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DR ROBERT ROBERTSON (1742 – 1829): FEVER SPECIALIST,
EIGHTEENTH-CENTURY MEDICAL EXPERIMENTER, NAVAL
HEALTH REFORMER AND SENIOR PHYSICIAN IN THE ROYAL NAVY
MEDICAL DEPARTMENT.

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Thesis submitted in fulfilment of the requirements for the degree of

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I certify that the substance of this Work has not already been submitted for any degree and is not currently being submitted for any other degree or qualification.

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ABSTRACT

The objective of the thesis is to identify the contributions made by Dr Robert Robertson (1742 – 1829) to the Royal Navy Medical Department by improving and ameliorating the cure and prevention of fevers within that organisation, set against the background of the extant management of fevers, limited to British medicine, during the latter half of the eighteenth-century. The life, writings and significant contributions by Robertson have received little historiographic analysis and the justification for his thesis is to redress the apparent oversight. No biography of Robert Robertson exists.

Robertson used the febrifuge Peruvian Bark (cortex Peruvianus) or Jesuit’s Powder obtained from the cinchona tree, in drug protocols which he first developed and tested in his voyages to the West Indies and West Africa during a five-year period from 1769. Later experimentations demonstrated to Robertson the highly effective, safe and dependable efficacy of the bark to cure and prevent intermittent and continuous fevers within the Royal Navy. Using early statistical methods he also showed benefit from cinchona treatment when contrasted with the extant and potentially more dangerous antiphlogistic regimen in fever management. He became an influential expert physician within the small British group of latter eighteenth-century fever specialists.

Robertson’s doctrine of Febrile Infection, a theory of one genus of fever at variance with the extant teachings, was not unique in eighteenth-century British medicine. He employed a similarly unitary view to treatment utilising solely bark regimens. These
regimens were a major progress in eighteenth-century medical practices, and for some years displaced the primacy of the depleting practices of the extant *antiphlogistic regimen*. Peruvian bark became one of the most efficacious drugs catalogued in the eighteenth-century British pharmacopoeia.

Whilst Physician-in-Charge at the Royal Hospital, Greenwich, Robertson continued his work and publications on fever medicine, experimentations with novel preparations of Peruvian bark and vigorously maintained his involvement and interest in the introduction of belated reformations to the Royal Navy Medical Department. The thesis concludes that Dr Robert Robertson’s ingenuity, industry and innovation made a significant contribution to improving the hygiene and health of the latter eighteenth-century Royal Navy.
INTRODUCTION and LITERATURE REVIEW

CHAPTER 1. INTRODUCTION

*Human experience, which is constantly contradicting theory, is the greatest test of truth.*

*Dr Samuel Johnson (1709 - 1784)*

The Thesis Objectives.

This thesis extends and complements previous histories by describing the contributions made by Dr Robert Robertson (1742 – 1829) to Royal Navy medicine and hygiene during the latter eighteenth-century, particularly in the cure and prevention of fevers in *hot climates* or *hot countries*, there being no other word in the eighteenth-century to describe the tropics. Robertson derived considerable status and influence in his day, indeed his work on fevers was quoted by the illustrious Dr James Lind (1716 – 1794), and his contributions to fever medicine provided new knowledge to both the cure and prevention of the two broad classifications of fevers, intermittent fever and continuous fever. Robertson’s writings described the cures he achieved in both types of fevers both in the northern hemispheric regions as well as the *hot countries* of the Greater Caribbean and West Africa along the Windward Coast. He developed treatment plans, drug regimens and preventive measures in order to attempt cure and prevention of *calentures*, ¹ aboard ship and ashore.

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¹ Tropical fevers
Robertson’s use of comparative analysis presented in tabulated format persuasively link a poor outcome in fevers treated with the extant febrifugal treatment known as the antiphlogistic regimen. In a similar manner he provided figures presented in a proportionate arithmetic style that quinine-containing Peruvian bark treatments demonstrated a safe and predictable effectiveness in the cure of those suffering with febrile illnesses. The thesis draws attention to the utility of Robertson’s tabulation within the context of eighteenth-century investigations into ship fever, presumably epidemic typhus fever, as well as extending this to the treatments of intermittent fevers, presumably malaria, in both the Temperate Zone and in the tropics. Robertson’s data, documented in the early years of the enfolding concepts of arithmetic medicine, conformed with the methodological tabulation principles of other medical men, particularly within the Royal Navy by Sir Gilbert Blane (1749 – 1834), explorers and observations made by philosophers of the natural world.

Robertson’s meticulously detailed clinical descriptions of disease, provided by way of case histories, particularly of the more complete and unusual presentations and clinical courses of presumed typhus fever, extended new medical knowledge of fevers. In a similar fashion he documented more fully the medical care of the institutionalised elderly infirm in-pensioners over a twenty-two year period whilst Physician-in-Charge at Greenwich Hospital.

There appears insufficient information about Robertson by modern historical scholarship whereas the records by some of Robertson’s eighteenth-century contemporaries purport a high regard of his writings. More broadly, descriptions of

2 Philosophy referred to the study of the character of man, nature, morality, literature and art
Robertson’s writings on fevers by modern historical recorders have been chiefly mentioned in passing amidst histories dwelling instead on James Lind, Sir Gilbert Blane and Dr Thomas Trotter (1760 – 1832) and other Royal Navy medical personae. Robertson’s brief entry in the *Oxford Dictionary of National Biography* (DeLacy 2004) tends to be somewhat dismissive, and the only review devoted entirely to Robertson (Cook 2006) has provided a comment in the conclusion which is perhaps an underestimate of Robertson’s innovations and contributions. No work has analysed Robertson’s publications in any systematic manner or his more complete contributions to latter eighteenth-century British medical thought. Dr William Turnbull, a contemporary of Robertson, wrote of Robertson’s publications as offering a significant source of new and useful medical information on fever,

‘In 1775 [1777] appeared Dr Robertson’s ‘Observations on Fevers’ [...] this work is the result of much experience in a warm climate, and contains an accurate journal of the diseases which occurred in three voyages to Africa and West Indies. Among the diseases, the great mortality will be found to have arisen from fevers. The bark, with acids, appears to be his favourite practice in their cure’.

(Turnbull 1806 p. xvi)

Turnbull’s writing, together with the publications of Robertson’s views and observations on fevers in books by Sir Gilbert Blane, (Blane 1799 p. 208) James Lind in the 1777 second edition of *An Essay on Diseases Incidental to Europeans in Hot Climates*, (Lind 1768) John Millar (Millar 1779 pp. 295-320) and Richard Shannon (Shannon 1794 p. 56) confirm that Robertson’s publications were, in part, favourably quoted within British medical circles of the late eighteenth-century.
In addition to Robertson’s experimental and clinical undertakings in the Royal Navy Medical Department a biographic resume is included and this will form part of the core of the research. Background documentation of extant theories and practices governing the understanding and management of fevers in the latter half of the eighteenth-century in Britain will be provided by way of a comparator to Robertson’s views. Included in the thesis objectives are relevant aspects of the mid- to late-eighteenth-century Royal Navy. Three questions are posed. First as to whether Robertson’s plan of bark therapy was persuasively considered as an alternative model to the extant custom of using Peruvian bark, often in sub-therapeutic dosages, only after the afflicted were subject first to the antiphlogistic regimen of antimony-containing emetics, then toxic doses of calomel cathartics, and at some stage, bloodletting, by the medical fraternity of the day. Second, did Robertson’s work significantly assist in unravelling the prevailing confusion as to when, how much, how long and in what circumstances was the use of the bark appropriate in the treatment of fevers? Finally, was the preventive use of the bark in intermittent fevers and continuous fevers within the Royal Navy, as proposed by Robertson, a unique chapter in the unfolding British practice of medicine in the hot countries during the eighteenth-century?

The thesis is presented in four parts. The first two segments focus on Dr Robert Robertson and his medical practices. The second segment includes an analysis as to Robertson’s perceptions of disease causation and cure more broadly, but specifically his doctrine of Febrile Infection and as to whether it was of sufficient merit and ingenuity to warrant Robertson’s inclusion within the leading British medical theorists of his day. The third part deals with the works of Dr Hermann Boerhaave
(1668 – 1738) and Dr William Cullen (1710 – 1790), with a review of the antiphlogistic management of fevers in the eighteenth-century. The concluding part of the thesis describes Robertson’s medical experimentations and meteorological medicine and finally his contributions to the reformations of the Royal Navy Medical Department during the 1790s and the early 1800s.

The methodology involved in the construction of a suitably comprehensive bibliography of primary texts was as follows. Admiralty-related files, often incomplete, were examined in both paper and microfilmed versions at The National Archives, Kew, London, together with those accessed from the extensive TNA website. The web-site of the National Maritime Museum, Greenwich, provided a valuable source. In this respect a helpful reference book edited by R Cock and NAM Rodger, 2008 (2nd edition) Guide to Naval Records in The National Archives of the United Kingdom, greatly assisted the research. Robertson’s important Naval Service Record (ADM 29/1/205), written by several hands reflecting institutional inaccuracies of eighteenth-century clerkship, was accessed on microfilm. Disappointingly his medico-surgical qualification certificates of 1760 were not catalogued. Microfilmed sources were also available from the Fisher Library, University of Sydney.

The archives of the library at the Royal Society of Medicine, London, was an especially valuable source of original books, pamphlets, booklets and a stipple engraving of Robertson. Original copies of two books, (Robertson 1789) (Shannon 1794) from the Sir Edward Ford Collection were made available from the library of the Royal Australasian College of Physicians, Sydney. The Eighteenth Century Collections Online, Gale ECCO print editions, consisting of scanned images of
Two Case Reports of Febrile Disease in the Year 1780

To permit some understanding of the incidence and seriousness of the health problem imposed by febrile disorders that confronted the practice of eighteenth-century British medicine and the British military, the following two case-reports on fevers, both recorded in the year 1780, are illustrative of their severity. The first case-report documents the impact amongst the urban common man and his family, particularly the city slum-trapped deserving poor, and the second, the consequential loss of fighting capabilities and reduced crew efficiencies experienced by the Royal Navy during the seventeenth and eighteenth centuries and beyond. Sailors at that time in any Royal Navy fleet or squadron, either on station or ashore, were more commonly afflicted by fevers than scurvy. Both, however, equally carried the soufflé de la mort – the breath of death.

In the winter of 1780, a northern hemispheric season typically associated with an increased prevalence of fevers, a delirious twenty-year old feverish woman, presented to the Royal Edinburgh Infirmary. Her mother had died of a fever three-weeks previously and her fevered father was slowly recuperating in the same institution. Within a week her eight-year old sister and three-year old brother were sent with fevers to the Infirmary and the sixty-nine year old grandmother suffering with fever and cough, unattended, probably died alone in a block of tenements in the Old Town.
The elder daughter went home twenty-four days later cured. This stark medico-social outcome from presumed epidemic typhus fever, encompassing probably a thirty-three per cent family mortality, is abstracted from the student casebook notes taken from the teaching ward ledger at the Infirmary made by James Gregory (1753 – 1821), son of Dr John Gregory (1724 – 1773) in the years 1779 and 1780. (Risse 2005 pp. 234-9) Some four in ten of the sick-poor of the late eighteenth-century Edinburgh sought hospitalisation and were “desirous of accommodation”. They were commonly in their mid-twenties, mainly female and sick for fewer than ten days. (Risse 1986 pp. 7-8) The hospitalisation of mainly acutely fevered young adult females, representing at least forty per cent of Edinburgh’s sick-poor, is nonetheless a significantly large proportion of the city’s ailing population.

The second vignette, recorded by Dr Robert Robertson as surgeon aboard the 74-gun escort, HMS Edgar, occurred in the first three-months of the same year, 1780. The Royal Navy Hospital at Gibraltar received 570 fever cases from twenty-six Royal Navy ships-of-the-line during this period. The prevalence of fevers was not evenly spread through this fleet and three ships in particular were more sickly than others. During the same period, 437 Spanish prisoners taken from a Cartel were also admitted to the hospital suffering from fevers. The treatment of fever then employed by the hospital doctors was the regimen known as the antiphlogistic consisting of the administration of “antimonial medicine, camphire and nitre”. Robertson recorded in the Sick List in his surgeon’s physical journal, that 57 Royal Navy ratings died whilst the deaths in the Spanish cohort numbered 37. (Robertson 1789 p. 267) These mortality rates of 10.0 per cent and 8.5 per cent respectively are modest with an

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3 Ships commissioned for Navy and Army prisoner exchanges
overall mortality of the two combined groups of 9.3 per cent. The death rates during major fever epidemics amongst naval crews were commonly far higher.

**Eighteenth-century Britain and the Georgian Navy**

Eighteenth-century Britain with its core socio-political values of patronage, paternalism and reciprocal obligation, reminiscent of the Roman *clientala*, a system of deference by the client for support provided by their *patronus*, was a century of imperial colonial expansion, commercial and economic development, and as within other Western societies, a time of increasing medicalization. The growth of a medical marketplace, whose flourishing expanse characterised eighteenth-century medical practice, offered a proliferation of devices and remedies for practically every known ailment. Domestic health manuals became a popular literary genre. By mid-century John Wesley’s (1703 – 1791) *Primitive Physick* (Wesley 1747), the Swiss physician Samuel Tissot’s (1728 – 1797) *Avis Au Peuple* (Tissot 1767) and William Buchan’s (1729 – 1805), co-authored with Dr William Smellie (1740 – 1795), *Domestic Medicine* (1769), (Lawrence 1975 p. 20) were among the best known. (Porter 1992)

At the same time diseases were naturalised and no longer considered the result of providential interventions or punishments for religious transgressions. Disease was explained as a natural event requiring secular explanatory theories and man-based curative therapeutic intrusions. (Spary 2011 p. 87)

For Britain and Europe the eighteenth-century was a *saeculum mirabilis*: a period when the secular world’s values replaced that of a religious world. Revelation was replaced by Reason. To describe this relentless instatement of new values and ideas, a
new terminology was later applied: *Enlightenment* that corresponded to terms already coined in the early eighteenth-century. François-Marie Arouet (1694 – 1778) writing under the pseudonym Voltaire, called the French Enlightenment, the *siècle des lumières*, whilst Immanuel Kant (1724 – 1804) derived the term *Aufklärung*, loosely meaning elucidation, for the same movement in his 1784 book *Beantwortung der Frage: Was ist Aufklärung?* In medicine the new learning embraced a downgrading of traditional and Galenic teachings with new replacement theories and systems. Was there an Enlightened English Medicine? Most eighteenth-century practitioners claimed to be enlightened in the manner they cultivated reason and the majority of British medical practitioners were orthodox in their monotheistic religious and tolerant political views. The body, as a material and natural object, became more central to natural philosophical projects during the eighteenth-century. (Spary 2011 p. 93) The Enlightened rational doctor turned to interventional and professionalised medicine in an attempt to introduce curative remedies and gradually to schemes of social planning in order to prevent and to eliminate disease entirely. (Cunningham and French 1990 pp. 1-3)

At the commencement of the eighteenth-century, insular Britain quite remote from European powers, the most liberal country of eighteenth-century Europe, was sparsely populated in predominantly bucolic communities. From 1714, Britain was ruled by a dynasty descended from an imported Hanoverian Elector of whom none of the four Georgian monarchs proved willing to visit Wales, Scotland or Ireland during the eighteenth-century. England had just united with a reluctant and protesting government of Scotland in 1707 to become a nation of greater England under one standard, the Union Jack. (Porter 1991 p. 34) The term British refers to the inhabitants,
including the forces, under the governance of Parliament. The eighteenth-century inhabitants were the peoples of Britain, Ireland, the Isle of Man and the Channel Islands. The British people were devoted to trade yet nonetheless hard working sufficient to become the first industrialised nation in eighteenth-century Europe. The industrialisation was fast progressive, dependent on a developing complex of river locks and tributary canal networks, and soon to be the forerunner of the nineteenth-century English Industrial Revolution.

