

ART. XII – *Death in 18th century Whitehaven: the mortality records from Holy Trinity Church*

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THE town of Whitehaven began as a small fishing port and grew within two centuries to become one of the most important harbours in 18th century Britain.¹ This was largely due to the acquisition of the Manor of St Bees by the Lowther family in the 17th century;² and, as successive members increased their landholdings, the exploitation of rich coal seams lying under their property. This was on a small scale initially, with adit mines producing only a minor tonnage, but by the time of Sir John Lowther and more especially the occupancy of his son, Sir James, deep shafts had been sunk into the richer measures using the latest mining techniques. To export this huge increase in coal, the small harbour was expanded, with new piers erected between 1680 and 1750 providing safe shelter for the increasing fleet of coal ships. Many local merchants constructed vessels to engage in the lucrative trade with Dublin,³ building on the expertise they had already acquired on the trans-Atlantic trade route to the New World. This trade continued alongside the expanding export of coal, and the town became an entrepôt for rum, sugar, molasses and tobacco from America and the West Indies, with its shipping tonnage placing it third in rank in the British Isles by the 1750s.⁴

The Lowthers encouraged the growth of a planned town by selling spacious plots to the merchants along a grid pattern of streets, and encouraging them to build houses of uniform height to produce a pleasing aspect, and although later development deviated from this planning restriction, the elegant houses and gardens proclaimed the prosperity of the town.⁵ With the rise in trade and commerce the population began to accelerate rapidly and had increased from 1,089 in 1685 to 9,063 by 1762, swelled by the large labour force required by the coal mines, shipyards, and such ancillary industries as ropeworks, a pottery, a glassworks, brewery, sugarhouse and timber yards. The new building also attracted large numbers of labourers and masons, and many captains and seamen made Whitehaven their home base. This influx of people caused a threat to the spacious planned town, for the Lowthers were reluctant to release land for building near their own house, The Flatt, at the landward end of the valley, and the steep hills to north and south prevented easy expansion. What resulted was infilling of the original planned grid, with substandard cheap housing crammed into the once spacious gardens, and many of the original street-front houses sub-divided into units with whole families occupying single rooms in attics and cellars. Many of the houses built in the rear gardens were only accessible through narrow alleys and had little light, no water and no sanitation. Such rudimentary hygiene was absent even when the Lowthers built three rows of the New Houses above the harbour to house their colliers, and a Mr Hogarth, a linen merchant, built the unhappily-named Mount Pleasant on the adjacent hillside.⁶

The town lay within the ancient parish of St Bees, and by the 1750s there were three chapels built to serve the Anglican worshippers, as well as the meeting houses

