose to around 25 tons to meet the demand for cheap steel.

The prototype Bessemer converter is at the Science Museum in London & a production example is in the Sheffield Kellham Island Museum. The Bessemer Process was licensed for use in many countries including America & was used (in competition with the Siemens-Martin process from 1890) for almost 100 years & had made Bessemer a very wealthy businessman, initially started by his reverse engineering of a brass gold paint process in London to fund his researches.

The quantity of coke which needed to be produced from coal heated in the absence of air for Sheffield by 1860 was in the millions of tons. [As a matter of interest in 2019 approximately 50% of Australia’s coal exports was coking coal-151 mil tons total [Japan 35.8 mil, China 39.6 mil, India 45.3 mil & other 30.3 mil tons] & steaming coal 155 mil tons [Japan 81 mil, China 49.8 other 24 mil tons]. The converter was lined with refractory bricks for maintaining the molten heat in the steel being produced.

## **27. Sheffield Steel Industrialists.**

Three industrialist ( John Brown [1816-1896], Charles Cammell [1810-1879], Edward Vickers [1804-1897 ]) who started in Sheffield with a desire to get into the steel industry, began in a small way but by the 1860's were public liability companies with paid up capital & debentures of approximately 1,000,000 pounds each. In the 1850's their factories had grown in area 10 fold from 2-3 acres & their workforces in the 1860's in the order of 4,000 & annual turnover of 1,000,000 pounds from the sale of railway lines & rolled armour plating for the Royal Navy.

John Brown & Co initially prospered from the invention of railway steel spring buffers & by 1859 was using the Bessemer process which led to the production of 12 inch armour plating from a rolling mill. ("Atlas Works"). In 1871 John Brown resigned from the company & his very capable partner John Ellis (1824-1906) & his 2 sons continued through to 1899 when John Brown & Co bought a Clydebank shipyard (in 1902 Vickers Ltd bought a 50% share in John Brown & Co Clydebank) which became the preferred shipbuilder of Cunard. John Brown was Sheffield Master Cutler in 1865 1866.

Charles Cammell [ Top right photo] was a neighbour & competitor of John Brown & Co with his "Cyclops works", who was also producing railway lines & armour plating but for many years prior to his death he took no part in the running of the company.

Edward Vickers was greatly assisted by his 2 sons, Thomas (1833-1915) & Albert (1838-1919) with their metallurgy & sales skills & were succeeded as Chairman of the company in 1918 by Douglas Vickers (1861-1937) [Bottom photo] , the son of Thomas. In 1868 Vickers were making marine shafts & in 1897 bought Barrow Shipbuilding where the 1<sup>st</sup> Royal Navy submarine was built in 1901.

Vickers Ltd are very well known for the water cooled Vickers .303 heavy machine gun in service 1912 to early 1960's which was used in aircraft as well as with infantry & was very reliable. Albert Vickers financed the Maxim Gun Company to make the 1<sup>st</sup> automatic firearm operated by a recoil firing system in 1886 before it was absorbed into Vickers & redesigned by Vickers to become the Vickers Machine gun. Maxims were in use for over 60 years.

The American, Frederick Taylor (1856-1915) with steel industry experience, analysed the industrial workflow & worker productivity & put forward 4 principles for better management including identification of individual worker skills who could be given instructions & trained to follow management plans. These principles were widely adopted.

## **28. Sheffield Shipbuilding Enterprises.**

The supply of metal plate for shipbuilding from Sheffield led to merger & takeover restructuring around 1900 with John Brown & Co building HMAS Australia (I, II), HMS Hood (1920-1941) & the large ocean liners for Cunard, (Lusitania, Aquitania, Queen Mary, Queen Elizabeth & QE2) with Vickers at Barrow in Furness building submarines (HMAS AE1, AE2) through to nuclear submarines such as HMS Resolution. The "Oriana" so well known in Sydney during the 1960's was built by Vickers. (VSEL-Vickers Shipbuilding & Engineering Ltd). The Cammell Laird merger of Laird Brothers , shipbuilders in Birkenhead & Johnson Cammell of Sheffield does not appear to have built any ships for Australia except a small island supply yacht (298 tons) requisitioned as HMAS Southern Cross in Darwin in 1941. (Admiral John Fitzroy Duyland Bush's destroyer, HMS Belvoir was built by Cammell Laird in 1942). [HMAS Australia & AE1 photos are shown. Oriana at Circular Quay]