To provide safe-passage through their regional and global mercantile sea-lanes, to defend Britain’s extensive coastlines and to protect far-flung imperial colonial settlements abroad, particularly the North American colonies and Canada, the islands of the West Indies and to support the Honourable East India Company in British India, England relied on a first class Georgian Navy, which during the early eighteenth-century was perhaps a fluctuating illusion. During wartime, naval protection was mandatory to British merchantmen against enemy warships and from privateers based in the French ports such as Saint-Malo and Brest. In peacetime the navy ensured that foreign merchantmen were kept out of British overseas territories and escorted mercantile transports plying the more hazardous piracy active routes. (Colley 1992 p. 71)

By mid-century the Royal Navy was the largest organisation in eighteenth-century Britain. The Royal Navy Dockyards in south England at Plymouth and Portsmouth and the south east at Chatham, Deptford, Sheerness and Woolwich were immense facilities and were the largest industrial sites in the country, bigger than their rivals,

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4 Following the 1801 Act of Union
the mines and breweries. (Brewer 1989 p. 36) The navy’s growth during the century, and increasingly after the victory at Quiberon Bay off the French coast of Brittany in 1759, ensured that Britain ultimately became the world’s greatest sea power for almost the entire century. The Royal Navy underwent impressive expansions from around 7,000 seamen in 1700 to 114,365 by 1796 and later peaking in 1812 with 145,000 seamen on the muster lists. (Crimmin 2009 p. 106)

At the beginning of the century, the Dutch dominated the world carrying trade, yet at the end of the eighteenth-century whilst the concept *command of the sea* had not yet entered political language, maritime supremacy was implicitly understood by Britain. This concept, however, did not imply a total possession of oceanic waters: both physically impossible and strategically unnecessary. (Kennedy 1976 p. 2) The complete dependence on a powerful navy by the British government and its policy of imperial expansion was absolute. The thirteen North American colonies for example underwent population increases from 340,000 in 1700 to 1,200,000 by 1760, due largely to dispossessed and disaffected Scots and Irish. (Porter 1991 p. 36) Furthermore, the population of British North America increased five-fold between the years 1675 and 1740, a phenomenal rate of population expansion perhaps unequalled in any other European empire. (Colley 1992 p. 70)

In the largely rustic nation of 1700 Britain with 90 per cent of the small population of five million employed in agriculture, the individual Englishman anticipated an average life expectancy of about thirty-seven years. Though bubonic plague had not re-visited England after the Great Plague had struck the mainly London poor in 1665, nonetheless it had reappeared in eighteenth-century France and Russia, in Marseilles
in 1719-20 and Moscow in 1771, (de Mertens 1799) inflicting mortalities in excess of 30 per cent of the population in these two large cities during a period of six-months. (Slack 1988 pp. 434-5) Yet years of severe fever epidemics were still frequent in England during the eighteenth-century, particularly the 1720s and 1730s. In spite of the attempts emanating from the English and Scottish Enlightenments, eighteenth-century British medical cure and prevention of fever disease was limited. People’s ill health did not reliably respond to the outcomes provided by the conventional medical wisdom of the day. Fever treatments, whether self-administered folklore remedies or that prescribed by physicians, surgeons, apothecaries and even clerics, were themselves inescapably potentially hazardous.

The fevers that affected British communities, especially the poor and indigent at home, were the same afflictions that also appeared within the British military sustaining similar high morbidities and mortalities. Unlike the common poor that often neither sought nor received any medical attention, surgeons in the Army and Navy were responsible for both the cure and for lowering the incidence of disease among the personnel of their services. Moreover medico-surgical services provided by the King’s ships were infinitely superior to that available to crews in the Merchant Service. Whilst crews aboard merchantmen were paid far more than in the Royal Navy and were at liberty to leave a ship at the end of every voyage, they always remained vulnerable to crimps and the Impress Service.

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5 Entrappers
Eighteenth-century Guidelines for Good Health

Prior to a discussion of the eighteenth-century concepts of febrile disease and the contribution by Dr Robert Robertson to the cure and prevention of fevers within the late eighteenth-century Royal Navy, a record of what were the prevailing eighteenth-century beliefs as to what maintained good health is relevant. As in all times, health in eighteenth-century Britain was significantly enhanced in those members of society who had wealth, leisure and education. Basic to these variable enhancers was the Galenic-Arab concept of six things non-natural (sex res non naturales). The doctrine of non-naturals, a concept of health and hygiene to which eighteenth-century medical practitioners ascribed, identified those external factors that continuously and invariably influenced the individual wellbeing. Hygiene was considered the principle instrument of health and to have two objectives. The avoidance of potential causes of disease plus the provision of stability for the proper functioning of the organism. The uninterrupted correct preservation of health functions was determined by the non-naturals.

The six non-naturals became natural when their use benefitted health and contra-natural when their use harmed one’s being; what the eighteenth-century physiologists defined as the animal economy. Health preservation was often deemed a moral duty within the genteel and ‘middling’ strata of society. Prominent among the non-naturals was the air whereby a dry, temperate and brisk climate was most propitious. Within the eighteenth-century climate doctrine, winds likewise purified the air: winds off the sea or, more dangerously that from swampy areas, were harmful. Air in closed
residents, near latrines and sewers, cemeteries and slaughterhouses were deemed the most pernicious.

Apart from the air, the remaining five non-naturals were all of equal importance in sustaining a vigorous health. Food and drink, in order to reconstitute the blood. Bread and water nourished, yet vegetables, meat and spirituous liquors posed potential risks. Closely aligned to diet was sleep and wakefulness, as also motion and rest. The fifth non-natural was evacuation and retention. The cleansing of the bowels, perspiration, the passage of urine, semen, milk, lachrymation and menstruation should all accord a natural cycle and course to support a healthy state. The final and unique entity was the passions of the soul whereby gentle passions were deemed desirable since they constituted the joy of living.

Health therefore was a function of the interaction of the body with all the non-naturals, not with any particular one or another. Whereas the physician dealt primarily with the contra-naturals, the individual was solely responsible for the non-naturals. Nature was viewed pre-eminent above the care-cure art of medicine; this *vis medicatrix naturae* determined health and disease. But by mid-eighteenth-century the surety and reliability of the natural resolution of disease was under analysis and question by the new corpus of the British medical academy centred at Edinburgh University under the aegis of Dr William Cullen. (Coleman 1974 pp. 399-405, 409-11)
CHAPTER 2. LITERATURE REVIEW

There is a comprehensive corpus of British literature devoted to the history of fevers from the sixteenth to the nineteenth centuries. The scholarship focuses on both civilian and military medical practices of febricitant containment and prevention during these centuries, including histories of the British Army Medical Department, (Hudson 2007) the Royal Navy Medical Department, (Keevil 1958) (Lloyd and Coulter 1963) the Medical Service of the Honourable East India Company (Harrison 2007) (Harrison 2011) and the health of the British Merchant Service. (Cook 2007) The Army, Navy and Honourable East India Company (1600 – 1874) represented Britain’s international armed services each administered by their own bureaucracies including separate medical departments. The history of British medical institutions such as infirmaries, (Risse 1986) dispensaries, the charity hospitals, (Risse 2005) asylums, fever hospitals (Bynum 1979) and other speciality hospitals have all received appropriate historical attention. Military medical institutions, in particular the naval facilities such as the Royal Hospitals at Greenwich, Haslar at Gosport near Portsmouth, and Stonehouse near Plymouth, Chelsea Hospital, London, and the Royal Hospital Kilmainham, Dublin, the latter two for discharged injured soldiers, (Stevenson 2007) together with the Hospital Ships have each been the subject of historical review. The early need to establish Royal Kilmainham Hospital reflected the great reliance for the maintenance and surge requirements of England’s armed forces upon the recruitment within Ireland during the seventeenth and eighteenth-centuries and beyond.
Throughout the eighteenth-century military surgeons were held in low esteem by the public and military alike, particularly the lower paid non-commissioned naval surgeons. The practice of the military surgeon, unlike their civilian counterparts, was characterised by administering and caring for an institutionalised clientele who were in no position to object to the various therapies they were subject to. In addition, military surgeons were permitted a freedom of practice that did not involve the constraints and interventions of influential physicians. (Jewson 1974 p. 385)

Unhindered by physicians’ therapeutic preferences and proscriptions, enlightened military surgeons such as Robert Robertson, were thus in an enviable position to institute variations to extant regimens and to institute novel therapeutic programs. In the Royal Navy, however, experimentation with new practices first required the ship captain’s authorisation. Similar professional independence was to be gradually exhibited by surgeons and physicians at the Honourable East India Company’s hospitals at Madras, Bombay and Calcutta and aboard the Company’s ships. (Harrison 2007 p. 88)

The dominant scholarly work on the history of medicine in the Royal Navy, *Medicine and the Navy, 1200 – 1900*, written in four volumes between the years 1957 and 1963, by J J Keevil (volumes I and II) and co-authors Christopher Lloyd and Jack L S Coulter (volumes III and IV) cited Robertson perhaps more fully than any other sources. The forward to Volume III, *Medicine and the Navy, 1714 – 1815* (1961) by Surgeon Vice Admiral Sir Cyril May, former Medical Director General of the Navy, lists Robertson, along with Lind, Blane and Trotter, as one of four “famous men who assisted in the conquest of the great sea diseases”. Lloyd and Coulter, in *Medicine and the Navy, 1714 – 1815*, described Dr Robert Robertson’s career as more successful,
though his talents were less distinguished than his contemporary, Dr Thomas Trotter. The authors suggest that Robertson was a,

‘kindly, religious and pedantic doctor, although a great deal of his work is considered to be ephemeral in content and verbose in style’. (pp. 44-5)

This assertion as to Robertson’s works will be further explored. Lloyd and Coulter included a detailed description of Robertson’s tenure as Physician-in-Charge to the Royal Hospital, Greenwich, where the term hospital was then limited to describe a home for the aged and infirm. Within Greenwich hospital there was a separate Infirmary where in-pensioners were admitted when unable to fetch their own victuals from the kitchen. The building of the Infirmary, with an elaboratory, was completed in 1771.

Robertson’s monthly reports on sick in-pensioners during his first tenure as Physician-in-Charge, from 1790 to 1807, is recorded in Robertson’s Observations on the Diseases Incident to Seamen, the title of the first volume of a four volume text published in 1807. (Robertson 1807) Lloyd and Coulter discussed the seventeen-year period during which Robertson superintended the care of 11,904 patients in the Infirmary with an average annual mortality of 210. (Lloyd and Coulter 1961 p. 200) The authors record that in 1807 Robertson reported that the hospital housed a large number of 2,410 invalid in-pensioners, attended by 150 nurses, as well as 200 boys at the school, and that Robertson annotated the common diseases in the Infirmary, which included “intoxications after pay day” (one shilling per week), influenza, rheumatism and,

‘pulmonic affections, which far exceed any other in the nosological monthly
Robertson served a total of twenty-two years as the Physician-in-Charge at the Royal Hospital at Greenwich, divided into two appointment terms between the years 1790 and 1819, enabling him the opportunity to gain a unique experience in the medical care of the aged infirm. He worked full-time assisted by a modest medical staff and in this manner, like Dr James Lind before him at Haslar Hospital, developed a unique continuity of care quite unlike his civilian counterparts who attended *ad hoc* large London metropolitan hospitals. Robertson by the time of his retirement had become, in addition to being a fever specialist, an experienced hospital physician in the medical management of the elderly and a capable administrator, as well as the titular Senior Physician in the Royal Navy Medical Department. By 1760 there were three Royal Navy Hospitals and by contrast, Georgian London in the same year had only seven all-purpose hospitals, six special hospitals and two asylums, all smaller facilities than the Navy Hospitals or the Army Hospitals at Chelsea, London, and Kilmainham, Dublin. Three new London hospitals were founded over the succeeding sixty-years with the London Fever Hospital, the first institution to research contagious fevers, opening in 1802. (Trohler 2000 p. 12)

The published naval surgeon, Dr Thomas Trotter in an 1801 memorial to Admiral Earl St Vincent, (1735 – 1823) noted that only three naval physicians [including Robertson and Trotter] had,

‘obtained a regular degree, all others (including Sir Gilbert Blane) having obtained theirs by proxy’. (Trotter 1804 p. 260)
Trotter unfortunately had overlooked the granting of an MD by the University of St Andrews in 1797 to Surgeon John White RN some two years after he had returned to England after fulfilling the role of the Surgeon-General of the First Fleet, from October 1786 to January 1788 and the Colony of Port Jackson, from 1788 to December 1794. Likewise overlooked was Leonard Gillespie (1758 – 1842) who received an MD from St Andrews in 1795. In support of Trotter’s alarm at the seemingly poor medical education of the Navy’s ships’ surgeons was the entirely different picture found in the Army. During the War of American Independence (1775 – 1783) about twelve medical officers held MDs at the time of their Army enlistment and an additional sixty-two went on to receive MDs during, or more typically, after their period of service. Most MDs were sought from either St Andrews or, like Robertson, Aberdeen University. (Kopperman 2007 p. 57) Sir Humphry Rolleston, a former Surgeon-General Royal Navy during World War I and biographer, wrote some of the early biographies on James Lind, (Rolleston 1915) Gilbert Blane, (Rolleston 1916) and Thomas Trotter (Rolleston 1919) but no work devoted to Robert Robertson. Margarette Lincoln (Lincoln 2007) wrote about the eighteenth-century image of naval seamen, the public perceptions of naval matters, the conditions of service and the improvements in the health of crews during the latter century. Dr Robert Robertson was referred to as William Robertson the ship’s surgeon aboard Juno and Edgar, more correctly from 23 January 1779 to 7 May 1782 (The National Archives: ADM 29/1/205), as showing the great efficiency of using Peruvian Bark (quinine).

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6 The Register, University of St Andrews recorded the granting of AM and MD on the 10th March 1797 to White, the testimonials signed by W Buchan MD and S de Leon MD
Ulrich Trohler in an historical account of eighteenth-century evidentiary medicine recorded Robertson’s views on fevers and his publications using comparative analyses. (Trohler 2000) He included Robertson’s thesis on scurvy, his bark therapy, administrative reformations to the Royal Navy Medical Department and drew attention to the similarities of the non-collaborative ideas and works of the two leading late eighteenth-century British fever specialists, Dr Robert Robertson and Dr John Millar. Trohler considered that Robertson had been unduly neglected or misrepresented by historians. (Trohler 2000 p. 39)

Christopher Lloyd edited a publication by the Naval Records Society in 1965, *The Health of Seamen* wherein Lloyd selected three manuscripts by eighteenth-century physicians who were at the forefront of the early development by the Navy of a public health service. The three works were Lind’s 1753 seminal text *A Treatise of the Scurvy*, Blane’s authoritative *Observations on the Diseases of Seamen* (1799 edition), and Trotter’s 1804 edition of his major work, *Medicina Nautica*. The comprehensive notes supplied by Lloyd to supplement each manuscript provided the reader with an invaluable insight to the conditions under which men lived in the eighteenth-century Royal Navy. Lloyd included several notes concerning the contributions by Robertson to naval health. It is a most useful resource to the study of the eighteenth-century Royal Navy hygiene.

The experimental work conducted by Robertson comparing the mortality rates in intermittent fever and continuous fever treated with the *antiphlogistic regimen* versus cinchona bark together with the bark preventive protocols which he developed has been discussed by two authors, the statistician Abraham Lilienfeld (Lilienfeld 1982)
and historian Andreas-Holger Maehle. (Maehle 1999) These authors together with Ulrich Trohler highlighted the importance of Robertson’s tabulations demonstrating the usefulness of comparative statistics to indicate the febrifugal benefit, or not, between *antiphlogistic regimens* versus cinchona bark therapy in fever management. In a paper based on his 1999 publication, *supra vide*, Maehle described Robertson’s bark experiments during the American War of Independence. (Maehle 2013) The 2013 publication outlined the contributions by four British bark experimenters in the latter third of the eighteenth-century. Maehle described the first experiments performed in a hospital setting by Professor Francis Home at the Edinburgh Royal Infirmary. Another carried out in the Army at Niagara, Canada, by Dr Richard McCausland and one in private medical practice at Alnwick, Northumberland, by Dr T Colingwood. Finally studies by a Navy observer, Dr Robert Robertson wherein Maehle provided a brief summary of Robert Robertson’s comparative statistics comparing the antimony-based gut depleting protocol and his bark practices aboard *HMS Juno* between January 1776 and September 1778. Robertson accumulated this data due to the exigencies enforced by the wartime interruption of regular and adequate supplies of quality Peruvian bark necessitating him to use the cheaper and more plentiful *antiphlogistic* medicines in lieu of bark.