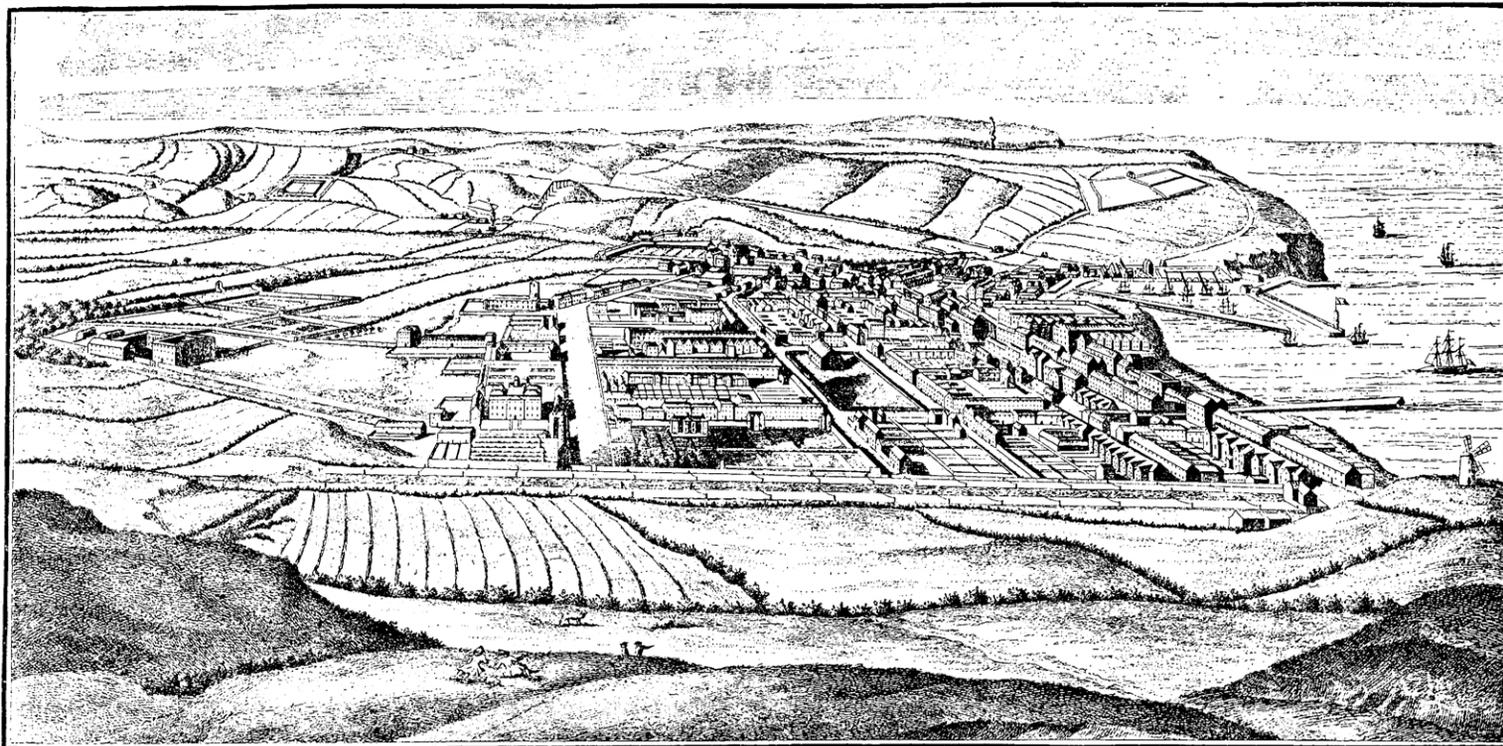


FIG. 1. "Bird's eye view of Whitehaven" by Mathias Read.
(Holy Trinity is the building with a tower at the extreme landward end of the town)

for Catholics, Presbyterians, Quakers and Methodists.

All these kept rudimentary records of mortality, usually only noting name and date of burial, but one, Holy Trinity Chapel, expanded on this for thirty years, noting date of burial, name, status or profession, age, occasionally dwelling place and cause of mortality. It also expanded detail on paupers, poorhouse dwellers and bastards.⁷ This record gives an insight into the ailments, epidemics and accidents affecting a section of the town's population and covers a representative selection of the social positions to be found there. Holy Trinity was erected in 1715 to serve the rising population who, it was felt, might be driven towards the ranks of Dissension if no church was available. Money was raised by public subscription and the sale of pews for the structure, which was known variously as, the New Chapel, St George's and finally Holy Trinity. Work was overseen by a master mason, John Bodle and accounts of the build kept meticulously by Lowther's Colliery Steward, John Spedding. The chapel cost £2,032 17s. 2d.⁸ and the first minister, John Dalton, was installed in October 1715, largely due to Lowther's influence on the Bishop of Chester. Its position attracted many of the wealthy merchants but it also served the crowded areas of the Market Place and the Ginns, occupied by sailors, artisans, colliers and labourers, while some worshippers travelled several miles from the eastern outskirts of the town (Fig. 1). Dalton was succeeded in 1729 by William Brisco and he in turn by Thomas Sewel in 1745.⁹ Sewel began to keep the mortality records in the same manner as his predecessors, but in 1750 he began to add causes of death and continued to do so until just before his death in 1780. An examination of Sewel's circumstances may indicate why this was undertaken. He was born at Bongate, Appleby, in 1711 and after a short spell as schoolmaster, he became assistant at Distington Church in 1735. He then moved to St Nicholas in Whitehaven as assistant and deacon, his reference stating "he has behaved himself piously, soberly and honestly, and diligently pursued his studies".¹⁰ The strain of his studies may have proved too much for him as he was treated by Dr William Brownrigg of Whitehaven for ailments in 1738 and again in 1741. The doctor's casebook described him as "a man of keen wit, wrapped up in his literary studies and nocturnal readings. Perhaps he indulges too much in alcoholic liquors, as they say, to keep up his spirits when depressed. In other respects, he is a temperate, sober man". This depression and a great lassitude was accompanied by a recurring fever and while the doctor treated him for it, Sewel had already tried his own remedy, ". . . Peruvian Bark, and has had recourse to it so often that he used to eat it greedily when at his books".¹¹ In 1741, his health was still poor and accompanied by weakness, poor digestion and swollen legs. All this indicated a man driven to succeed in his profession, and despite his variable health, determined to carry on with his work. In 1745, this determination resulted in his appointment as incumbent at Holy Trinity, and he married Susan Oliver in 1748, perhaps enabling him to attain a balanced life and better health. His physician Dr Brownrigg became a member of the Holy Trinity Vestry in 1743, and may have been instrumental in Sewel's appointment as well as continuing as a personal friend.