## **29. British Westinghouse (1899-1919) Manchester, Trafford Park.**

In the latter part of 1902 John Madsen was given leave by Adelaide University to undertake a study tour, at his own expense, of England & America to prepare himself for the new role of Lecturer in Electrical Engineering at the University which involved visiting teaching Universities, Technical

Colleges & the major manufacturing businesses in both countries. It is highly likely he visited the Westinghouse works either in Pittsburgh or the newly built, equipped & staffed British Westinghouse works at Trafford Park in Manchester.

George Westinghouse (1846-1914) [On the left in the photo] was able to acquire 130 acres at Trafford Park in 1899 & by a huge effort had replicated his East Pittsburgh works in England by the end of 1902 complete with key American management & allied with the redoubtable Lord Kelvin (1824-1907) [In the centre of the photo] as adviser, established a business which after 1919, to better include English equity, continued in the field of electrical engineering as Metropolitan Vickers (MetroVick, M-V) with a record of extraordinary achievements. The Vickers Ltd equity was undoubtedly funded from the profits of the Sheffield based steel operations. In 1919 Vickers acquired 99% of the shares in Metropolitan Carriage Wagon & Finance Co who had jointly acquired British Westinghouse & as Westinghouse in America did not want their name used, Vickers changed the name to Metropolitan Vickers whereby the electrical & carriage building operations continued separately but with common directors & policies. Following financial difficulties in America in 1907 British Westinghouse had more independence from Westinghouse's control.

The water tower shown was to maintain hydraulic pressure throughout the Works which was organized in 5 "aisles"- A,B,C,D,E (total area of 900 X 440 feet) in the main building. Aisle "G" for windings is also mentioned.

### **30. Metropolitan Vickers: MetroVick (M-V).**

The versatility of M-V during WW2 as led by Sir George Bailey (who started his career as an apprentice) [In the centre of the photo] to undertake a vast array of additional production as well as maintaining their regular supply of motors, generators, alternators, instruments etc. included the production of radar equipment & a shadow factory on the Trafford Park site producing, under licence from Avro, Manchester & then Lancaster bombers in the latter case using Rolls Royce Merlin engines supplied from the Ford Trafford Park shadow factory.

M-V supplied generators to NSW for Bunnerong & Pyrmont power stations both pre & post WW2 as well as 46 electric locomotives in 1956 to haul trains over the Blue Mountains electrified line & later to Gosford & proved to be very reliable over some 40 years of service. The turbo generators shown are at the Yallourn Power station in 1925.

Postwar, M-V produced gas turbine engines as well as instruments such as electron microscopes & cyclotrons.

### **31. Metro-Vick Radar.**

Realising that increasing demand for electricity would require higher voltages, Thomas Edward Allibone FRS (1903-2003) at M-V was able to work with Ernest Rutherford PRS (1871-1937) at the Cavendish (1927-1929) devising high voltage experiments creating a powerful beam of electrons to further investigate the structure of the atom. ER had been at Manchester University in 1907-1918 & when M-V opened the new High Voltage Research Lab in 1930 (with Allibone as Director-TEA) a veritable galaxy of scientists (4 Nobel Prize Winners) & engineers were there when ER performed the opening (the photo is 1 year later with C R Burch, ER, TEA, A P Fleming) & he was clearly an inspiration for all those doing research for M-V.