A further experiment carried out by Robertson involving the apparent effective fumigation of a ship with tobacco as a means to stem the spread of the continuous fever, ship fever, is described by Friedenberg. (Friedenberg 2002) Some writers give brief accounts of Robertson’s prescribing practices of bark treatment, as in Peter Mathias’ uncited mention of Robertson. (Mathias 1975) The authors of *Nelson’s Surgeon* (Brockliss, Cardwell et al. 2005 p. 177) and Gordon Cook (Cook 2006)
suggested that Robertson’s long-term involvement in the care of the residential and institutionalised aged as an example of the early practice of the much later development of geriatrics. A useful source of limited biographic material on Robertson is provided within the classification tables in the catalogue, *Eighteenth Century Medics (subscriptions, licences, apprenticeships).* (Wallis and Wallis 1988)

A detailed account of Robertson’s views on febrific aetiology is provided by William Bynum’s scholarly dissertation, *Cullen and the Study of Fevers in Britain, 1760 – 1820* (Bynum 1981) though in a later publication he omitted Robertson’s works when discussing the output of several Scots who he identified as pioneers in eighteenth-century British military medicine. (Bynum 1994 pp. 2-5)

In October 2005 fourteen papers, limited to the eighteenth-century medical theory and practice in the German and Anglo-American sphere, were read at a conference held in the Francke Foundations at Halle/Saale, Germany. The compilation, divided into four sections, was published in 2008 entitled *Medical Theory and Therapeutic Practice in the Eighteenth Century.* (Helm and Wilson 2008) The first section provided insight into the complex relationships between medical theory and practice. Marion Maria Ruisinger examined the conflict between traditional bloodletting and the pressure of new anatomical knowledge following Dr William Harvey’s (1578 – 1657) publication in 1628 of *Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus.* (Ruisinger 2008) Harvey’s slim book was published in Frankfurt [am Main] by William Fitzer and contained a prefatory dedication to the Royal College of Physicians, London. A section of *Medical Theory* was devoted to the physician-patient relationship and therapeutic uncertainty. Another section dealt with the problems of the *Materia medica* and A Lunz and J Crellin presented the
pharmaceutical therapies of the Prussian iatromechanist physician, Dr Friedrich Hoffmann (1660 – 1742), in the eighteenth-century.

The papers presented at a naval medical history seminar conducted by the National Maritime Museum, Greenwich, in 2007 were published in 2009. (Haycock and Archer 2009) Robertson’s earnest concerns about the dismal state of the remunerations and conditions of service that naval surgeons experienced as outlined in a memorial to the Sick and Hurt Board was addressed in part by Pat Crimmin. (Crimmin 2009) Michael Crumplin, within a largely surgical overview, briefly referred to Robertson, (Crumplin 2009) whilst David Haycock (Haycock 2009) and John Cardwell (Cardwell 2009) both provided excellent background material on the conditions of service of eighteenth-century Royal Navy surgeons and the anomalies in health provision to the Navy. In a separate publication, John Brewer provided a wealth of useful data on the effects of warfare on the economy of eighteenth-century Britain emphasising the inordinate expenses befalling government in order to sustain standing armies in the field and large fleets on station. (Brewer 1989)

There was a pivotal change in the eighteenth-century’s attitude to dirt and the belated realisation of the close association between uncleanliness with health and hygiene, where cleanliness was to form a major part of the emerging discipline of hygiene alongside medicine. This late eighteenth-century hygiene development was stimulated by the industrial production of soap together with the prescriptive policies practiced by the Royal Navy dealing with personal lavation and clean slops \(^7\) to stem the spread of ship fever and contagions. Soap was not standard issue until the end of the century

\(^7\) Sea-going clothing worn by naval ratings
when Admiral Lord St Vincent introduced it within the Mediterranean Fleet in February 1796, supplied then only to sick-berths. These sick facilities had been repositioned from the orlop deck, immediately above the bilge, to the starboard side of the forecastle in St Vincent’s earlier reforms. St Vincent, a patron of Horatio Nelson (1758 – 1805), in September 1796 had regulated the supply of soap to all ships’ crews throughout the Mediterranean Fleet. (Crimmin 2007)

Geoffrey Hudson edited a 2007 publication *British Military and Naval Medicine, 1600 – 1830* whose contributors provided studies examining the institutional organisations of the Navy, Army and Honourable East India Company’s establishments in Britain and in the Colonies of North America, West Indies and British India. A chapter by Christine Stevenson was devoted to the architectural history of the military hospitals buildings. The three Royal Naval Hospital, as well as the purpose-built hospitals at Chelsea, London, in 1686 and the Royal Hospital Kilmainham in Dublin in 1684, were both a reward for long service and a response to community concern for the plight of disabled sailors and soldiers. Pensioned and disabled sailors were cared for in permanent establishments built later than those designed to house crippled and pensioned soldiers. The Royal Naval Hospital at Greenwich, commissioned in 1696, received its first in-pensioners in 1705; that at Haslar was founded in 1746 and admitted its first patients in 1754; whilst the Plymouth Hospital was commenced in 1758 and received its first patients two-years later. These large institutions, predominantly the naval establishments, facilitated the gradual development of enquiry into scurvy and fevers, preventive hygiene protocols, drug experimentations and improvements in the care of the aged-infirm within British eighteenth-century medicine. The knowledge and clinical experience derived from
these naval hospitals was complementary to the century’s British medical academy. Essays in *British Military and Naval Medicine* that are devoted to case histories and key figures in the military medical departments included Sir John Pringle, (1707 – 1782) Dr James Lind, Dr Thomas Trotter and Dr John Hunter, (1728 – 1793) but not Sir Gilbert Blane or Dr Robert Robertson. Nonetheless, the publication is an excellent introductory guide to the historiography of eighteenth-century British medicine within its armed forces.

The first reports of Robertson’s younger life are to be found in Robertson’s publication where he documented his apprenticeship as a surgeon-apothecary in 1759, but not where nor with which master, and a subsequent sea voyage in his eighteenth year, as surgeon for four months aboard the *Grand Tully* hunting whales off the coast of Greenland in early 1760. (Robertson 1790 p. 63) Robertson’s writings subsequently revealed little if any of the more significant biographic aspects of his personal life.
PART 1. DR ROBERT ROBERTSON (1742 – 1829)

CHAPTER 3. STATE OF HEALTH OF THE GEORGIAN NAVY

From the time of Robert Robertson’s enlistment in the wartime Royal Navy of 1760, Britain was to embroil herself subsequently in three separate wars during the second half of the eighteenth-century. It was an era of recurrent turmoil within commerce and business, in government, politics and planning, and within society and the military. From the outbreak of the Seven Years War in 1756 (1756 – 1763) with France, just eight-years after signing a peace treaty with Spain thereby ending the War of [Robert] Jenkin’s Ear (1739 – 1748) ⁸, to the close of the century, a period of forty-four years, Great Britain enjoyed only half that time at peace. The two interwar years of untroubled peace curiously bear no eponyms. In spite of enduring recurrent warfare Britain became the first industrial nation in eighteenth-century Europe and the centre of an expanding trading empire. Eighteenth-century warfare, nonetheless, contributed much to the enlargement of the British Empire. Territorial aggregation depended as much on perceptive, if not also deceptive, diplomacy, as on a victorious Army and Navy. For example the earlier War of the Spanish Succession (1701 – 1714) gained for Britain, Gibraltar, Minorca, Nova Scotia, Newfoundland, Prince Rupert’s Land surrounding Hudson Bay, and trading concessions in Spanish America. Similarly, Britain’s participation in the Seven Years War provided her with large tracts of North American territories, islands in the West Indies and important trading settlements in India and Africa. (Colley 1992 pp. 70-1)

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⁸ War commenced in October 1739 following an incident of a Spanish coastguard boarding a British merchantman and cutting off part of the ear of the English captain.
As much in response to this growing mercantile trade and commercialism and the need to protect vast fleets of merchant shipping and military transporters during the increasing and lengthening wars of the latter half of the eighteenth-century, as well to the employment of huge manpower resources both on land and sea necessitated by these many conflicts, the vulnerabilities imposed by the threats of fevers, scurvy and other diseases to Britain’s military capacities, became of compelling importance. In this respect Britain was little different from the same vulnerabilities to disease to which her enemies were also exposed. Late eighteenth-century British medicine rapidly confronted new disease pathologies that were to threaten the ever increasingly large coastal colonial communities abroad.

The new worlds exposed visitors to new tropical and sub-tropical vector-borne febrile diseases such as yellow and dengue fevers, *falciparum* and *vivax* malaria, and the ubiquitous water-borne diseases of cholera, hepatitis A virus infection, amoebiasis, salmonellosis and shigellosis. The signal importance of this new and largely tropical experience in *hot countries* was the urgent and pressing need to refine northern hemispheric-derived medical treatments and remedies in an attempt both to eradicate and prevent new tropical fevers, carrying with them high mortalities and morbidities. The increasing threats of northern hemispheric and tropical fevers compounded and exceeded the health threats posed by wounding, mutilation, dismemberment and death from direct action of ships’ ordnance. Naval ordnance in use during the second half of the eighteenth-century, fired by the new gunlock device which replaced the older slowmatch ignition, extended from a 9-pound, 12, 18, 24, 32 and 42-round shot through to a devastating 68-pound ball. Fire at sea, shipwreck and disciplinary acts completed the unique risks to life to which the ordinary seamen were exposed.
Paramount diseases within British military medicine in the eighteenth-century were fevers, scurvy and fluxes, afflicting the Navy and Army alike. James Lind analysed 5142 cases at Haslar Hospital between 1758 and 1760 and recorded the following figures:

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Figures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fevers, continued or remittent (eg. typhus)</td>
<td>2174</td>
</tr>
<tr>
<td>Fevers, intermittent or agues (eg. malaria)</td>
<td>67</td>
</tr>
<tr>
<td>Consumption</td>
<td>360</td>
</tr>
<tr>
<td>Dysenteries or fluxes</td>
<td>245</td>
</tr>
<tr>
<td>Rheumatism and lumbago</td>
<td>370</td>
</tr>
<tr>
<td>Smallpox</td>
<td>53</td>
</tr>
<tr>
<td>Scurvy</td>
<td>1146</td>
</tr>
<tr>
<td>Venereal disease</td>
<td>680</td>
</tr>
<tr>
<td>All other diagnoses</td>
<td>47</td>
</tr>
</tbody>
</table>

(Lloyd and Coulter 1961 p. 348)

These figures representing the hospital admissions during a two-year interval, reveal that 43.6 per cent of patients suffered fevers, 22.3 per cent suffered scurvy and a surprisingly low incidence of 4.8 per cent from dysentery: the three diagnostic labels together accounting for 70.7 per cent of the total.

Scurvy persisted throughout the Royal Navy until 1795 when the Admiralty finally ordered the universal provisioning of specific anti-scorbutics to replace malt of wort. Scurvy was a particular risk, but not an exclusive risk, to long voyage sea transportation. Other deficiency disorders, such as the barbiers or beriberi found

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9 Unfermented freshly sprouted barley sprouts or sugar of barley
along the southern Malabar Coast of British India (Lind 1768 p. 260) (Clark 1792 p. 99) and the consequences from low vitamin B-containing sea ration diets were frequent.

Adding to the introductory seminal works by the iatrochemist Thomas Willis (1621 – 1675) and the fever physician and nosologist practising in Pall Mall, London, Dr Thomas Sydenham (1624 – 1689), eighteenth-century British literature on fever enquiry both as to cause and cure rapidly expanded. Willis’s major work, *Diatribae duae medico-philosophicae quarum prior agit de Fermentatione sive de motu intestino parycularum quovis corpori* (1659), contained tracts on fermentation and fevers in which Willis proposed that curing diseases involved the control of various fermentations. (Martensen 2004) Shortly thereafter Dr Thomas Sydenham published in 1666, *Methodus curandi febres, propriis observationibus superstructa*, a ‘Method of Curing Fevers based on Original Observations’. (Cook 2004) Important literary contributions subsequently published during the first half of the eighteenth-century were made by Dr Richard Mead (1673 – 1754), and particularly the writings on continuous fevers of the typhus type by the Plymouth-based Dr John Huxham (1692 – 1768) (Huxham 1750). Huxham together with Dr Robert James (1703 – 1776), a fashionable London physician and correspondent with Dr Samuel Johnson, patented their own secret and highly popular febrifuges: *Huxham’s Tincture* of cinchona bark and *Dr James’s Powder* of antimony and phosphate of lime.

Mid-century fever investigators included the Army and Navy physicians, Sir John Pringle (1707 – 1782) and Dr James Lind respectively, and the leader of the medical academy at Edinburgh University, Dr William Cullen (1710 – 1790). Treatises in the
latter half of the century included those written by Dr Robert Robertson who recorded his first experiences treating fevers in *hot countries* aboard *His Majesty’s Sloop Weasel* dealing perhaps with yellow fever in 1769, Dr John Brown, (1735 – 1788) Dr John Millar, (1733 – 1805) Dr John Clark, (1744 – 1805) Dr Francis Riollay, (c1748 – 1797) the eminent naval physician, Sir Gilbert Blane and Dr George Fordyce (1736 – 1802). The ubiquitous *fluxes*, predominantly dysentery, were water-borne gastrointestinal infections that had assailed military campaigns since antiquity. The ignorance of basic field hygiene procedures within the large eighteenth-century armies lead to almost permanent troop debilitations from infectious *fluxes*, parasitic and helminthic infestations.

A frequent disease of the eighteenth-century British military was lead toxicity, the cause of *dry belly-ache of the tropics* from faulty distillation methods in rum manufacture allowing saturnine contamination, which was widespread on the West Indies Station. This linkage was re-affirmed by Dr John Hunter (1754 – 1809) and described in his major work in 1788, *Observations on the Diseases of the Army in Jamaica*, where he found it evident in both Barbados and Jamaica. Hunter showed the *dry belly-ache of the tropics* to be due to a similar aetiological mechanism as the *Endemial Colic of Devonshire*. Sir George Baker (1722 – 1809) had investigated the often seasonal abdominal colic due to lead-containing Devonshire cider. (Baker 1767)

Non-sea officers, such as the ship’s surgeon, and ratings wore distinctive sea-going clothing. It was not until after the Crimean War that in 1857 a standardised all-season uniform was made available for issue to naval ratings. Paradoxically, however, in 1757 a century beforehand, ratings had been issued with dedicated hospital uniforms.
in order to prevent desertion from shore-based hospitals, dispensaries and temporary sick-quarters. (Lloyd and Coulter 1961 p. 77) These incursions and others on naval force efficiencies were a reflection of the persistent inadequacies in the deliberations of the eighteenth-century *Sick and Hurt Board* and the *Victualling Board*. 
PART 1  DR ROBERT ROBERTSON (1742 – 1829)

CHAPTER 4.  BIOGRAPHY

I

Documentary records of the early life of Robert Robertson are not available. He was a Scot of presumed unpretentious origins. The year of his birth was given as 1742 and perhaps he was an only child. No particulars as to where he was born or baptismal record survive. Likewise there is no recorded genealogical information. His largely unremarkable beginnings extended through to his adolescence, when in his eighteenth year in early 1760, he completed a surgeon-apothecary apprenticeship. In the same year he sailed from Dundee on board a whaling ship, the *Grand Tully*, as a surgeon for a four-month cruise in the North Atlantic off the coast of Greenland, and from September 1760 he undertook a brief cruise in a Cutter as a surgeon’s mate.

(Robertson 1790 p. 63)

As to where Robertson served as a surgeon-apothecary’s apprentice is unknown, but presumably somewhere in Scotland. In England the apprenticeship system required a written indenture and the *1709 Stamp Act* fixed a tax scale on the premiums the apprentice’s parents or guardians paid the master. This tax was a lucrative income for the government who legislated that apprenticeships were to be entered in registers kept in London at the Public Records Office. Apprenticeships did not begin for most occupations, including surgeon-apothecary, until the age of fourteen with a term for
most eighteenth-century occupations of seven-years. (Lane 1985 pp. 60-73) By early 1760 Robertson would have completed a surgeon-apothecary apprenticeship of a little less than four-years if he presumably commenced his indentureship at the age of fourteen, for which there are no records.

Like many Scotsmen before and after him, Robert Robertson sought service in His Majesty’s Navy, presently in the mid-course of the Seven Years War (1756 – 1763), when vacancies for surgeons and surgeon’s mates abounded in the rapidly expanding Navy. In the same year as George III (1738 -1820) ascended the throne in 1760, Robertson succeeded in obtaining a surgeon’s mate certificate. This was issued after attending a typically perfunctory *viva voce* examination at the Court of Examiners of the Company of Surgeons, at Surgeon’s Hall, Old Bailey Street London. Robertson also required another certificate attesting his medical competence issued by the physicians at the Royal Hospital, Greenwich. He then presented these two documents to the Navy Board who granted Robertson a warrant to seek a vacancy on board a ship-of-the-line of the rating that had been stipulated on the qualification certificates by the examining surgeons and physicians, (Haycock and Archer 2009 pp. 100-1) similar to the wording of the following credential:

‘We have examined the bearer thereof William Rise and do find him fittly qualified to serve as Surgeon on board any of His Majesty’s Ships of war of the Second Rate.