The detailed mortality records indicate that Sewel must have spoken to at least one doctor in the town, as the terms used were those of the medical profession, not normally employed by laymen (Appendix I).

Begun on 26 June 1751, he kept detailed records of causes of death until 27

October 1780, when his increasingly poor handwriting and infrequent entries indicated his own ill-health leading to his death and burial on 2 December 1780.

His temporary replacement, John Sedgwick, kept some details going until June 1781, but the new incumbent reverted to the simple recording of name, age and date of burial.

An analysis of the 1751-1781 records show where the worshippers were located within the town, but this is not totally accurate as in many cases deaths only were often noted, and Holy Trinity served as a chapel for labourer, artisan, merchant and even Lowther's Stewards as well as a large number of colliers and seamen (Fig. 2) and (Appendix II). As with all 18th century records, there was a very high child mortality, but the records indicated that if a person survived these dangerous years, as a member of the Holy Trinity congregation, they could expect to live to a considerable age, with over 22% of the mortality amongst those of over 60 years of age. In the thirty year sample, 185 men and 263 women survived into their 70s and 80s, the latter being mainly widows, as one might expect in a town which had hazardous occupations for men beneath the ground and on the sea. One person lived to 103, two to 100 and two to 99 years, and the total death count was 3,138 persons over the thirty year period. The analysis of causes of death is difficult, as the terminology used was ambiguous and some conditions would certainly not have killed people, so they have been grouped together under general classification of identifiable diagnosis.

Not named (886)

These entries gave no indication of cause of death. There were 451 adults, most of whom were recorded in the 60+ age grouping, perhaps indicating death due to old age which could not be linked to identifiable conditions without post-mortem. The 435 children were mostly a few weeks or months old and were probably within the "natural" child mortality figures produced by poor ante-natal care, indifferent nutrition and low standards of hygiene.

Non specific (485)

Dotage	2
Decline	471
Letharge	2
Sudden Death	2
Inflammation	8

These could cover many conditions recognised today e.g. sudden death – heart attack; decline – Alzheimer's. In his later years, Sewel only inserted entries sporadically, a large number of which were "decline" and this may have been a result of William Brownrigg, his doctor, going into retirement at Keswick and not being available for accurate consultation, or the fact that Sewel himself was becoming very elderly and "worn out".

Genito-urinary (6)

Gravel	1
Gout	3
Stone	2

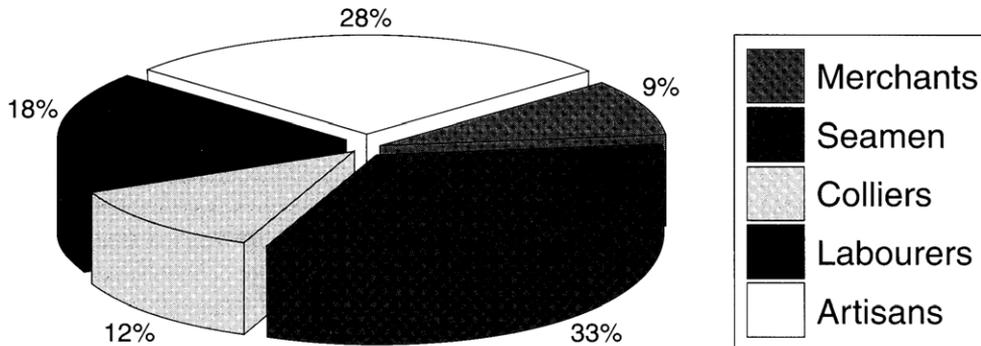


FIG. 2.