C R "Bill" Burch FRS (1901-1983) was one of those encouraged by ER & his commendation of Burch's paper to the Roy Soc in 1927 on induction furnaces (used in Sheffield to make 600 tons of high grade steel alloy per day) no doubt carried through to Burch's later work on thermionic valves for the GPO

Rugby trans- Atlantic communications transmitter by Bill, his older brother Francis & J H Ludlow. On 9 February 1933 the 3 applied for a patent for the tetrode but 2 days later Francis died of peritonitis (probably a blood transfusion mis- match) & Bill soon after left M-V to do University research however in 1936 the high powered tetrode which had become a show piece of M-V research happened to be seen by Robert Watson-Watt (1892-1973) who was on the lookout for a high powered pulsed transmitter for RDF & was so impressed he promptly placed a verbal order on behalf of the Air Ministry for "1 set of RDF Transmitting Equipment" which involved M-V with considerable design work to convert the tetrode from continuous wave to pulsed operation delivering some 750 kw. A key aspect of the operation of the tetrode was the use of an oil-diffusion pump to continuously evacuate the system which was a crucial contribution from the Burch brothers & J H Ludlow. From this beginning M-V radar work grew enormously, not only for the CH (Chain Home) system, but for Royal Navy sets at 10 cms & also the Light Weight air warning set used in North Africa (the SCR 602 in the South West Pacific). This work was led by Dr J M Dodds (in the bottom right group) & a highly talented group built up by A P M Fleming & supported by the M-V Chairman Sir George Bailey. After the War, M-V radar was installed in liners such as the Queen Mary & Queen Elizabeth.

### **32. AEI (Metro-Vick & BTH) Research.**

In 1918, at the end of WW1, English Electric was formed by the merger of 5 engineering businesses making locomotives, steam turbines, aircraft & electrical equipment in the south west Midlands with factories in Stafford, Preston, Rugby, Bradford & Coventry) which by 1928 led to a proposal from General Electric Schenectady that Metro-Vick, British Thomson Houston (BTH), General Electric Company of England (GEC) & English Electric should merge, with GE presumably having a significant shareholding, however GEC would not agree to this so Metro-Vick & BTH combined under a holding company, AEI (Associated Electrical Industries) but never effectively merged which many years later was to have disastrous consequences when the unfamiliar "AEI" brand name was not recognizable to customers. [JPVM up to 1968 used to be sent a sales magazine from English Electric promoting their steam turbine equipment & who were also producing the Canberra bomber for Australia. (52 Canberras for the RAAF, 48 built in Melbourne by the Government Aircraft Factory in service until 1971. The RAF between 1961-1971 had 48 Nuclear weapons "Red Beard" securely stored at Tengah, Singapore available for use by Canberras) [JPVM was also sent technical bulletins from Philips in Eindhoven & CSIRO]. During WW2, EE produced 2,145 Halifax 4 engined bombers from a shadow factory at Preston].

In 1946, after the War, Thomas Allibone took up the role of Director (offered to him by Sir George Bailey) of Research for AEI which was an overarching facility for M-V & BTH investigating long term opportunities starting with nuclear physics & electron microscopes following on from M-V research at Manchester. (Within days of the Japanese surrender on August 15, 1945 Sir John Madsen as Chairman of the Australian National Research Council formed a committee including himself to recommend to the Australian Government the policy of co-operation with Great Britain on nuclear research which was accepted by Prime Minister Ben Chifley 4 months later). The Aldermarston research Lab over 20 years, before its sudden demise, through lack of AEI profitability, had staff of 500 people.

In 1950 the British Atomic Research Establishment was located on the WW2 Aldermarston RAF airfield in Berkshire. The 1<sup>st</sup> UK atomic bomb tested off the North West of Australia at Monte Bello Island in October 1952; the "Blue Danube" was built at Aldermarston.

GEC started research at Wembley in 1919 & during WW2 was responsible for turning Randall & Boot's 10 cm cavity magnetron into a fully operational working valve. English Electric does not appear to have a central research laboratory but did have a technical tie up with Westinghouse in America.

The eventual restructuring of all these major enterprises under GEC in 1968 did not end well unfortunately & by around 2000 their names were no longer around. The Trafalgar House Plc conglomerate which operated for 30 years (1963-1996) included John Brown Engineering from 1986 & Cunard Line (1971-1998) before becoming unprofitable through high borrowing costs not properly recognized. (In 1973 the author worked in London for Cementation, another Trafalgar House subsidiary).