Barbers and Surgeons Hall, January 13th 1714.’

The National Archive: ADM 106/2952-63

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10 In 1745 the surgeons broke from the Company of Barber-Surgeons to form the Company of Surgeons. In 1800 the Company was granted a Royal Charter to become the Royal College of Surgeons in London. In 1843 a further charter granted the title Royal College of Surgeons of England.
Robertson’s qualification certificates of surgical and medical competencies submitted to the Navy for cataloguing are not traceable. In spite of Dr Tobias Smollett’s (1721 – 1771) oft-quoted metafiction in his novel *The Adventures of Roderick Random* published in two-volumes in the mid-eighteenth-century, (Smollett 1748) regarding the superficial and ill-conceived examination procedure for surgical certification, the Seven Years War had, nevertheless, stimulated the examining court to meet far more frequently if not more efficiently. The ten-membered court met to examine candidates for the Navy, Army, Honourable East India Company and for those sitting the diploma of Member of the Company of Surgeons to enter civilian practice. The candidate was asked his age, his apprenticeships, studies and practices as a surgeon; he was questioned on anatomy, surgery and physiology and how he would treat various surgical cases. The Army, unlike the Navy, did not require that applicants for all Army surgical posts be subject to examination at *Surgeon’s Hall*. Some regimental surgeons were un-tested but all Army hospital surgeons were so appointed only after passing an examination. (Kopperman 2007 pp. 57-8) At the conclusion of the interview the now-certified surgeon’s mate or surgeon paid a one-guinea examination fee for the hand-written credential. (Crumplin 2009 pp. 69-70) The Examination Books of the Company of Surgeons (COS/2/1 and COS/2/2) do not record Robert Robertson’s name amongst those examined in 1760, although another Robert Robertson was passed for service as First Mate on the 3rd February 1763.
Robertson’s service records indicate Robertson’s first tour at sea commenced on, ‘24th January 1761 aboard HMS Prince of Orange until the 10th November 1762, as a surgeon’s mate’.

The National Archive: ADM 29/1/205

Robertson’s naval career was divided into three segments of service and of commendable duration. He first undertook twenty-two-years of sea duty as a surgeon followed by two separate appointments as the Physician-in-Charge at the Royal Hospital, Greenwich. From his first sea posting in January 1761 to April 1783 at the conclusion of the American War of Independence (1775 – 1783) when he went ashore on half-pay following the de-commissioning of the ship’s crew at the end of hostilities, Robertson undertook continuous sea-service. The iniquitous half-pay system and loss of sea-going allowances surprisingly persisted in the Royal Navy, and also in the British Army, until it was abolished just before World War II (1939 – 1945).

During the next part of his medical career Robertson entered private medical practice in the village of Hythe, across the Southampton Water, in Hampshire, in part to supplement his lowered income. He practised in Hythe from 1783 to 1789 and in addition undertook three limited six-month cruises with the Navy to Newfoundland during each of the years 1786, 1787 and 1788. His last career appointment, and the most prestigious, was as Physician-in-Charge to the Royal Hospital, Greenwich, from 1790 to 1807 followed by a second tour of duty from 1814 to 1819. By 1790 Robertson was the most senior amongst the few Royal Navy physicians on the active

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11 See Appendix 1 for the list of HM Ships in which Robertson served (see page 190)
12 See Appendix 2 for Chronology of Robertson’s Naval Service (see page 191)
list and this accounts for his promotion as the titular Senior Physician in the Royal Navy at Greenwich Hospital. Physicians to Royal Navy Hospitals were appointed differently from those in the Fleet, and were not recruited necessarily from those physicians who served in the Fleet. However, an Order in Council made in 1805 decreed that Royal Navy Hospital appointments should be held only by those who had served in the public service afloat. (Glass 1949 p. 8) As to his activities between 1807 and 1814, Robertson provided no information. Much like James Lind’s ten-year hiatus between leaving the Navy in 1748 and his appointment as Physician-in-Charge at Royal Hospital, Haslar in 1758, during which time Lind’s precise activities are unknown, although presumably in some form of medical practice, it is likely that Robertson too re-entered private medical practice.

Robertson’s total Naval service as surgeon’s mate and surgeon may be computed from his writings to be twenty-nine years, although his less concise service record disclosed a total sea duty of only some:

‘21 years, 12 months, 3 weeks and 2 days and was paid off from HMS Salisbury on the 28th November 1788’.

The National Archive: ADM 29/1/205

Immediately preceding Robertson’s fifteenth sea posting as surgeon to HMS Edgar on the 24th May 1779, whilst he makes no reference as to how he achieved this accomplishment in his publications, Robertson gained a doctorate of medicine from King’s College, Aberdeen University on the 12th February 1779. (Anderson 1893 p. 135) Aberdeen University during Robertson’s time remained a bi-collegiate educational institution. King’s and Marischial Colleges were to fuse into one learned
academy in September 1860. (Carter and McLaren 1994 p. 73) How long did Robertson attend lectures before his graduation, who taught him and what was he taught? Whilst no written or oral examination system existed at Aberdeen University at the time, what instead was the title of his thesis? Unlike the granting of MD at Edinburgh that required a thesis written entirely in Latin, Aberdeen made no such stipulations.

Robertson provided no information as to his activities between the end of November 1778 when he arrived in England after quitting HMS Juno and taking up his new post in HMS Edgar at the end of May 1779. At most he would have had a little over two-months in Aberdeen prior to graduating. The mediciner 13 at King’s College at the time of Robertson’s conferring of degree was Sir Alexander Gordon, who from 1764 to 1782 had succeeded Dr John Gregory (Anderson 1893 p. 36) on Gregory’s transfer to the University of Edinburgh in 1766 as co-chair of the Practice of Physic with Dr William Cullen. Medical graduation from the two colleges at Aberdeen University during the second half of the eighteenth-century permitted the award of MD to be made in absentia. Marischal’s degree was of limited repute since little more than a fee of twenty-guineas was required to obtain it. Aberdeen was not unique in respect to in absentia medical graduations in Scotland. St Andrews had a chair of medicine in 1772 but no medical school until 1897, nevertheless St Andrews had been awarding the degree of MD in absentia and honoris causa for many years past. (Miles 2009 pp. 24-6) If Robertson had indeed applied for a degree by the payment of a fee together with supporting documentation from one or two respected physicians or other certificates of competence, the acquisition of a doctorate of medicine in the

13 Physician
eighteenth-century was of some significant moment. It was the calling of a Gentleman raised above the status of a merchant. The physician was identified by the carriage of a gold-headed cane containing a potpourri of scented herbs and flower petals in the hollowed head. The manual occupations of surgery and apothecary, by contrast, were certainly not considered genteel.

Robertson’s service in the Royal Navy from 1779 to 1789 was continued as a ship’s surgeon, and unlike Army surgeons he was not of commissioned status. Now a qualified physician, Robertson was a member of a very small and elite professional group within the Royal Navy Medical Department. By the end of the 1790s amongst the naval surgeons there were perhaps five graduate physicians, including Robertson. In the 1793 edition of *Steel’s Unofficial Navy List*, which had been published privately from 1782, the names of 550 surgeons are recorded, which by 1806 the number had increased to 720. Recorded are the names of full surgeons only, not their mates, or as they later became known as surgeon’s assistants. (Lloyd and Coulter 1961 pp. 19-21)

**III**

During his time at Greenwich Hospital from 1790, Robertson’s career was subsequently enhanced by three further advancements. In June 1793 he was awarded, after an oral examination by four censors, a licentiate of the Royal College of Physicians of London. (Munk 1861 p. 369) Fellowship of the college was denied Robert Robertson because he had not attended the local English universities at Oxford or Cambridge nor was he a member of the Established Church. He was thus denied
voting rights and participation in the administrative affairs of the college. Nor was
Robertson subsequently able to achieve fellowship *speciali gratia* as some luminaries
such as the Edinburgh graduate Dr John Hunter (1754 – 1809) had achieved in 1793,
(Wilkinson 2004) and another Edinburgh graduate of 1754, Dr George Fordyce (1736
– 1802), who was granted fellowship in 1787. (Coley 2004)

The realities of the day, however, were that the medical faculties at Leiden,
Edinburgh and Glasgow were the undisputed leaders in medical teaching throughout
eighteenth-century Europe, whereas medical graduates from Oxford and Cambridge
were considered not so well educated. (Porter 1991 p. 75) From the mid-eighteenth-
century Edinburgh became the fastest growing and paramount institution of medical
education in Britain, rivalling the French, Dutch and German universities. Scottish
medicine was to become one of the hallmarks of the Scottish Enlightenment and
Edinburgh its centre. Robertson, however, unlike James Lind, did not seek election as
a fellow of the authoritative Royal Society of Medicine in London.

The second improvement in Robertson’s professional career came about in 1803.
After certification by seven subscribers, including Prime Minister Henry Addington
(1757 – 1844) and Richard Arden (1744 – 1804), the Master of the Rolls 14,
Robertson was granted fellowship of the elite Society of Antiquaries of London on the
12th May 1803. (Antiquaries 1803 pp. 438, 492) This prestigious award of fellowship
poses two questions. What was Robertson’s classicism and antiquarian interests? As
a long-standing and meticulous recorder of climatic and clinical parameters,
Robertson may have equally indulged in the popular eighteenth-century pastime of

14 The deputy of the Lord [High] Chancellor, the presiding officer or Speaker of the House of Lords
collecting artefacts. Yet this is not revealed in his writings. Furthermore, his knowledge of Physick was a particularly unusual means for a candidate to proffer as claim to the Society’s fellowship.

His final preferment within the London fraternity of physicians occurred during the next year. By 1804, Robertson was a gentleman and physician with membership of the Royal College of Physicians of London, occupying the most senior position within the Royal Navy Medical Department, a highly regarded fellow of the Society of Antiquaries of London and with scholarship and, by then authorship of six medical publications. On the 14th June 1804 he was elected and admitted to fellowship of the Royal Society, London. (Thomson 1812 appendix IV, p. lxvii) There is little evidence that Robertson played an active part in the intellectual exercises of the Society, delivering no papers or addresses to the fellowship, unlike the redoubtable senior Army physician, Sir John Pringle Bart MD FRS, (1707 – 1782) or the Royal Navy navigator-explorer-scurvy researcher, Captain James Cook FRS RN (1728 – 1779).

A view that Robertson later received a knighthood in recognition of his works (Trohler 2000 p. 147) is not supported by this thesis research. The bestowal by the sovereign of a knighthood in recognition of merit or service by a member of the eighteenth-century military medical services was quite rare. Military physicians, and particularly surgeons, were conspicuously unfashionable and unpopular within the populace as they were at Court. Only two eighteenth-century British military doctors, both Scottish physicians from wealthy families, are recorded as rendering distinguished service sufficient to warrant recognition by the Crown. Sir John Pringle Bart. MD FRS, physician-general to the Army from 1744 to 1752 and a later notable
reformist in the Army Medical Department, was created a baronet in 1766. Sir Gilbert Blane Bart. MD FRS, a reformist in the Royal Navy Medical Department and later physician to George IV (1820 - 1830) was rewarded in 1812 for his Commissioner’s enquiry report during the failed 1809 Walcheran Expedition, a baronetcy.

The only surviving image of Dr Robert Robertson is an undated eight-centimetre by twelve-centimetre stipple engraved bareheaded bust by the Historical Engraver to George III, James Heath (1757 – 1834). The artist was Miss Emma Smith (1783 – 1808), but her sketch of Robertson is not included in her entry of Royal Academy of Arts exhibitors. (Graves 1970) The engraving supra vide is in the archives of the library of the Royal Society of Medicine, London, and is captioned ROB T

ROBERTSON MD. FRS. FAS Member of the RC of P & Physician to the Royal Hosp. at Greenwich. The likely date of the engraving is equivocal. The terminus post quem is May 1804 when Robertson was elected FRS. The terminus ante quem is less clear. It is most likely that the Commissioners of Greenwich Hospital offered the financial support for Heath’s masterful work. Further, it seems fitting that the period from 1804 to 1807, the latter year being that of his first termination of office at Greenwich Hospital when Robertson was aged between sixty-two and sixty-five years, would have been chosen by the Commissioners to recognise Robertson’s good works by way of a dedicated portrait. Robertson’s facial features, hairstyle and bearing would perhaps support an age of between sixty-two and sixty-five at the time of his portraiture. The whereabouts of Robertson’s original portrait is unknown, unlike the renowned 1783 etching of Dr James Lind by the Scottish artist Sir George Chalmers (c 1720-3 – 1791) that has been reproduced in almost all historical textbooks or articles dealing with Lind and scurvy.
At the age of seventy-seven Robert Robertson retired from the Navy in the year 1819. There is no evidence available to indicate that Robertson was ever married nor were there any issue. This is at variance with the data given by Lloyd and Coulter in which the authors state that the manuscripts of Dr Robertson were still in the possession of his family. (Lloyd and Coulter 1961 p. 380) The authors do not cite nor refer in their work to the existence of an older and unrelated Dr Robert Robertson who graduated from Edinburgh University in 1765 and whose manuscripts may be those to which Lloyd and Coulter refer. The older Robertson, a fellow Scot, was admitted as a licentiate to the Royal College of Physicians of London on the 30th September 1775. (Munk 1878 p. 308)

The younger Robert Robertson (1742 – 1829) appears not to have retired to a familial home since the register of out-pensioner candidates for admission to Greenwich Hospital on the 20th July 1821 included Dr Robert Robertson amongst the twenty-seven registrants. (The National Archive: ADM 6/228/27) All the registrants had past service in the Royal Navy, the Royal Marines or the Naval Dockyards, whereas a merchant seaman was ineligible for entry to the hospital. This is in spite of the fact that every merchant seaman, except fishermen, contributed to the upkeep of Greenwich Hospital by being taxed sixpence a month out of their wages. (Lloyd and Coulter 1961 p. 197) The returns from the Sixpenny Office permitted government ready access to the numbers of sailors employed by the merchant service who could be recruited to the Royal Navy during wartime. (Rodger 1986 p. 149) Likewise, only
officers who had entered the Royal Navy as a rating or non-sea officer could be admitted as in-pensioners. (Brockliss, Cardwell et al. 2005 p. 178) In the mid-eighteenth-century the Royal Navy was a classless structure, there was no schism between the quarterdeck and the lower deck like that which appeared in the Royal Navy less than a century later. Post-Captain James Cook FRS RN himself had “come up through the hawsehole” following his commissioning as a lieutenant on the 25th May 1768. (Hough 1994 p. 39)

Robert Robertson died an in-pensioner a little before December 1829, eight years before the introduction of compulsory registration of births, marriages and deaths in England and Wales, in which the cause of death was recorded. He was safely anchored in one of the two walled burial grounds of the Royal Hospital, Greenwich. By 1857 both grounds were filled and the present East Greenwich Pleasaunce was purchased. In 1875 the bodies of three thousand pensioners were transferred to the Pleasaunce. Ratings were buried in the west grave plot and officers, possibly including Robert Robertson, in the east. (Meller 1985 p. 252) The preamble in Robertson’s obituary in the December 1829 edition of The Gentleman’s Magazine recorded,

‘Lately, At Greenwich, aged 87, Robert Robertson MD FRS and SA, a Director of Greenwich Hospital and formerly a Physician to that establishment’.

(Urban 1829 p. 561)

15 The obsolete form designating the Naval rank of substantive Captain
Robertson’s long and diligent naval service was marked by the rendering of advances in naval fever medicine and in the development of the rudiments of public health, hygiene and in-patient care of the aged-infirm.
CHAPTER 5. ROBERTSON’S MEDICAL LITERARY WORKS

Throughout the eighteenth-century and thereafter, British physicians were faced with restricted options in order to advertise their skills, particularly their successful treatments, and overall experiences in medical practice. By far the most important means, but which was available to a relative minority, was patronage from the nobility and gentry. Patronage and the introduction to wealthy client-patients were highly sought by both London and Provincial physicians. Self-funded medical publications were another popular avenue to self-advertise as well as formulating patented eponymous medicines, often without full disclosure of the contents. Throughout eighteenth-century Britain there was an abundance of medical literature. These tracts were written primarily for the educational and instructional benefit of medical professionals, however, by mid-century popular home guides of medical instruction, particularly Dr William Buchan’s *Domestic Medicine* (Buchan 1769), already had a fast growing and widespread readership. Medical texts were invariably written by university medical graduates and thereby physicians in Britain came to dominate medical authorship.