Only in their severest form would those conditions have resulted in death. 18th century patients were greatly afflicted by “the stone” and, reluctant to undergo heroic surgery, were keen to dissolve the stone by patent remedies, most of which were totally useless.¹² Putting off lithotriptic intervention would have resulted in obstruction and death.

Musculoskeletal (3)

Rheumatism	1
Sciatica	2

Those were all found in persons of advanced age, and while not causing death, would have been the only recognisable “ailment” to account for natural death (which was not admitted anywhere in the Register.)

Respiratory (28)

Pleurisy	1
Asthma	23
Inflammation of the lungs	2
Asthma and Dropsy	2

There were surprisingly few deaths under these headings, despite the position of Whitehaven in a low-lying valley on the damp west coast. There were also large numbers of colliers near Holy Trinity who worked in ideal conditions to contract chest complaints.

Gynaecological (27)

Childbed	20
Decline from change in female	1
Flooding	1
Miscarriage fever	5

Childbirth was a hazard of the time, with complications and infection usually leading to death. Puerperal fever was certainly covered by some of these terms, as may have been haemorrhaging, while one “change of female” may have referred to a menopausal condition.

Neurological (101)

Palsy	24
Convulsions	6
Apoplexy	19
Disorder in the Brain	1
Convulsive Fits	49
Lunacy	2

Many illnesses could be covered by these terms e.g. emboli-AF conditions, Parkinson’s disease, cerebral haemorrhage. Lunacy was a convenient term to conceal suicides of two women, Martha Stewart and Mary Evans who were also described as “putting an end to their lives”.¹³

By not entering “suicide” Sewel was repeating the 18th century concept that suicide occurred when people were “wooded by the devil” and “had not the fear of God before their eyes”.

Skin (3)

Scrophulous consumption	1
Ulcers	1
Hives	1

Consumption would have resulted in death, but others could have concealed the shame of syphilis and venereal infections. Skin conditions could also have pointed towards extreme allergy reactions.

Circulatory (53)

Dropsy	51
Mortification in the foot	1
Leg cut off	1

Dropsy may have indicated heart problems, obesity or all manner of conditions. One person certainly died from gangrene and another from post-operative shock or infection.¹⁴

Tumours (27)

Cancer	12
Cancer in the womb	4
Cancer in the lips	1
Cancer in the breast	1
Cancer from a wen	1

Impostume	2
Tympany	2
Swelling in the breast	1
Swelling in the scrotum	1
Swelling in the throat	1
Dropsy in the breast	1

These conditions were well known by contemporary doctors. Little could be done about them except opiates and surgery, the latter hastening death in some cases by infection.

Digestion (75)

Colic	19
Flux	26
Bowel disorder	2
Inflammation of bowels	4
Colic from a rupture	1
Mortification in the bowels	2
Worm fever	9
Jaundice	6
Cholical fever	4
Scrophulous swelling in the gullet	1
Cholical disorder	1

The town had a large population, poor sanitation and an indifferent water supply, so digestive problems would have been common. A poor diet, particularly amongst the seamen, caused stomach upsets. In their most acute form, these could be colon parasitic infection, hepatitis and salmonella. Dysentery was also brought into Whitehaven from ships.¹⁵

Accidental (89)

Burned	4
Scalded	5
Drowned	15
Killed	22
Shipwrecked and starved at sea	2
Burnt in the pits	21
Killed in the pits	20