### **33.Vickers Ltd & Vickers Armstrongs.**

In 1927 Vickers Ltd merged with the similar engineering business of Sir W G Whitworth & Company to form an engineering conglomerate producing military hardware, shipbuilding & aircraft.

The Aviation Dept of Vickers started at Brooklands (Surrey) in 1915 & near the end of the war produced the Vickers Vimy bomber which was flown by Sir Keith Smith (1890-1955), his brother Sir Ross Smith (1892-1922) & 2 mechanics from London on November 12, 1919 to Darwin in 28 days & were able to claim the Australian Government prize of 10,000 pounds to have done it in 30 days. (Only 2 Vimys survive: Adelaide & the Science Museum in London for the 1<sup>st</sup> trans- Atlantic flight in June 1919).

In 1928 Vickers acquired Supermarine Aviation which won the Schneider Trophy in 1931 for 5 wins in 5 years & formed the design by R J Mitchell (1895-1937) & Joseph Smith (1897-1956) for the revolutionary Spitfire produced at Brooklands as well as the Wellington twin engine long range bomber with its geodetic airframe designed by Barnes Wallis (1887-1979) [11,462 built under Vickers name]. {The Hawker Hurricane designed by Sydney Camm (1893- 1966) is also remembered for having been produced in Brooklands by Hawker from 1935 using the Rolls Royce Merlin engine }.

### **34.Henry Robinson Smith (1810-1879).**

H R Smith arrived in Sydney in 1847 & by 1851 had moved his studio to King Street East above a chemist shop (Mr Rowe) & in 1852 in Pitt Street was teaching "Landscaping & figure painting in oils as well as pastel crayons". In 1864 he was at 108 Abercrombie Street. According to the NSW Library Smith was a well regarded portrait painter in Sydney in the 1850's but few works have survived. The painting of the NSW Governor, Charles Fitzroy (1796-1858), is described as a "Striking likeness" in the usual good taste displayed by this eminent artist. Fitzroy was NSW Governor 1846-1855 when Victoria & Queensland split away & the portrait coincided with his departure in January 1855.

The David Jones (1793-1873) oil painting by Smith is in the National Portrait Gallery, Canberra & was done in 1853. David Jones spent 40 years in the colony as a retailer of good quality merchandise with premises on the corner of George & Barrack Streets opposite the GPO & when his grandson Charles Lloyd Jones (1878-1958) became a Director in 1906 & then Chairman (1920-1958) premises were at Elizabeth & Market Streets..

Under the "Bonded Distilleries & Sugar Houses Act of 1862" Smith & John Wye were to be Inspectors of Sugar under a Chief Inspector of Distilleries (Henry Lumsdaine). The CSR sugar refinery at Pyrmont from around this time is shown.

Maud Madsen (1879-1932) evidently had some of her Grandfather's artistic skill in carving the 3 piece fire screen panels.

### **35. William Francis Molesworth (1817-1859) & the RPS (Royal Pharmaceutical Society of Great Britain).**

William Francis Molesworth was born in Chichester, not far from the naval base of Portsmouth, where his father was a draper. By 1846 it appears that he was living in Banbury, north of Oxford, to further his experience as a chemist. On his arrival in Sydney with his family about 1850 he advertised the opening of his "Chemical & Drug Establishment" at 293 Pitt Street, near King Street, stating that he was a member of the Royal Pharmaceutical Society of Great Britain & that he had been engaged in the laboratory of Savory & Moore of Bond Street & that he would charge London prices.

The RPS was founded in 1841 & the stain glass of its coat of arms has the motto which loosely translated means "we must pay attention to our health". The Savory & Moore pharmacy in Bond Street (which for over a 100 years had provided to the Ministry of Defence & Buckingham Palace) was closed in 1968 & in 1971 the shop structure, (counter etc. as shown) was shipped to Melbourne University. In the early days of chemists it was a sign of a high standard of skill if the medicinal jars were of the expensive Delft type.