It was mainly through his medical writings that ultimately brought Robertson a certain prominence within the Royal Navy Medical Department. Between 1777 and 1812 he wrote a total of twelve publications almost all devoted to fevers. 16 His first publication was authored not as a physician but as a ship’s surgeon with seventeen-

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16 Appendix 3 for complete list of Robertson’s publication (see page 182)
years surgical experience and printed two-years prior to his medical graduation from Aberdeen University in 1779. His first book was titled *A Physical Journal kept on board His Majesty’s Ship Rainbow during three voyages to the Coast of Africa and the West Indies*. (Robertson 1777) The book recorded Robertson’s earliest experiences treating fevers with Peruvian bark and included a brief account of the remitting fever which occurred on board *His Majesty’s Sloop Weasel* during a cruise to the African Coast in 1769. This description of remitting fever during the African cruise was included by James Lind, with a favourable comment in the second edition written in 1777, of *An Essay on Diseases Incidental to Europeans in Hot Climates*. (Lind 1768)

Robertson’s second work was published in 1783 entitled *Observations on the Jail, Hospital or Ship Fever*, and contained a dedication to William Hunter MD, Physician Extraordinary to Her Majesty, dated May 17th 1782 at Kingston, Portsmouth. This work was enlarged and republished in 1789 under a new title *Observations on the Jail, Hospital or Ship Fever from the 4th April 1776 until 30th April 1789, made in various parts of Europe and America and the Intermediate Seas*. Robertson, writing at Hythe, Hampshire, dedicated this edition to Prince William Henry, Duke of Clarence (1765 – 1837). In both books Robertson categorised his experiences with ship fever, yellow fever, smallpox and scurvy aboard *HMS Juno* in cruises to Quebec, Halifax, New York and Newport between January 1776 and September 1778 during the American War of Independence. Robertson successfully treated his scurvy sufferers with the vitamin C-rich pine needles from the North American Spruce Pine (*Pinus glabra*)

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17 Queen Charlotte (1744 – 1818) wife of George III
18 Duke of Clarence, third son of George III and later the last monarch of the House of Hanover as William IV (1830 – 1837)
prepared as Spruce Beer, a formulation first employed by the French explorer in Canada, Jacques Cartier (1491 – 1557).

During cruises aboard *Juno* Robertson made clinical notes of cases of ship fever which he treated with bark, which was frequently unavailable due to wartime restrictions, as well as those treated with the cheaper and more plentiful antimonials, camphires \(^{19}\) and blisters. He recognised the superior response of the bark-treated cases of fever when compared to any other administered medicines. Both the 1783 and the 1789 editions included lengthy monthly reviews of the sick lists, numerous case histories and his similar experiences with bark and antimonials in fever cases treated later aboard the *Edgar* from May 1779 to May 1782, where the *Edgar* formed part of the fleet protecting Gibraltar and later cruised the Ushant \(^{20}\) off Brittany.

Robertson opined that in the northern waters aboard both the *Juno* and the *Edgar* “that infection is greatly checked on board of a ship by its coming to action, or firing a good deal”. (Robertson 1789 p. 261) Robertson provided no explanation for this curious observation. The 1789 tract included additional descriptions of his brief tours aboard the fourth-rate *HMS Romney*, from June to December 1782, and the second-rate *HMS Blenheim* from January 1783 to Robertson’s quitting the ship in April 1783 on half-pay at the end of the war. Both ships were employed on Channel service and thus frequently received fresh drafts of febrile impressed merchant seamen and Cartel men, resulting in recurrent outbreaks of ship fever. Upon receiving new crews into *Romney* and *Blenheim* Robertson recommended to his captain that he should first

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\(^{19}\) Camphire an archaic name for the fragrant flowering *Henna* shrub (*Lawsonia alba*) used to dye hair and skin

\(^{20}\) A French island at the south western end of the English Channel
enquire as to whether the transferring ships’ companies were healthy. If not then he advised that a man is not sent to or received from that vessel. (ibid. p. 422) It was in Romney that Robertson recorded a common febrile symptom of ship fever not previously observed: “they complained of heat in the eyes and were unable to look at the light.” (ibid. p. 423) Cough was also a dominant feature in those with ship fever at that time and when available Robertson continued successfully to treat the fever cases with bark. Robertson tabulated the number of fever patients during the three-months aboard the Blenheim at 157 with no deaths. (ibid. p. 437)

In the 1789 edition of Observations on the Jail, Hospital or Ship Fever Robertson expanded a chapter devoted to the ‘Management of Fever’ to provide brief opinions on the extant febrifugal medicines. He was dismissive of bloodletting pointing to its poor efficacy as “[there was] not a single instance of fever cured by letting blood only” (ibid. p. 379), to its low safety margin and that bloodletting frequently impeded recovery: the last two comments reflected the developing medical opinions of the time. Robertson considered that emetics if given at the first symptom of contagion or during the cold shivering fit of the first febrile paroxysm, they may prevent the fever progressing, otherwise, emetics were of little further use. The place of sudorifics and blisters again he believed were of benefit only if applied very early in ship fever. Cathartics were only prescribed in conjunction with the bark and only when the emetic had produced some stools.

As to the bark Robertson emphasised that the early it is given the better, for it to be administered in high doses, that it may be subjoined with other medicines such as

21 Drugs which promote sweating; known also as diaphoretics.
emetics and cathartics and that it unusually cured ship fever in American waters as quickly as it did the fevers in hot countries. This latter observation was ascribed by Robertson to be due “only to the virulence of the infection” in the North American region. (ibid. p. 192) The required quantity and duration of bark therapy he summarised depended on the virulence of the infection, the climate, season, age, sex and the patient’s constitution, and particularly, “on the goodness of the bark”.

Robertson concluded the 1789 edition with his observations on the prevailing diseases in Hythe from 1783 to 1789 observing the high incidence of fevers which he presumed to be related to the vapours from surrounding marshy lands or undrained swamps. Robertson wrote little about his presumed failures utilising the bark apart from his observations that he did not always achieve similar high levels of success when treating the villagers of Hythe. He attributed this entirely to their late presentations in seeking his help.

Robertson’s fourth work, An Essay on Fevers (Robertson 1790) and a later title, Synopsis Morborum, (Robertson 1810) each contained the quintessence of Robertson’s medical views on fevers. The Essay on Fevers was revised in four-volumes and re-titled as Observations on Fevers which arise form Marsh Miasmata and from other causes in Europe, Africa, West Indies and Newfoundland with occasional remarks on the Principle Diseases Incident to Seamen (Robertson 1807) and again re-edited in four further up-dated volumes entitled, Synopsis Morborum. Synopsis Morborum was designed chiefly for the use by young professional practitioners in the Navy and Army, and thereby an early, and one of a few, contemporary training texts specifically for ships’ surgeons. His final book was an excerpt taken from Synopsis Morborum and published as a separate small booklet in
1812 much as a prescriber’s guide for preparing *Peruvian bark gingerbread*.

(Robertson 1812)

Robertson’s theme in his literary output related to fevers although he also proffered an opinion as to the causes and treatment of scurvy in which his interest in scurvy reflected the extant literature of an atmospheric model of scurvy proposed by Pringle as a putrid pathology, (Lawrence 1996 p. 86)

> ‘The corruption of the bilge water, is not only a main cause of sea scurvy but often occurs in crowded ships, to raise a fever of the hospital or jayl kind’

(Pringle 1750 p. 8)

A febrifacient causality of scurvy was later advanced also by James Lind, in the first edition of *A Treatise of the Scurvy*,

> ‘moisture was the principal and main predisposing cause [of the scurvy]’

(Lind 1753 p. 107)

The Pringle model was further developed by Dr David Macbride’s (1726 – 1778) concept of *fixed air* in which he hoped the delivery of carbon dioxide to the blood would cure putrid diseases in general. (Macbride 1767) Joseph Priestley (1733 – 1804) later synthesised *soda water* for medicinal purposes for which he was awarded in 1773 the prestigious gold *Copley Medal*. Nevertheless, Robertson who supported a fever-related causality of scurvy, also observed that alcohol excess, in particular of diluted spirits, chiefly rum, in water would sometimes produce scurvy by “destroying the digestion”. This opinion antedates the present day clinical experience whereby

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22 Scurvy was described in 18th century literature to be either Land Scurvy or Sea Scurvy with the imputation that the causes and treatment were considered different.

23 Carbon dioxide

24 An annual award bestowed by the Royal Society of London for researchers in either the physical or biological sciences.
subacute and overt scurvy is common amongst chronic alcoholic cohorts: alcohol exacerbates the effects of the low-absent vitamin C diet of the alcoholic. Robertson prescribed both “lemon acid” and “orange acid”, with sugar in wine, to the scorbutic cases aboard Edgar with good effect such that Robertson declared “I never in any ship lost a man by scurvy”. (Robertson 1789 p. 287) Robertson’s administration of a specific anti-scrototic during the late 1780s was ahead of the Victualling Board’s extant provisioning of a malt of wort as an inferior scurvy preventive.

British medical and scientific publishing, like all general publishing, in the latter half of the eighteenth-century remained centred in the licensed presses of London and was a costly venture. Robertson a doctor on a modest fixed income, however, self-funded the publication of three books during his sea service career, each printed with more than one edition. (Robertson 1777) (Robertson 1783) (Robertson 1789) In eighteenth-century Britain the task of accessing the publications of new medical literature was greatly improved by the release of the first English language journal of abstracts from medical publications, Medical and Philosophical Commentaries, first printed in Edinburgh in 1773. The anonymous editor was Dr Andrew Duncan, Senior, (1744 – 1828) who was appointed Professor of the Theory of Medicine at Edinburgh University in 1790, the same year he was appointed President of the Royal College of Physicians of Edinburgh, from 1790 to 1792. The journal was ultimately renamed the Edinburgh Medical Journal during the last 100 years of its publication, from 1855 to 1955. (Cook 1990 pp. 238-43)

The Medical and Philosophical Commentaries was the most respected British review journal of medical literature between 1773 and 1804 and was published
simultaneously in London, Edinburgh and Dublin. (Trohler 2000 p. 121) Similar to works by James Lind and John Millar, Robert Robertson’s publications also failed to be reviewed by Dr Duncan’s journal, yet other contemporaries of Robertson, such as John Clark, William Black, John Lettsom and the celebrated Sir Gilbert Blane, all received favourable critiques. Robertson did receive supportive comments from Ralph Griffiths (fl. 1720 – 1803), the editor of *The Monthly Review or Literary Journal* (1749 – 1844), who in 1793 published a review of Robertson’s 1790 edition of *An Essay on Fevers*, prefaced the 15th February 1790 and completed whilst Robertson was in private medical practice at Hythe. (Griffiths 1793 pp. 568-72)

Throughout the century Army and Navy surgeons and physicians contributed much new medico-surgical, botanical and natural philosophical knowledge gained by their experiences in climates beyond the Temperate Zone in which they had received their initial apprenticeship training and early clinical experience. Numerous medical texts published by Naval surgeons and physicians in the latter fifty-years of the century appeared in bookshops but of particular note were the many titles written by Dr James Lind, Dr Robert Robertson, Sir Gilbert Blane and Dr Thomas Trotter. New medical knowledge was reported by many surgeons of the Royal Navy who undertook far-flung global cruises which included regular voyages as far south as the Falkland Islands, the coast of Patagonia, (Macbride 1767 p. 287) by the recorded observations of the Surgeon-General, John White RN at Port Jackson, New South Wales (White 1790) and expeditions to New Zealand.
PART 1. DR ROBERT ROBERTSON (1742 – 1829)

CHAPTER 6. THE ROYAL NAVY IN ROBERTSON’S EARLY YEARS AT SEA

I

The Royal Navy to which Robert Robertson had enlisted in 1760 was the largest organisation in eighteenth-century Britain. The organisation of the Georgian Navy was centred on the Board of Admiralty headed by the First Lord and situated at Whitehall in central London. Its function was the responsibility for the deployments of fleets and ships, the supervision of the departments that administered dockyards and victualling stations and, in particular, for the promotion and posting of executive sea officers. A separate branch of the Navy, which superintended the civil branch of the service, was the Navy Board, headed by the Comptroller of the Navy. An important subordinate department of the Navy Board was the Sick and Hurt Board. It was only when appointed to a specific ship that the surgeon came under the supervision of the Sick and Hurt Board, which was responsible also for Navy and Army prisoner care and exchange. The surgeons in the eighteenth-century Royal Navy were also the ship’s physician, apothecary, and on Royal Navy exploratory expeditions he was the official Naturalist, and were styled warrant officers. Thus theoretically not of wardroom rank, holding a warrant issued by the Navy Board. Surgeons did not hold the King’s commission issued by the Admiralty conferring

25 In 1904 the title changed to the extant First Sea Lord
26 Known as The Principle Officers and Commissioners of the Navy
27 Known as the Commissioners for taking care of Sick and Wounded Seamen and for exchanging Prisoners of War
gentility of quarterdeck rank. They were also denied a distinguishing service uniform with insignia until 1805.

Prior to 1796 the *Sick and Hurt Board* had little to do with the actual care of sick seamen at sea. The Commissioners were administrators without authority and could not control or dictate treatments to naval personnel. The Board was created during the Dutch Wars in the mid-seventeenth-century and after hostilities the commissions of board members lapsed. From 1740 a fresh commission was established, and though the number of board members was reduced in peacetime, the Board remained a permanent department. During peacetime the number of commissioners was reduced to two, in war years it varied between three and five, and by the 1790s the majority of commissioners were doctors. The *Sick and Hurt Board* was abolished in 1805 and the reduced numbers of staff were transferred to the *Transport Board*. (Charters 2009 pp. 19-38)

A hierarchy distinguished the Navy Officers of the Admiralty and *Navy Boards* from the commissioned Sea-Officers in the fleets and squadrons. Robertson’s 1760 Royal Navy lacked a single word for *discipline* and this remained so for the rest of the century. The word itself was well enough known, but the meaning was approximately equivalent to the modern term ‘training’. A ship’s *state of discipline* to the eighteenth-century naval world meant the modern version of ‘working up’ their ship to an efficient state of sea-worthiness. (Rodger 1986 pp. 205-11) The expense of maintaining the mid-century Royal Navy was immense. The capital assets of a large eighteenth-century British business rarely exceeded £10,000 that entailed less capital than a single major battleship. In the early part of the eighteenth-century the cost of a
first-rate-ship-of-the-line was between £33,000 and £39,000 and by 1765 this cost had nearly doubled. The 100-gun first-rate *HMS Victory* laid down in 1759 and launched in 1765, cost £63,174 to construct.

The Navy also required appropriate facilities to service, build and repair the fleet. New dry docks and wet docks, or non-tidal basins, were built in the 1690s at Portsmouth Harbour, established in 1495, and at Plymouth Dock. With dockyards at Sheerness (1665 – 1957) on the Isle of Sheppey and at Chatham (1567 – 1983), both on the River Medway and the two nearby Thames yards at Deptford established in 1513, and Woolwich established in 1512, these six Royal Dockyards, together with many smaller coastal and overseas Naval Dockyards, provided the support centres for the eighteenth-century Royal Navy. (Duffy 1980 p. 62)

II

British forces in 1759, the year before Robertson’s service enlistment, were committed to a third year of a seven-year conflict with France. This global clash, referred to in United States history as the French and Indian War, began in the North American continent two-years earlier in 1754. For Britain 1759 was an *annus mirabilis*. Month by month there had been news of eight consecutive successes executed by British land and sea forces. In particular during September the French-held bastion of Quebec had been taken by the forces of Lieutenant General James Wolfe (1727 – 1759) who fell in that combat. The year culminated with the most far-
reaching success of all with the defeat by the Georgian Navy of a large French battle fleet at Quiberon Bay 30.

In consequence to the French Navy’s defeat, Britain had grasped \textit{le trident de Neptune est le sceptre du monde}, from the poem, \textit{Commerce}, by Antoine Martin Lemierre (1733 – 1793). (Marcus 1960 p. 177) After Quiberon the increasing mastery of the Royal Navy was never again seriously questioned by any nation: Trafalgar only served to remind and reinforce the later maritime world of that simple axiom.

James Lind served throughout the War of the Austrian Succession (1740 – 1748), which included the War of [Robert] Jenkin’s Ear against Spain, and quit the navy at its conclusion after nine-years service. In a like manner, Robertson joined the Navy during wartime, the Seven Years War, and continued service throughout this and the subsequent American War of Independence, going ashore at the war’s conclusion in 1783. Both men were sent ashore on the decommissioning of their vessels at the termination of hostilities: Lind on no pay and Robertson at least on half-pay.