The Trinity registers provided a detailed account of the perils common in a town with such dangerous trades. Domestic accidents occurred among the young and very old, with burns and scalding causing death in the overcrowded living accommodation. Most of those recorded as “killed” were mature males often with the footnote “by accident”. In 1780 John Douglas was recorded as “killed by enemy”, indicating either a domestic dispute (murder) or perhaps a fatality on board ship in the American War as he was a 47 year old sailor. Three children were also killed, one Margaret Barrow aged two, by a wagon, suggesting she had strayed into the busy road or, on to the coal waggonways near the harbour.¹⁶ In 1754 two men

killed: "in the rock" were probably quarrying building stone for the rapidly growing town. A harbour town always had the danger of drowning, particularly when not many sailors could swim. A "fall from a ship" may indicate death in the harbour, probably by falling from a mast (a drowning at sea would generally provide no body for burial), and in 1763 Alexander McAlester 30, was recorded as drowning in the quay, while in 1772 John Harman 28, was drowned in the neighbouring harbour at Parton. Two men "drowned in a ditch" and, "in the beck" may have been casualties of too much drink!¹⁷ In 1760, William Irvine 18, died "starved at sea shipwrecked" and was buried only ten days before his shipwrecked companion Antonio Lewis from Portugal. These two had endured a long time in an open boat after disaster but had obviously been in extremis when rescued by a ship heading for Whitehaven, as was Robert Evans 67, who died in 1761 from "lethargy from cold and shipwreck".

The colliers who were members of Holy Trinity generally lived in the Ginns area of the town, below the hill on which most of the mines were sunk. They followed a particularly dangerous profession, for not only would they be killed by falls underground, but the mines were prone to fire damp and choke damp which regularly caused explosion and fire.¹⁸ Between 1750 and 1780, six colliers were "killed", 20 "killed in the pits" in unspecified accidents, and twenty-one "burned in the pits". Attempts were made to prevent explosions, by cautiously pricking for methane in advance workings and the steward of the colliery invented a steel mill as a safety device to provide illumination by means of a shower of sparks.¹⁹

Death by burning in explosions, however, regularly occurred, and the Holy Trinity register even recorded the death of the colliery steward, Carlisle Spedding, who was killed by an explosion in August 1755, despite his safety invention.

Infectious (1351)

Fever	282
Pleuritick fever	4
Tooth fever	75
Hectic fever	3
Violent fever	6
Slow fever	5
Inflammatory fever	2
Eruptive fever	3
Putrid fever	63
Fever rash	8
Chin cough	58
Smallpox	597
Consumption	133
Measles	92
Inflammation of throat	1
Sore throat	12
Quinsy	3
French disease	1
Thrush	3

As with other 18th century towns in Britain, Whitehaven was an ideal breeding ground for the spread of infectious disease. Lack of sanitation, poor water supply, overcrowded housing and the presence of the harbour as an inlet for maladies, combined to produce serious epidemic illnesses in adults and children. While Holy Trinity's registers only covered about 30% of the town area, examination of high mortality figures from the other two chapels of the town indicate similar peaks of incidence.

(a) Childhood Infections

Fevers, sore throats (possibly diphtheria) and rashes were all death indicators, but the major killers were Tooth fever, Chin Cough, Measles and Smallpox. In years when an epidemic wiped out most of the susceptibles, there was a corresponding drop in the other childhood infectious deaths. Tooth fever struck down children every year between the ages of six months and three years, with peaks in non-epidemic years. This may be Sewel's interpretative description covering a number of diseases, ranging from influenza to mumps (which do produce excessive salivation like teething), and Chin Cough (whooping cough) followed a similar pattern among the one to four year olds. Measles attacked children between six months and seven years, with the only two adult deaths recorded in thirty years, probably from new arrivals to the town from areas where the disease was not present. In 1763, 13 children were buried, having died of measles, in Holy Trinity, and Dr Brownrigg wrote to Sir James Lowther in London; "I write this in great hurry, having now above 20 under my care in the measles, besides many other patients . . .".²⁰