Unfortunately around 1859 William had to declare bankruptcy & after auctioning his stock & fittings was able to pay 12 shillings & 6 pence in the pound to his creditors. He died in Mudgee following 3 months of chronic diarrhea , possibly an inherited colitis affliction (both great grandsons, Dr Jim Molesworth & Roger Cecil Madsen in Syria in 1941 had colitis while serving in the AIF with the 2<sup>nd</sup> 3<sup>rd</sup> Bn.)

### **36. William Molesworth & Thomas Sutcliffe Mort (1816-1878).**

For a short while after closing his chemist shop it appears that William was working for Thomas Sutcliffe Mort who had arrived in Sydney in 1838 from Manchester intending to restore the family's fortunes & by 1843 after gaining local commercial experience set himself up as an auctioneer in wool which succeeded & by the 1850's was able to provide facilities to consign wool through to London which completed an integrated set of services to pastoralists that formed the pattern for later wool broking firms. (Mort married Theresa Shepheard in 1841).

In 1855 Mort opened a major dry dock facility in Balmain but it was grossly overcapitalized (80,000 pounds) & was not a success but this seems to be where William Molesworth was based while working for Mort in Sydney (how he ended up in Mudgee is not clear). There is a statue of Mort in Macquarie Place which by coincidence is close to where Hans Frandsen Madsen (1842-1937) started his surveying career with the Lands Dept & also to Loftus Street where Edmund Molesworth (1848 - 1823) started his business as a customs agent.

William Molesworth's activities with Mort appeared to be centred on Balmain in furtherance of political interests.

### **37. Edmund William Molesworth (1848-1923) & Sir George Reid MLA, PM (1845-1918).**

Edmund Molesworth,[Left side photo] while living in Newtown, had a customs & shipping agency business in Loftus Street not far from the Customs House at Circular Quay from 1870 & was an active member of the Anglican Church of St Stephens, Newtown & later as a member of Synod & Hon. Treasurer.

Edmund represented Newtown- Erskine in the NSW Legislative Assembly in Macquarie Street as a Free Trader for 12 years (1889-1901) & was involved during this time on 27 Committees dealing with banking, the Lt. Governors opening speech & Woolloomooloo land resumption.

George Reid, [Right hand photo] the author of 5 Free Trade Essays in 1875 was a local member for East Sydney for 20 years (1880-1901) & Premier for 5 years (1894-1899) as a Free Trader & represented NSW at the Federal Convention of 1897.

The Westminster Act to constitute the Commonwealth of Australia was passed in July 1900 & Reid representing his Free Trade Party became the 4<sup>th</sup> Prime Minister of Australia (1904-1905) whilst being the federal member for East Sydney (1901-1909) & at times the Leader of the Opposition in the Federal parliament. From 1910-1916 he was the 1<sup>st</sup> Australian High Commissioner in London & a popular member of the House of Commons in London (1916-1918) as a Conservative Unionist.

The final piece of Westminster legislation recognizing Australian independence was in 1986 some 55 years after the 1931 Statute of “request & consent” for Canada & Australia.

The lion & unicorn on the British coat of arms represents England & Scotland: the lion is said to be the unicorn’s arch nemesis, also interpreted as strength & femininity.

### **38. Richard Molesworth (1751-1814)- Battle of Trafalgar 1805.**

Richard Molesworth was a midshipman who served on HMS Britannia (1762-1825), a 100 gun 1<sup>st</sup> rate ship of 2,100 with a crew of 850 men & officers (10 killed, 40 wounded at Trafalgar). At Trafalgar Britannia was the 6<sup>th</sup> ship in the Weather column led by Horatio Nelson (1758- Oct. 21, 1805) in HMS Victory (1765-present) & the battle established Royal Navy supremacy against Napoleon. HMS Britannia served in 3 other major Battles & was also involved with the American War of Independence (1775-1783).

Richard spent his last years in the Greenwich Hospital for RN veterans after his wife, Mary Lowance (1749-1801) had past away.( Richard & Mary were married in Portsmouth in 1780). By 1814 there were 2,710 pensioners in Greenwich Hospital. Nelson’s Trafalgar signal by pennant was that “England expects that every man will do his duty”.