Stimulated by the needs to protect the lives within the many fleets and squadrons stationed in \textit{hot climates} during the War of Independence, Robertson’s work in establishing Peruvian bark therapies for the cure and prevention of intermittent fever and the cure for continuous fever were a significant innovation within the Royal Navy Medical Department. His premises, theories and experiments in fever medicine will be discussed in fuller detail in Parts II and IV.

\footnote{30 Atlantic Ocean off the coast of north west France}
PART 2.  DR ROBERTSON’S MEDICAL PRACTICE

CHAPTER 7. CONCEPTS OF FEVER IN 18TH CENTURY BRITAIN

A focus on the incidence of febrile disease in eighteenth-century Britain will commence the narrative in this chapter. The centrality of constitution in the overall concept of disease will be discussed together with a view of what the eighteenth-century practitioner understood by the term disease. Included within the theories of fever production are the contributions of two pre-eminent practitioners in Anglo-European medicine of that century: Dr Hermann Boerhaave (1668 – 1738) and Dr William Cullen. A brief record of the significant work by the early English eighteenth-century fever specialist, Dr Richard Mead is also introduced.

I

In all seasons throughout eighteenth-century Britain and Europe, fevers were very commonplace. This applied particularly to the omnipresent fever which today is presumed to be epidemic typhus fever dependent on the infestation with the human body louse as vector. Especially in the autumn-winter months epidemic typhus fever was essentially a disease of the packed populous, the common lot: the pruriginous and fretful great unwashed. The fevers were identified with different nomenclatures in the eighteenth-century British medical literature, but they shared the same causation: congested multitudes within confined domiciles enclosing personnel in pressing proximities bearing lice-infested clothing.
Fevers erupted in crowded ‘tween-decks of a high rating ship-of-the-line-of-war, in
troop transports, convict ships, guardships, hospital ships, *slop* ships,\(^{31}\) tenders,
merchantmen, but unusually in Guineamen.\(^{32}\) Fevers were generally less frequent in
the workhorses of the Navy: the small and large frigates, sloops and corvettes of the
5\(^{th}\) and 6\(^{th}\) rates. Crews regarded them far healthier than the large battleships since
they were less crowded and their twin and single deck designs enabled better
ventilation. French and Coalition prize ships of all rates were renown for harbouring
potential fevers, a reflection of both a much lowered standard of supervised deck
drills and cleanliness and the religious custom of storing the remains of dead crewmen
in the orlop and the hold for later land burial. (Blane 1799 pp 87-8, 149) Fevers
appeared in Army cantonments, camps, garrisons and barracks; jails, dungeons and in
The Black Assize\(^ {33}\) at the Old Bailey during 1750; (Lloyd 1965 p. 30) prison-hulks
and prisoner-of-war compounds.

Throughout Britain fevers broke out in slums and workhouses; hospitals, infirmaries,
dispensaries and places for the sick; in alms-houses, foundling hospitals and
orphanages. It afflicted work-hands in sweatshop factories, breweries and mill
workforces in their mephitic, wetted and small basements or jammed in high terraces
reached by steep, narrow and neglected staircases. Gypsies, vagabonds, harvest-failed
market townspeople; the needy and destitute, were all similarly vulnerable. A
contemporary narrative describing the annual mortality of two thousand children in
London from “diseases most fatal”, Dr William Black (1749 – 1829) wrote about

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\(^{31}\) Provisioning and clothing transporters
\(^{32}\) Slave ships
\(^{33}\) Assize: a superior court which formerly periodically sat in each county of England
and Wales to administer the civil and criminal law
‘Cities are now the graves of young children. Close streets, alleys, lanes and
habitations of the working poor inhibit free ventilation and circulation of air.’

(Black 1781 p. 155)

Through the seventeenth to the twentieth-centuries fevers hounded and dogged the
ever increasingly large armies in the advance but particularly in the disorder of the
retreat of rabbles and during precipitate troop withdrawals. (Talty 2009) Fevers beset
the immigrants from feudalism and famine in Europe: from the 1883 poem The New
Colossus by the American, Emma Lazarus (1849 – 1887), the huddled masses, during
the late eighteenth-century en route to the New Worlds of the Americas. The genesis
of this common fever directly related to the lack of regular body and clothing lavation
by the eighteenth-century common man.

The fevers in English medical literature were variously named. Amongst many
epithets were the Ship, Barracks, Camp, Garrison, Jail, Hospital and Vagabond Fevers,
or the Irish Ague. These diseases essentially affected the military, the deserving or
industrious poor and the lower social ranks, assailing people of all ages. But unusually
the nobility and the gentry were so blighted. Nonetheless, the fevers were potentially
fatal to all. Lethal fever epidemics in the provinces and regions became more
common in eighteenth-century Britain, stimulated by the intensive living conditions in
insanitary townships and cities, with the years 1718-19, 1727-31 and 1740-42 being
the most severe. Mostly due to fevers and other sicknesses, the English population fell
some 100,000 by 1730 when compared with 1720. (Porter 1991 pp. 202-3) Although
Dr Thomas Short reported in 1767 that “contiguous epidemics” are more frequent and
fatal in the country than in London, which he thought was due to the fact that country
people are,
‘less accustomed to each other’s company and less used to impure
air in general’.

(Short 1767 p. 52)

Whilst this generalisation was reported thirty-two years later by Sir Gilbert Blane,
(Blane 1799 p. 223) later observations pointed to the cities and large towns as most
often the generation of epidemic fevers.

II

Medical understanding of fevers at the beginning of the eighteenth-century, and little
advanced by the fin de siècle, remained that espoused in humorist theories dating
from the Hippocratic Corpus (c 440 – 340 BC). The term infection was understood
long before microbiological science demonstrated specific pathogens, much in the
same manner as fever was identifiable by eighteenth-century practitioners long before
the use of eighteenth-century thermometers were routinely used in a diagnostic
capacity. Moreover, Oswei Temkin (1902 – 2002), in an historical analysis of the
concept of infection stressed the lack of intellectual advancement of the rudimentary
views of pollution, contagion and miasma from the times of the Veronese physician
Girolamo Fracastoro (1478 – 1553)\(^\text{34}\) and Dr Thomas Sydenham through to the 1850s.
(Temkin 1953 p. 135)

The Professor of Physic at the University of Edinburgh, Dr William Cullen, regarded
medicine as the “art of preventing disease” that was achieved only by correcting some
defect in the constitution. The concept of the human constitution and its modifications

\(^{34}\text{Known also by the Latinate name Hieronymus Fracastorius}\)
by climate, diet, exercise and the like, was considered to be the basic determinant of
good health on the one hand, and the portent to possible disease on the other. The
concept was not a medical innovation of the eighteenth-century but was introduced in
the Hippocratic Corpus where diathesis was utilised particularly by Aristotle (384 –
322 BC) often without a constant and precise meaning. Other equivalent
terminologies include predisposition, tendency, trait or dyscrasia. Diathesis could be
replaced by the Greek word for nature or tenor, physis, meaning among other things,
notions of what Galen of Pergamum (Claudius Galen, AD 129 – c 210) was to later
call temperament, and what today is meant by constitution. Yet Galen also mixed the
meanings of diathesis: to him, on one hand, it connoted a sickly condition of the body,
or related to the constitution of the body and even the constitution of the disease.
However, as Erwin Ackernecht (1906 – 1988) pointed out, the term most often used
by Galen to describe our notion of constitution was krasis, or temperament. This more
correctly signified the proper mixture of the four Hippocratic humors of blood, black
bile, yellow bile and phlegm, which produced the corresponding four temperaments.
The mixture of the four qualities could produce up to forty types of temperament.
(Ackerknecht 1982 pp. 317-9)

Cullen reminded his students that a physician must always consider the Hippocratic
temperaments and the common hereditary idiosyncrasies as well as incidental
modifiers to the patient’s constitution produced by “the circumstances and manner of
life”. (Cullen 1777 p. 223) The concept of constitution embraced the idea that the
body is an organised structure with its constituent traits inherited in toto. This
organisation permitted the identification of a strong constitution relatively disease-
resistant versus a delicate constitution vulnerable to disease. (Olby 1993 p. 412-3)
Whilst diathesis could be both acquired and inherited, the word became popular at the end of the eighteenth-century and by 1812, the *Dictionnaire des sciences medicales* defined *diathèse* along contemporary usage as,

‘the state of the body which makes it acquire certain diseases’.

(Ackerknecht 1982 p. 461)

Temkin later described *diathesis* as “the illusion of an explanation” (Temkin 1977 p. 461) in that it appeared to satisfy a demand for nosological completeness. One’s *constitution* thereby became central to the eighteenth-century concept of disease creation and thus for practical therapeutic consequences, *constitution* replaced pathological anatomy.

What was the eighteenth-century understanding of disease? In the sixteenth and seventeenth-centuries the Latin word *morbus*, which translates as disease, was used with a sense that *morbus* alluded to a state of ill-health that might lead to death. The English word derives from the Old French *aise*, meaning ease; dis-ease literally indicated loss or interruption of one’s ease or comfort. By the eighteenth-century the concept of disease no longer related to death but applied to any major or minor medical interference in one’s comfort. (King 1982 p. 140) By the end of the century an acceptable definition of disease was formulated as,

‘A disease takes place when the body has so far declined from a sound state that its functions are either quite impeded or performed with difficulty. A disease may affect any part of the body either solid or fluid or to any one of the functions’.

This 1797 description which appeared in the third edition of the *Encyclopaedia Britannica*, published in Edinburgh, accords with the twenty-first century viewpoint
expressed in the third edition of the Oxford English Dictionary (2009) that identified disease as,

‘A disorder of structure in an animal or plant of such a degree as to produce or threaten to produce detectable illness or disorder’.

Both these functioned-based precepts of disease stressing a disability to perform functions naturally, the _actiones naturales_, are insufficient descriptions: disease is not simply sub-optimal physiology. Charles Rosenberg pointed out,

‘Disease does not exist until we have agreed that it does, by perceiving, naming and responding to it. Disease must also be seen as a taxonomy, with individual ailments arranged in some orderly structure’.

(Rosenberg 1992 p. 305)

Rosenberg stressed here, in part, and which was well understood by the early eighteenth-century nosologists, Boissier de Sauvages (1706 – 1767), Carl von Linné³⁵ (1707 – 1778), Rudolph August Vogel (1724 – 1774) and William Cullen, was the basic need for a satisfactory and acceptable nomenclature and classification of disease states. In a lecture delivered in July 1961 at Oxford University, Owsei Temkin outlined his views on what constituted disease in a two-part notion. One he labelled ontological and the other physiological. An ontological construct of disease denoted a disorder existing as a discrete entity with a predictable and characteristic course. Thus a disease with an independent natural history, but in the history of medical ontology, specific aetiology is not an essential part. The other notion of physiological construction, a disease is viewed as necessarily individual. (Temkin 1963 pp. 630-1) A simple concept was that advanced by Arthur Kleinman in a 1988 publication, _The Illness Narratives: Suffering, Healing and the Human Condition_,

³⁵ Swedish botanist-physician, Carl Linnaeus, known after his ennoblement as Carl von Linné
covering two parallel distinctions. The contrast of illness as experienced by the patient and disease understood by the clinician. (Rosenberg 1992 pp. 317-8)

Charles George proposed another function-based definition of disease:

‘Disease is a word used by observers to describe a process that occurs when one or more external factors interact with a living organism to produce physical and/or mental changes within the organism that the observers consider disadvantage the organism as compared with its former state’.

(George 2005 p. 140)

George ruefully asserted that diseases are conditions that people hardly desire to acquire. They may cause pain and suffering and often reduce longevity. Whether diseases occur in humans, in animals or in plants, economical potential may be destroyed. Diseases are then archetypically undesirable and disadvantageous things.

Dr William Cullen, on the other hand, in the mid-eighteenth-century considered a disease whereby,

‘Everything in which a sick person is observed to differ from one in health is called a symptom: and the most remarkable of these symptoms and which more constantly appear, define and constitute the disease’.

(Thomson 1827 p. 452)

Cullen considered disease as distinguished by a single symptom, or more commonly, by a cluster of various symptoms, which he called notæ or marks. Presciently pointing out that hardly any disease is distinguished by a single pathognomonic symptom, he relied on the meaning emphasised by Hermann Boerhaave that a symptom was an
observable abnormality. For the eighteenth-century physician the term symptom, or *phenomena*, was the semiotic device enabling the identification of the unfolding pathological status, the disease.

As to the eighteenth-century belief of the causation of febrile disease, this in part, was based on the concept of contagion. The notion of contagion was almost unknown to classical antiquity but had become entrenched in Western culture after the acceptance of the contagionist Jewish Old Testament. *Leviticus* 11.1-15.32 and *Deuteronomy* 14.3-14.21 citing unclean skin diseases, domestic mildew, unclean bodily discharges and the ingestion of unclean animals. A contagionist theory was advanced in the sixteenth-century by Fracastorius, which he termed the theory of *contagium animatum* involving the transfer of imperceptible particles of contagion, *seminaria*. The infectious bodies were transmissible at a distance, or by direct contact or by inert objects, but not foodstuffs, which he called *fomites*. (Fracastorius 1546) Cullen considered Fracastorius, the author of *Febris pestilens*, to be the first writer to publish a treatise on typhus which offered advice on how to identify typhus from other diseases, particularly plague. (Cullen 1784 p. 522) By 1800, however, the two-hundred and fifty-year old doctrine of *contagium animatum* was regarded as an obsolete theory and was gradually replaced at the beginning of the nineteenth-century by the concept of *contagium vivum*: the existence of an agent of contagious matter that behaved as if alive outside as well as inside the body. (Richmond 1980 p. 84)

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36 A concept originated by the Greco-Roman *Empiricists*, founded by Akron of Agrigentum (c 440 BC), who believed symptoms as well as syndromes (collections of symptoms) were diseases.
Much as Dr Thomas Willis and Dr Thomas Sydenham had exerted such a profound influence on English medicine in the seventeenth-century, medical practice in Britain during the eighteenth-century was determined very largely by two theorists whose teachings became the bedrock to the art and philosophy of medicine during both the English and Scottish Enlightenments. Neither of these Olympians was an Englishman: the Dutch Hermann Boerhaave, the systematist, and William Cullen a Scot, the nosologist. Both published seminal medical educational texts, one in the first half of the century and Cullen’s publication in the second half.

Hermann Boerhaave, born in 1668 in a small village near Leiden, was the Professor of the Practice of Medicine and Botany at Leiden University spending his entire professional life at that institution. Boerhaave, a botanist, humanist, physician-teacher and a theologian student who eventually held four professorships, practised a post-Newtonian mechanistic disease rationale that, in part, distinguished between diseases of the solids and those of the humors and blood. He believed that the causes of all diseases resided in the fluids. A brilliant teacher, who established the novel method of bedside tuition at St Caecilia Gasthuis Hospital in Leiden in which twelve beds were set aside for such educational purposes. (Lindeboom 1968 pp. 283-92) This mode of medical teaching, by reviving the Hippocratic dictum of observing the sick in bed, would later be described as the clinical approach to disease. Derived from the Greek klinē meaning bed referring to a sick bed and attended by a physician, a klinikos, to make observations. (King 1982 p. 149) Boerhaave’s school of medicine based on hospital bedside teaching reflected the developing neo-Hippocratism of the
eighteenth-century, a movement in which Boerhaave was authoritative. In the three-
hundred years from the founding of Leiden University in 1575 to the year 1875, a
total of 2,124 English-speaking medical students graduated from Leiden: fully
twenty-five per cent emanated from Scotland. This close Scottish-Dutch connection in
medical education extended to the entire first generation of medical professors at the
University of Edinburgh who had been trained by Boerhaave. (Vale and Edwards
2011 pp. 9-10)

The publication in 1709 of *Aphorisms on the Recognition and Treatment of Diseases*
in Latin with many subsequent revisions and translations provided Boerhaave a
platform whereby he effectively dominated European and British medical thinking for
the next seventy-years. Aphoristic collections, so-called wisdom literature, \(^{37}\) became
frequent publications in Western culture by the seventeenth-century. Boerhaave, who
regarded Sydenham’s works most keenly, taught that the foremost symptom of fever
was a fast bounding pulse that was associated with an increase in body heat. In spite
of the quickened pulse being for Boerhaave the single most common element in all
fevers, pathognomonic, yet consistent with his teaching principles of bedside
observations, Boerhaave at times measured the elevated body temperature by means
of an alcohol thermometer held in the palm of the patient’s hand. (Jarcho 1993 p. 144)

Whilst references to the thermometer are frequent in eighteenth-century literature on
fevers, the necessarily protracted axillary placement of a large-bulb mercury
thermometer with non-standardised measurement calibrations etched in bone and
wired to the seven-inch glass stem, in part led physicians to express scepticism as to
their accuracy. (Worth Estes 1991 p. 197) Cullen mentioned this diagnostic

\(^{37}\) First used in the *Aphorisms* by Hippocrates (c 460 – 380 BC)
instrument somewhat dismissively, but on one occasion he investigated the effect of camphor on fevers by “measuring the heat with the thermometer”. (Risse 1986 p. 114)

Whilst Boerhaave’s school dominated the teaching and practice of medicine in Europe and Britain in the first half of the eighteenth-century, during that time there was another important contributor to the British understanding of fevers. Dr Richard Mead (1673 – 1754) early in the century, along with Dr John Huxham, became one of the most influential specialists in fever medicine in England. In 1719 an outbreak of plague occurred in Marseilles during the second of the three European plague pandemics (ff 1347 to the 1830s). Mead was summoned to prepare a protocol for plague prevention in England and published his recommendations (Mead 1720) in which he proposed that contagion was propagated by three means: the air, diseased persons and goods transported from “infected places”. The air was described in typically meteorological terms. Mead’s pamphlet recommended the prohibition of the transportation of potentially flea-carrying clothing and personal belongings and the isolation of plague-sick from the healthy rather than the customary quarantining of households or entire residential districts. This recommendation that a *cordon sanitaire* should not be instituted thereby averted public panic and commercial disruption within a city that often followed military-controlled isolation of the citizenry.