Smallpox was the greatest killer of children in Whitehaven, an epidemic disease flaring into life on an approximate four year cycle when the pool of susceptibles was built up, or a trigger was introduced from outside (Fig. 3). Heavy mortality was recorded in 1758 (107 out of 194 deaths), 1772 (70 out of 137) and 1776 (81 out of 180), the entries showing that two or three siblings were often buried in the space of a month, with some families suffering a loss of children with every smallpox cycle. In 1776, the first reference to inoculation appeared in the *Cumberland Pacquet*; 11 July 1776

During the course of the last week the Small Pox have appeared and spread with most surprising rapidity in this place. A large number of children have already been inoculated. We have authority to assure the Public that all poor people or their children may be inoculated GRATIS by applying to any of the following gentlemen: Mr Peele, Mr Hamilton or Mr Jackson, Surgeons in this town.²¹

This particular outbreak can be traced to a carrier on a ship from Dublin. The first two victims were the children of a sailor and the third, Mary Church, aged three, a new arrival in Whitehaven from that town. In 1780, 65 deaths from a total of 180 encouraged a local leather merchant, John Bragg, to record the inoculation of his two grandsons; "Our grandsons George and John were enoculated for the smallpox by John Hamilton, surgeon . . . George had about 20 (postules), John only 2 or 3".²²

Children noted in the register as "poor" or "from the poorhouse" were often among the dead but only four adults died from smallpox in the thirty years. In 1753, it was George Mawson 32, a mariner; in 1762, Mary 28, wife of Henry Wilson

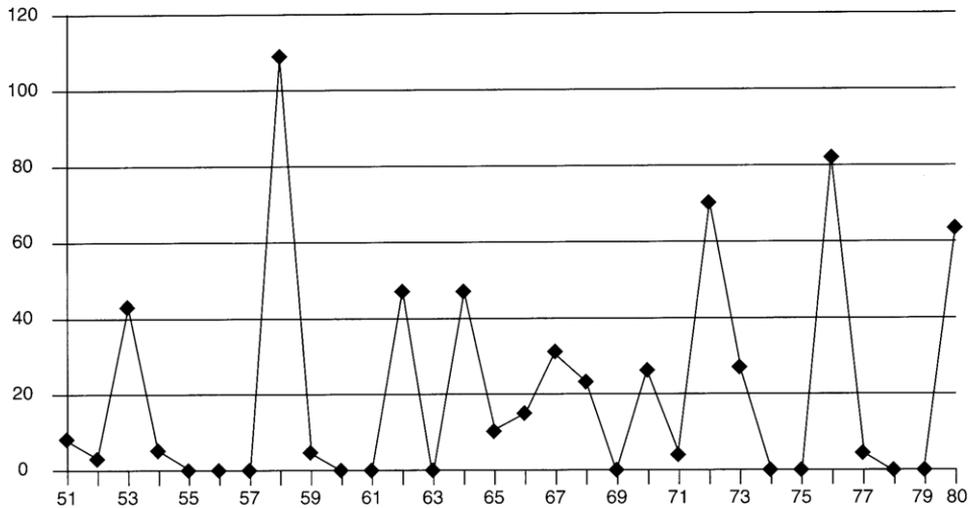


FIG. 3. Small pox deaths 1751-1780.

mariner; in 1773 Ebenezer Sanderson, native of New England and in 1776, James Rimington 50, from Rhode Island, America, perhaps indicating they came from areas where they were unexposed to smallpox as children.

(b) Adult Infections

Consumption killed at least 133 in the thirty years, but more may be concealed beneath Sewel's later gaps from 1770-1780. It seems curious that only one case of French Disease resulting in death is noted in a town with a huge population of seamen and transient soldiers, but Sewel may have been reluctant to stigmatise his flock under this heading, preferring to note hives, rash or disorder of the brain as causes of death. Throat conditions again may cover the indicators of many diseases. Fevers, however, were serious within the adult population and occurred in epidemics. Sewel noted ten varieties of fever which were killers.

Some may have been influenzas, but "pleuritic", was pleurisy, "hectic" possibly consumptive, "inflammatory" a variety of pneumonia and "eruptive" and "slow fevers" were typhus.²³

Two serious outbreaks of typhus were noted in the records with 1757 leaving 58 dead out of a total of 124 and 1773 having 44 out of 172. In 1770, Brownrigg wrote to his friend Sir John Pringle, President of the Royal Society, about a fever outbreak in Cumbria which may have been part of the epidemic which peaked in Whitehaven in 1773;

All this summer and autumn . . . we have had in this country (in our towns especially) the worst type of slow fevers I have ever seen. They do not seem to terminate by any regular crisis, but go off, as they come on, by very slow degrees. Several are carried off by deliriums and other affections of the brain. Some have patchial spots. Few medicines seem to give much relief. These fevers are certainly infectious, seizing whole families, especially the younger sort and frequently affecting such as occasionally visit the sick.²⁴

Age groupings in typhus deaths

Age	-10	-20	-30	-40	-50	-60	60+
Year							
1757	6	5	5	13	10	9	9
1773	9	2	5	8	10	3	7

Brownrigg was so worried by typhus that he published a paper in which he stated that he had experience of this condition, which he called "gaol-fever", several times in Whitehaven.²⁵ In the 1757 epidemic, indicated by the Trinity records, he stated that the fever was brought into town by a sloop of war which had been sent to protect the coal trade to Dublin. Manned by seamen from a guardship at the Nore who were already infected, the ship came to Whitehaven and the sick sailors were transferred ashore. They were housed in an empty building with over 40 crammed into three small rooms in the heat of May. Brownrigg visited them and contracted typhus himself, but recovered, unlike the ship's surgeon who went ashore with his patients. The disease then spread rapidly through the town, killing two other doctors and their patients before spreading to the neighbouring towns of Workington and Cockermouth. It appeared to die down in the winter, but flared up again in the following spring. Brownrigg blamed the spread on the crowded conditions aboard the ship and in the quarantine house, for he remarked that an earlier outbreak in the town, brought by two troopships from Dublin, had been successfully contained as the men had been billeted in separate airy and spacious rooms.

The Holy Trinity records of mortality carefully compiled over thirty years are a valuable tool in attempting to analyse the diseases suffered by the population of an 18th century town which was isolated by land, but open to many countries by sea. Although they only account for a portion of the inhabitants, the wide range of occupations and social positions of the victims are a reflection of the town as a whole. An attempt has been made to list the categories of disease, the hazards of life, the horrendous accidents caused by the coal mines and the spread of epidemics in an overcrowded and extremely prosperous town between 1750 and 1780. With his meticulous attention to detail and his interest in his parishioners, Thomas Sewel left a valuable legacy to medical history.

APPENDIX I

Whitehaven doctors 1750 -1780

Thomas Airey – trained at Rheims
 Lancelot Airey – trained at Leyden
 William Brownrigg – trained at Leyden
 Joshua Dixon – trained at Edinburgh
 John Hamilton
 Isaac Hamilton
 John Peele
 Henry Steele
 Isaac Williamson

APPENDIX II

Trades in Holy Trinity Records

Apothecary	Clerk to Brewery	Militiaman	Steward of coal mines
Anchor Smith	Chimney sweep	Mercer*	Glass grinder
Attorney	Cork cutter	Mathematician	Grocer
Beggar	Clerk of Holy Trinity	Musician	Surgeon
Bookseller	Coal trimmer	Nailer	Sailmaker
Bread baker	Coal pricker*	Officer of excise	Slater
Baker	Deputy collector	Officer	Supervisor of excise
Butcher	Exciseman	Physician	Saddler
Brazier*	Engineer	Piermaster	Steward to Sir James
Barber	Fidler	Pedler	Lowther
Boatman	Farmer	Painter	Supernumary man*
Brickmaker	Flax dresser	Pipemaker	Tobacconist
Borer of ships*	Gunsmith	Postmaster	Tax collector
Basket maker	Gardener	Plasterer	Tailor
Brewer	Glazier	Patternmaker	Turnpike
Blacksmith	Grazier	Piper	Tinker
Blockmaker*	Glover	Porter	Small twine maker
Chandler	Husbandman	Printer	Staymaker
Comedian	Hatter	Ropemaker	Tidewater*
Cordwainer*	High Sheriff	Sergeant in militia	Turner
Cooper	Heckler*	Smith	Trimmer*
Collier	Ironmonger	Sailor	Twine spinner
Currier*	Innholder	Shipbuilder	Tide officer
Carpenter	Innkeeper	Soap boiler	Upholsterer
Cartmaker	Joiner	Sawyer	Weaver
Clogger	Jeweller	Shoemaker	Watchmaker
Carman*	Labourer	Soldier	Watchman
Cutler	Landwaiter*	Sexton	Wheelwright
Captain	Limeburner	Salt officer*	Waggoner
Customs Officer	Mariner	Shopkeeper	Yeoman
Clerk of Parish Church	Mason	Stationer	
Cartwright	Maltman	Silversmith	
Cabinetmaker	Merchant	Schoolmaster	