At almost twice the age of Hermann Boerhaave, who had been appointed at the age of thirty-three to the chair of medicine and botany at Leiden, William Cullen, in 1773 became the sole professor of the practice of Physic at Edinburgh at the relatively advanced age of sixty-three. In that same year Cullen was also elected President of the Royal College of Physicians of Edinburgh from 1773 to 1775. William Cullen had a
long and distinguished career as a medical teacher, extending over forty-years of pedagogy. He began as an extramural medical teacher at the University of Glasgow in 1744-45, and then Professor of Medicine at Glasgow from 1751-55 before transferring to the University of Edinburgh in November 1755 as Joint Professor of Chemistry till he advanced to the sole chair the next year.

Whist Professor of Chemistry he was authorised to present clinical lectures at the Royal Infirmary of Edinburgh in December 1756. A decade later he was appointed Professor of the Institutes or Theory of Medicine sharing the teaching with Professor John Gregory, who had moved from the University of Aberdeen to be appointed to the chair of the Practice of Physic in the same year of 1766. In 1769 Cullen became Joint Professor of Theory and Practice of Medicine and appointed sole professor of the senior chair, the Practice of Physic, three years later in 1773 on the death of John Gregory that year. He retained this post to within two-months of his death in February 1790, having resigned and then reappointed Joint professor with the incumbent junior Professor of the Institutes of Medicine, James Gregory (1753 – 1821), the son of the late John Gregory, on the 30th December 1789. (Barfoot 1993 pp. 113-8)

Cullen taught and very largely wrote in English, although the first edition of Synopsis Nosologiae (1769) like the subsequent four editions was written in Latin. Cullen’s book on the classification of diseases contained a synopsis of de Sauvages’ nosology (1768, emended edition) and the complete nosologies of Linné (1763), Vogel (1764) and Cullen (1769). (Kendell 1993 pp. 216-8) Cullen published the first edition of First Lines of the Practice of Physic in four volumes in 1777 that was to become his

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38 1772, 1780, 1785 and 1792
masterpiece. This lengthy text, published in the same year as Robert Robertson’s first
publication, became a serial publication over seven-years, from 1777 to 1784, with an
updated reprint appearing in 1796, six-years after Cullen’s death. Early in the
narrative Cullen professed to have “avoided hypotheses” yet he forthwith succeeded
in drawing together empiric experiential knowledge with dogmatist factual
explanation into one practice credo such by the time of his successor in Edinburgh,
James Gregory, the word empirics was reserved largely for quacks. (Clayson 1993 p.
92)

IV

Central to the Cullenian doctrine of fevers is the role of the “cold stage of fever”
which accords with Boerhaave’s aphorism 756, but differs in Cullen’s interpretation
as to the genesis of the initiating cold fit. Where Boerhaave taught that the cold fit
developed from blood stagnating in the arterial system, Cullen proposed the
inchoation of a neuropathological rationale for the development of fevers. (Cullen
1784 pp. 490-2) Cullen justified the existence of a neurological debility on the basis
of the physical findings of a weak pulse, facial and extremity pallor and languidness
of the limbs which suggested “that the energy of the brain is greatly weakened”. He
further determined a tripartite febrile symptomatology or phenomena. First, a state of
debility, then a state of cold followed by a state of heat, which all regularly and
constantly succeed each other. Cullen did not provide a cogent explanation as to how
debility produced symptoms of the cold stage, although he offered one suggestion: the
preservative power, or vis medicatrix or autocrateia. This, and alone sufficient for
curing many disease in its own right, is excited “to motion” by fever and is
responsible for “the increased action of the heart and arteries which occurs in the hot stage’. The preservative power remained, however, subordinate to the fundamental power, the vis vitae, the vital life force. (Cullen 1784 p. 561)

As a tenet in his proposed aetiology of febrile disease Cullen replaced the Sydenham-Boerhaavian emphasis on the blood vessels and their contents by a dominant disease source involving the nervous system. In this neuropathological concept Cullen may have been influenced by the earlier writings of the German physician at the University of Halle an der Saale, in Eastern Germany, Friedrich Hoffmann (1660 – 1742). This iatromechanist, or iatrophysicist, contended that all contagious disease is propagated through the air. Yet his staunch mechanical views required a chemical component of speculative humoral allusions in order to complete his theory of febrile disease. In Fundamentia medicæ published in 1695, Hoffmann proposed physico-chemical principles for bodily functions with the nervous system central to the model. (Hoffmann 1971 pp. 39-81)

Cullen linked vomiting with sweating whereby vomiting, commonly associated with the initial cold stage of fever was thought by Cullen to readily cease with the onset of the hot stage and to completely stop with the onset of sweating. (Cullen 1784 pp. 495-7) First proposed in 1777 this relatively simple hypothesis, regarded by Cullen as the principal proximate cause of fever, may be viewed as a disturbance in the gastro-sudoriparous interdependence on cerebral nervous tissue. Diminished brain activity, the debility, inducing vomiting in the cold stage, followed by the anti-emetic effect of diaphoresis of the final stage of heat. Three medical interventions formulated on Cullen’s doctrine of fevers were measures firstly to stimulate or re-balance the
debilitated system, then the induction of an emetic-cathartic regimen and finally ways to stimulate sweating.

Since fevers were generally epidemic, Cullen first identified the atmospheric carriage of matter that attached to humans as an explanation of proximate fever causations. For further explanations on causation, Cullen reverted to humorist theory, whereby contagions or effluvia arising from a diseased person spreads to the healthy and miasmatic effluvia arising from non-corporeal sites were likewise spread to unaffected persons. He introduced another form of contagion. The simple effluvia from living bodies which if not readily diffused from a site but retained in one place became capable of producing a highly contagious fever. These effluvia, he maintained, had been fully proven by observations on jail, camp and hospital fevers, yet curiously Cullen omitted a reference to ship fever which by the time of the publication of the 1784 edition of First Lines of the Practice of Physic had been linked to the habitation in unventilated and damp lower decks of naval ships-of-the-line. By then several ventilator inventions had been tested and found superior to the age-old method of ventilating ships by means of windsails on deck. Dr Stephen Hales’ (1677 – 1761) model called ‘Ship’s Lungs’ and Sutton’s Air Pump of 1757 were two of the more effective systems. Cullen also recalled, but did not acknowledge Fracastorius on this occasion, instead cited Dr James Lind that contaminated substances “may be called Fomites” which he alleged could produce greater contagion than if the contagion had passed direct from an affected person. (Cullen 1784 pp. 541-4) Cullen described other remote causes of fever that contain,
‘sedative powers’ to include ‘cold, fear, intemperance in drinking, excess of venery, food in the stomach and the epidemics of great famines due to the corruption of the common grain or animal food’.

Such were the leading theoretic principles that underscored eighteenth-century British medicine as to fever causation, which were entirely humoral aetiologies, and the classification of fevers which were treated with the Cullenian *antiphlogistic remedy* that was developed and intended for treating fevers in the Temperate Zone. The transposition of this *remedy* to the fever treatments in *hot climates* found the *remedy* gravely wanting. Indeed Lind, Robertson and later Clark pointed to the great risks associated with bloodletting in fever treatments in *hot countries*.

The next chapter deals with Robert Robertson’s quite differing views on fever classification specifically his concept of *Febrile Infection*. Included is a review of the opinions of some more notable British fever physicians practising during the latter half of the eighteenth-century.
In *An Essay on Fevers*, Robertson first proposed a *New Doctrine of Fever* in which he regarded the term *Febrile Infection* to be synonymous with *Idiopathic Fever* or simply *Fever* and considered it to be,

‘a disease *sui generis* and without regard to the genera or species of fevers insisted on by former writers’.

(Robertson 1790 p. ix)

Such former writers may presumed to be a reference, amongst others, to the nosographers Thomas Sydenham and William Cullen. Robertson was well read, both of seventeenth-century medical writers and contemporary medical literature, and importantly, he was a practical and humane doctor and eschewed any hint of the theorising by “the professors”. Robertson’s reluctance to be bound by Cullen’s disease theories and classifications is shown, in part, in the second volume of *Synopsis Morborum* that chronic rheumatism is given five different names, seven different species and,

‘the symptomatic specie are forty four in the *Nosologica Methodica Culleni*.’

Robertson, who regarded Sydenham as a favoured author, nevertheless despaired with Sydenham’s lengthy tracts and descriptions of fever disease, writing. “I was bewildered and lost”. (Robertson 1790 p. 4)
Robertson’s proposed *Febrile Infection* as a new terminology was based on his belief that fever was always infectious, occurred during any season, in any age, in any climate, evident in any part of the world, and

‘though in some trivial respects it differs in every two patients, and at different times even in the same patient.’

(Robertson 1790 p. 114)

Perhaps echoing occasional confusion within some eighteenth-century medical writings about the meaning of the terms infectious and contagious, Robertson posits that neither smallpox nor *Febrile infection* can be communicated. Communication, according to Robertson, required another variable: namely a *constitution* that contains a predisposition to receive the contagion. Here Robertson reiterated the prevailing importance of the *constitution* within eighteenth-century medical thought as a determinant of either good health or a vulnerability to disease. Whilst Robertson viewed plague as the most virulent form of *Febrile Infection*, nonetheless he asserted that *febrile Infection* was exactly the same disorder in whatever places he ventured. He professed a marked scepticism of the traditional *Hippocratic Corpus* purporting to contain all that eighteenth-century medicine required by way of cure and disease prevention. In brief, he likened *Febrile Infection* to the human race in that it consisted of only one genus, man.

Robertson identified four major immediate and remote causes of fever: none were innovative to the medical teachings of the day. All were environmental, all were based on the classicist humors and when fever was thereby provoked it always became infectious. Marsh miasmata, cold and moisture, heat and moisture and human effluvia in jails, hospitals, camps or ships, were all equally capable of producing
Febrile Infection in those with a predisposed constitution. Robertson added that most if not all diseases are the effects of “our forefathers intemperance and indiscretion” with the proviso that bad health generally was the consequence of the, ‘sick’s misconduct or negligence in preserving good health’.

(ibid pages 99-102)

It may be surmised that Robertson perhaps alluded to the primacy of inherited disease and to the influence of personal and communal hygiene as the fundamental aetiologies of disease. But more than likely he enunciated the prevailing ideas of illness experiences that were far more likely to be charged with life meanings such as sickness and sin, health and holiness and the constant proximity of sickness and death. (Porter 1985 p. 193) Robertson likewise also incorporated the wisdom of the day that of the strongly held eighteenth-century doctrine of the non-naturals whereby disease was seen to be the consequence of personal errors of regimen or in the personal management of the six non-naturals. Airs and winds, sleeping and waking, eating and drinking, motion and rest, evacuation and retention, and the passions of the soul. All were regarded as central to cure and prevention of disease, as to everyday life. (Spary 2011 p. 86)

II

Robertson’s views that Febrile Infection represented but one unified pyrotological type, in conflict with Cullenian traditional classification and nomenclatures of fevers, was far from unique. By the adoption of a single genus of fevers Robertson was at odds with the eighteenth-century practice of classifying numerous symptom
complexes rather than disease entities. Likewise he eschewed a speculative system of pathology and, like his fellow practitioners, showed a lack of knowledge of disease aetiologies by continuing the doctrine of defining illness in terms of the patient’s complaint rather than internal pathological lesions. (Jewson 1974 p. 370) Whilst Robertson’s terminology, *Febrile Infection*, may have been a literary contrivance perhaps to persuade his readership to adopt it as a novel explanation for the cause and subsequent treatments of fevers, nevertheless, the belief in the doctrine of a single genus of fever was already shared by several British contemporaries. Six of these practitioners included Dr John Brown (1735 – 1788), Dr John Clark (1744 – 1805), Dr Francis Riollay (c 1748 – 1797), Dr John Millar (1733 – 1805), Thomas Reide and Dr John Coakley Lettsom (1744 – 1815).

One of the more notable disciples of the single genus theory was Dr John Brown who believed there to be only one disease state, though it assumed a myriad of forms. Brown published his model of disease that was based on discrete segments of Cullen’s neuropathology of disease causation which Brown had plagiarized in large part and transposed in *Observations on the Principle of the Old System of Physic* (1786). Although Brown’s paradigm was known to Robert Robertson by 1790, he did not cite Brown or comment on the merits of the Brunonian system. (Robertson 1790 pp. 103-5) Brown espoused that there was no such entity as a healing power of nature; that there existed no specific cures for particular diseases or parts of the body; and that there was only one form of treatment, the administration of stimulants. Afflicted by frequent recurrent attacks of acute gout, Brown sought relief with one of his standard stimulant medicines, liquid laudanum or *wine of the Turks*, and was to become soon addicted to opium. Like Robertson, Brown also refuted the rationale
underlying the traditional *antiphlogistic* interventions. Ultimately the Brunonian system posed insuperable practical difficulties for doctors mainly as a result of the lack of a clearly defined distinction between the Brunonian states of *asthenia* and *sthenia*. Brown viewed health as an equilibrium between stimulus and excitability. Insufficient stimulation caused *asthenic* diseases and the less common *sthenic* diseases suffered excess excitement and needed mild depletion. The inherent difficulties of judging the degree of bodily excitability, which was Brown’s idea of the natural energy capable of restoring a healthy balance with the help of stimuli, together with the absence of a consistent Brunonian healing plan, were soon the cause of a gradual disenchantment by practitioners in the merits of his system.

One enthusiastic devotee of Brunonian theory was the physician-chemist Dr Thomas Beddoes (1760 – 1808) who established a Pneumatic Institute in Bristol. He later employed the chemist Humphry Davy (1778 – 1829) 39 who had observed that nitrous oxide, 40 discovered by Joseph Priestley (1733 – 1804) who thought the gas not respirable, was indeed respirable and that it was a potent diffusible stimulant. Davy’s conclusions about the gas’s non-anaesthetic role in disease management, including a use in cholera treatment, were to remain uncontested until well after the eighteenth-century. (Conner 1966) Brown’s doctrine experienced early and widespread popularity in Britain and particularly within British military surgery, in parts of Europe and briefly in the 1780s at the Calcutta General Hospital. But the *asthenic-sthenic* dichotomy proved too nebulous and the rationale ultimately failed.

39 Later Sir Humphry Davy
40 So-called ‘Laughing-Gas’
Dr John Clark, a ship’s surgeon on an East Indiaman, publishing in 1773 and again a second enlarged edition in 1792, sought to simplify the numerous and often vague descriptions given to fevers. Clark also adumbrated fever to be of one genus and that there can be only three species: intermittent, remittent and continued. (Clark 1792 pp. 146-8) Like Robertson, John Clark whilst serving at the Honourable East India Company’s Calcutta General Hospital, became a devotee of Peruvian bark administration in fevers, but later held the benefits of calomel, mercurous chloride, in high esteem in the treatment of fevers of British India. Clark also believed that intermittent fevers were only slightly contagious, but warned that remittent fevers in hot climates on the other hand were very contagious and often metamorphosed to the continued specie. After returning to England, he later affirmed his three fever species model declaring that Peruvian bark, in very liberal doses, was simple and most efficacious to use and “the practice universally established” for treating all three varieties of fever. (Clark 1780 p. 18)

Three other British contemporaries of Robertson also believed in a single class of fever. These were the London physicians Dr Francis Riollay and Dr John Millar, who was appointed to the Westminster General Dispensary in 1774, and an Army surgeon, Thomas Dickson Reide. Francis Riollay, in his book *Critical Introduction to the Study of Fevers* (1788) which he read at the College of Physicians for the 1787 Gulstonian Lectures, posited that the concept of the same cause of fever, be this miasma, cold moist air, etc. could produce generically different fevers, to be a nonsense. He furthermore presciently proposed that, “Fever seems to be Nature’s common signal of distress”. (Bynum 1981 pp. 143-4)
From 1779 Robert Robertson and John Millar became close correspondents developing near identical views on fever causation and antipyretic treatment regimens with Peruvian bark. Robertson mentioned Millar with some reverence in the postscript on the 29th December 1782 declaring that,

‘Dr Millar’s works, who for various reasons, merits the title of the Sydenham of the Age.’