Glossary

Blockmaker	maker of moulds for hats
Borer of ships	one who removes ships' worms
Brazier	man who works in brass
Carman	driver of wagon
Cordwainer	shoemaker in fine leather
Currier	tanner
Heckler	dresser of flax or hemp
Landwaiter	customs officer
Mercer	one who deals in fabrics
Pricker	man who places gunpowder charges in boreholes
Salt officer	one who taxes salt
Supernumary	man excess to a ship's complement
Tidewater	customs officer who boards ships to tax goods
Trimmer	one who loads coal on wagons or ships

Notes and References

- ¹ D. Hay, *An Illustrated History of Whitehaven* (Whitehaven, 1979).
- ² C. H. H. Owen, *The Lowther Family* (Phillimore, 1990).
- ³ O. Wood, *West Cumberland Coal 1600-1982/3*, CWAAS Extra Series xxiv (Kendal, 1988).
- ⁴ J. V. Beckett, *Coal and Tobacco* (Cambridge, 1981). This also incorporated the figures from Workington and Maryport.
- ⁵ B. Scott-Hindson, *Whitehaven Harbour* (Phillimore, 1994).
- ⁶ *A Plan of the town of Whitehaven in the County of Cumberland*. Drawn and surveyed by J. Howard 1790.
- ⁷ Cumbria Record Office (Whitehaven) hereafter C.R.O.(W), *Burial Registers of Holy Trinity, Whitehaven*.
- ⁸ C.R.O.(W) *Account book of Holy Trinity*.
- ⁹ A. Dick, *A History of Holy Trinity Church* (Unpublished Thesis, Centre for Continuing Education, Newcastle University).
- ¹⁰ C.R.O.(W) DRC/10.
- ¹¹ J. Ward and J. Yell, *The Medical Casebook of William Brownrigg* (Wellcome Institute, *Supplement 13 to Medical History 1993*).
- ¹² D. Hartley, *A view of the present evidence for and against Mrs Stephens medicine* (London, 1739).
- ¹³ Martha Stewart and Mary Evans were both widows, so perhaps their bereavements led to suicide. There are no coroners' records surviving for them.
- ¹⁴ 1767, Thomas Wilson (33) had his leg cut off.
- ¹⁵ J. Ward and J. Yell, *op. cit.*, 16, 21.
- ¹⁶ M. J. T. Lewis, *Early Wooden Railways* (1979).
- ¹⁷ *Whitehaven Town Book* Mss. Jacksonian Collection, Carlisle Library. A242. This contains many complaints about illegal drinking cellars in the town.
- ¹⁸ "An account of the damp air in a coal pit of Sir James Lowther, Bart, sunk within 20 yards of the sea", *Philosophical Transactions of the Royal Society* xxxviii (1733/4).
- ¹⁹ J. Ward, "The Sinking of Saltom Pit", *CW2*, xci, 127-143.
- ²⁰ Cumbria Record Officer (Carlisle) *Brownrigg to Lowther 1763*. D/Lons/L1/1/89.
- ²¹ *Cumberland Pacquet 1776*. Also further inserts on 18 and 25 July 1776.
- ²² C.R.O.(W), *Diary of John Bragg*.
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- ²⁴ Sir J. Pringle, *Annotations. Mss Vol. I*. Royal College of Physicians, Edinburgh.
- ²⁵ W. Browning, *Considerations on the means of preventing the communication of Pestilential Contagion* (London, 1771).