(Robertson 1783 p. 317)

Quoting Millar’s publication of March 1770 entitled Observations on the Prevailing Diseases in Great Britain together with A Review of the History of those of former Periods and in other Countries, Robertson declared that Millar was the first author known to Robertson who espoused both a unity of fevers and that they should be treated very differently from that of the prevailing, largely Cullenian, methods.

(Robertson 1790 pp. 5-6)

Writing nine-years later in 1779, Millar published a further text on fevers, Observations of the Management of the Prevailing Diseases in Great Britain particularly in the Army and Navy, in which he documented that the remitting fever (intermittent fever) predominated in all the countries of Asia, Africa, Europe and America and that it always responded to Peruvian bark. Millar discoursed on the management of fevers in the British Army in the Low Countries with data taken from British Army Hospital records between 1742 and 1748 suggesting that the unacceptably high mortalities resulted from a failure to employ Peruvian bark. His further narrative on the management of fevers in the Navy hinged entirely on Millar’s summary of Robertson’s 1777 book, A Physical Journal kept on board HMS Rainbow. Millar corroborated Robertson’s well-tested dictum by stating,
‘No cure was accomplished by any preparation of antimony. Without Bark there was no cure’. (Millar 1779 p. 309)

Millar concluded his 1779 work with a series of comparative statistics including a re-write of Robertson’s own tabulations made aboard *HM Sloop Weasel* and *HMS Rainbow* wherein 55 fevered personnel were treated with antimony sustaining 11 deaths in the former vessel, and 279 fevered crewmen treated with Peruvian bark without any deaths aboard *HMS Rainbow*.

A former assistant of Dr John Millar at the Westminster Dispensary, Thomas Reide, later served as an Army surgeon from 1776 to 1791 that included service in North America and the West Indies. Reide adopted Millar’s arithmetical tabulation for analysing his medical practices and independently surmised that fevers were of only three types and, like Robertson, Clark, Millar and Lettsom, showed the clear benefit of early and high dosages of cinchona bark. He wrote his data, findings and conclusions in 1793 (Reide 1793) which subsequently drew a hostile response from government perhaps due to the foreseen high expense involved in the government supply of Peruvian bark to future Army campaigns. (Trohler 2000 p. 45)

The final member of Robertson’s contemporaries, whilst not a clear proponent of the one genus of fever doctrine, was a Quaker born in the Virgin Islands where he practiced medicine for a short time, Dr John Coakley Lettsom. He was, however, an ardent supporter of cinchona bark. A student of Dr William Cullen, though he graduated MD Leiden (1769), he entered practice in London where he soon became one of the wealthiest physicians of his time. In 1770 he united with others to found the General Dispensary in Aldersgate Street where he was appointed physician in
1773. This dispensary was the first charitable institute of its kind in London and in 1774 Lettsom wrote *Medical Memoirs of the General Dispensary.*

In *Medical Memoirs* Lettsom provided results of his monthly reports outlining the numbers admitted and the numbers discharged bearing definitive labels of *cured, relieved, irregular, improper, incurable* or dead. Discharge classifications from eighteenth-century British hospitals and dispensaries were primarily a statistical tool. Patients with conditions that improved, whether recovery was partial or temporary, complete and sustained, were deemed *cured,* and this was applied to approximately 60 to 70 per cent of discharged patients. Though post-mortem examinations were then uncommon, nevertheless, the mortality rate remained the most sensitive indicator of a facilities performance. Failed medical treatment, a small number, defined *incurable* cases. The term *improper* later replaced *incurable* to indicate patients who were found after exhaustive trials of therapy to be unsuitable for hospital or dispensary treatment. Those patients, nearly twice as many men than women, particularly seamen, who disobeyed medical orders or transgressed hospital regulations, were classed *irregulars* and were dismissed from the establishment. Lettsom also provided arithmetic medical tables listing diagnostic categories, methods of cure and computations of the total annual incidences of diseases. He roundly criticised the *antiphlogistic therapy,* regarding it to be frequently fatal, and affirmed the successes he achieved with Peruvian bark that he had introduced to the dispensary the year before, in 1773. (Payne 2004)
III

Although Robertson did not collaborate with other authors, yet was his precepts and terminology of *Febrile Infection* in which the fever was viewed to be always infectious and to consist of a single genus, no more than a guise for the similar, but apart from Brown’s system, un-named hypotheses espoused by five of his contemporaries? Were all six of these British physicians, *supra vide*, who were land-based practitioners and maritime surgeons, part of a new non-conformism to the Sydenham-Boerhaave-Cullenian traditions and thereby reacting to the neo-Hippocratism of British eighteenth-century medicine? Certainly Brown regarded his simplistic dualist theory of disease, where health was merely a disturbance of the proper functioning of excitement, to be in direct opposition to Cullen’s dominant neuropathology theory. The Brunonian doctrine included the concept that most diseases ultimately resulted in debility through the exhaustion of the principle of excitement. (Wilson 1993 p. 400) The curative principles of treatment suggested by Brown were equally straightforward, if not partially successful and seemingly popular with patients. Treatment of the more common disease class, lack of stimulation or *asthenic diseases*, was by large doses of opium, spirits and wine. (Lawrence 2004)

For his part Robertson too was at pains to distance himself from “the professors and their theories” and formulated his alternative hypothesis of *Febrile Infection* that he then immutably linked with a certain cure by Peruvian bark. The ready and predictable cure of intermittent fever and continuous fever by the bark, and the bark alone, that Robertson noted particularly of the intermittent fever in the West Indies
and West Africa, may have led him to speculate that he was in fact treating a single febrifacient aetiology. A case may be advanced that the efficacious febrifugal bark was so dependably reliable in fevers that Robertson perhaps formulated his doctrine of a single genus of fever, *Febrile Infection*, to fit the singular antipyretic potency of Peruvian bark. Regular treatment successes with bark may have been the stimulus for Robertson’s subsequent development of his unitary *Febrile Infection* theory of fever causation. Notwithstanding, Robertson’s single fever genus doctrine was also the viewpoint of Millar and Reide whilst Robertson and Reide also shared their enthusiasm for the stimulative properties of the bark especially in the *hot climates* of the West Indies and by Clark in British India. Doctors whose practices were entirely confined to Britain were far more sceptical about Peruvian bark than the spirited enthusiasts Robertson, Millar, Clark, Lettsom and Reide. Therapeutically the Cullenian era of fever treatments barely survived Cullen’s death in 1790 whilst the traditional *antiphlogistic regimen* for fevers was increasingly replaced during the second half of the eighteenth-century by bark-related stimulant therapy. Bark therapy in turn was partially abandoned in the early nineteenth-century for bloodletting and other interventional *antiphlogistic remedies* intended to more reliably relieve the inflammatory symptoms of fevers. (Bynum 1981 pp. 146-7)

In summary, Robertson’s doctrine of *Febrile Infection*, whilst perhaps a less clumsy construct than the prevailing theories of febrile diseases, is nonetheless still dependant on concepts of the humoral theories of contagion and infection. Proximate causes in atmospheric conditions and remote causations by effluvia; the effects of *constitution* and *diathesis*; and the preservative power and *vis vitae*, the vital life force. Robertson reaffirmed earlier eighteenth-century medical advice to naval personnel in the Torrid
Zones regarding the very close association of a ship’s proximity to the lee shore in *hot countries*, particularly at night, and the subsequent rapid onset of fever, frequently fatal. He offered no novel explanation as to causation of fevers, even his climatic observations were to no avail. But importantly, Robertson succeeded in developing a *modus operandi et vivendi* by way of new constructs in Peruvian bark administration in order to reliably and predictably cure and prevent fevers in *hot countries*.
PART 3  FEVER TREATMENTS IN THE 18TH CENTURY

CHAPTER 9. MANAGEMENT OF FEVERS IN THE TEMPERATE AND TORRID ZONES DURING THE LATTER 18TH CENTURY

The discussion in this chapter hinges on the Cullenian classification of fevers and the development of his antiphlogistic remedy, together with a review of the extant latter eighteenth-century treatment regimen of disease and the antiphlogistic regimen employed in the management of the febrile sick. This will include the rationale and effects of bloodletting and an outline of the fever treatments in hot countries. Finally a review of the nascent Royal Navy principles of hygiene together with the growing eighteenth-century realisation of the nexus between dirt and ill health will be discussed.

I

William Cullen’s nosological fever nomenclature divided fevers into two broad varieties based on their clinical course: either intermittent, remittent fever or ague and continuous fever. Continuous fevers had been determined to consist of two basic types by the English physician, Dr John Huxham earlier in the 1730s. The first class he termed inflammatory fevers typified by sudden onset of chills, general malaise, headaches, flushed face and a rapid strong pulse. The other he named slow nervous fevers that were characterised by the gradual appearance of nervous symptoms of drowsiness, muscular tremors, delirium and even coma with a rapid pulse of small amplitude. (Huxham 1750) Included amongst the slow nervous fevers were the so-
called *putrid fevers* whereby corruption-related discharges were released from the gut, kidney, lung or skin.

Cullen proceeded to rename Huxham’s terminologies: *inflammatory fevers* became *synocha* and the *slow nervous fevers* were re-named *typhus*. The disease *typhus*, a Latin word transliterated from Hippocratic Greek meaning ‘smoke’, had been introduced into eighteenth-century nosology by Francois Sauvages in 1759 in *Pathologia methodica, seu de cognoscendis morbis* (Leiden 1759), the forerunner of Sauvage’s first edition of *Nosologia methodicae* (1768). Cullen further refined *typhus* into two typologies. The *typhus petechialis*, referring to the presence of a skin rash consisting of small haemorrhagic marks mainly over the torso in the febrile patient, and *typhus icteroides*, where the gradual onset of fever became dominated by developing jaundice. (Risse 1985 p. 177) Cullen admitted that the nosological separation into two categories was not straightforward and that a mixed variety existed which he termed *synochus*. Cullen determined *synochus* to be the commonest form of continued fevers within the Scottish communities in the mid-third of eighteenth-century. He further seemingly complicated his classifications by stating that *synochus* was caused by the same factors as *typhus*, therefore classifying *synochus* to be only a variant of *typhus*. As to causation, Cullen ascribed *morbus contagiosis* to characterise *typhus* since it commonly arose from contagion or effluvia or some foreign matter introduced into the body, whilst rejecting this proposition for *synocha* that he viewed as having no contagious qualities. (Cullen 1784 pp. 517-21)

Cullen’s nosologies or taxonomic model of illness was based primarily on symptoms with a clinical orientation based on Cullen’s precept of physiology. He made no
attempt to establish a classification based on aetiology and thus notably absent from
Cullen’s nosology were diagnostic criteria based on pathological anatomy, soon to
become in France the deciding yardsticks to characterise individual diseases. (Risse
1986 p. 281) As late as the 1780s physicians, including Cullen, continued to link
inflammatory fevers with “a diathesis phlogistica prevailing in the body”. This
hypothetical diathesis was regarded as an increased arterial tone throughout the body
that Cullen stated “gives rise to the febrile spasms with more protracted paroxysms”.
This expedient was said to become active in continued fevers rather than in
intermittent fever. Cold was stated to increase the likelihood of the diathesis
phlogistica whereas heat, which relaxed the arterial system, made the diathesis
phlogistica less susceptible but, on the other hand, enhanced the tendency to
putrefaction. (Cullen 1784 pp. 515, 559)

The derivation of the term phlogiston has been attributed to the mid-seventeenth-
century German chemist-physician, Johann Becher (1635 – 1682), who wrote that
when a substance burned, a hypothetical substance or force called phlogiston was
released leaving a dephlogisticated substance as a residual ash. Becher’s theory was
further developed by a fellow German, the foremost chemist and physician, Dr Georg
Ernst Stahl (1659 – 1734), a contemporary of the Cartesian-influenced Dr Friedrich
Hoffmann at Halle. Stahl explained life and disease by the action of a ‘sensitive soul’
or anima that inhabited every part of the organism and which prevented spontaneous
putrefaction. (Ackerknecht 1982 pp. 128-9) Stahl’s animism views were to
predominate in European chemistry until the Chemical Revolution of the late
eighteenth-century refuted the postulate. Chief in this “new system of chemistry” was
the French antiphlogistian, Antoine Lavoisier (1743 – 1794) who enunciated an
antiphlogistic theory based on his recent description of oxygen as the oxidising principle in the process of combustion. Eighteenth-century medicine, like its forerunners, continued to use the term *phlogiston* to describe the heat and burning associated with *phlogosis* or diseases featuring inflammation.

Dr William Cullen formulated a three-point plan of cure, an *antiphlogistic remedy*, for continued fevers in which the first aim was to diminish “the action of the heart and arteries”. The second and third objectives consisted of a removal of the febrifacient causes and thus to counter the effects of debility and to obviate or correct the tendency of the fluids to putrefaction. He identified harmful irritants that maintained the increased cardiac action and which should be removed. These he described were impressions made upon the five senses that included any bodily exercise and use of cognition, the “taking of aliments and all aromatic and spirituous liquors”, the application of external heat, thirst and “corrupted humors in the stomach and retained faeces”. All these stimulants when removed or moderated constituted the *antiphlogistic remedy*. He offered by way of explanation, the fact that whilst “bleeding is [the major component of] an antiphlogistic regimen, [it is] not part of the antiphlogistic remedy”. (Cullen 1784 pp. 600-5)

The management of fevers proposed by the British medical academy of the mid-to-late-eighteenth-century, based on the Cullenian neuropathology paradigm, was a modest rearrangement of the extant *antiphlogistic regimen*. Cullen attempted to create a more contemporary theory for understanding the traditional humoralism of the ancients. An endeavour to provide a new set of propositions in order to pursue classicist models of treatment, in conjunction with the newer iatromechanistic
physical techniques, to bolster the natural healing powers inherent in the sick, the *vis medicatrix naturee*. The eminent British fever expert Dr George Fordyce (1736 – 1802), a student of both the Edinburgh and Leiden schools, practicing and lecturing in London from 1759, wrote four volumes on *Dissertations on Fever* between 1794 and 1802. A fifth volume was published posthumously in 1803. (Coley 2004) Fordyce, by way of reinforcing the idea for the need to augment the natural healing powers, reiterated the classicist treatment of fevers as the need to,

‘conduct the patient through the disease and allowing natural forces to expel the contagion’.

(Risse 1985 p. 185)

II

The sick person’s medical care commenced with the patient’s story of their sickness, the “accession of symptoms” or the “discovery of disease”, which was subjoined to a cursory physical examination. The body was viewed for rashes, swellings and oedema, the pulse was palpated, and the tongue, nose and throat inspected. Consistent with the extant practices of the licensed, university trained and usually wealthier physician, physical contact with the sick was minimised with greater attention paid to the cause and progress of disease from descriptions provided by their client-patient. The pulse, however, received special attention. A fast bounding pulse signified an *inflammatory fever*, whilst a slower and smaller amplitude pulse signalled a *slow nervous*, typhus-like, fever. Elaborate qualitative pulse descriptions were then common, yet, inexplicably the pulse watch introduced by Sir John Floyer (1649 – 1734) in a two-volume paper published in 1707 and 1710, *The Physician’s Pulse Watch* was ignored
until the early nineteenth-century. (Gibbs 1969) In the absence of a further and more systematic physical examination of the sick, each patient’s constitution was assessed as well as their temperament and habit to allow for a personalised treatment regimen, a *methodus medendi*, to be constructed.

Like hospitalised civilians the sick in the military were treated either in hospitals, sick-berths or purpose-built encampments. Medical management and treatments could theoretically be much improved by congregating the sick and infirm into dedicated quarters thereby providing shelter, food and aid. The eighteenth-century term ‘hospital’ indicated a place for the provision of simply food and shelter, whereas increasingly the terms ‘infirmary’ and ‘dispensary’ extended the aid by the provisioning of nursing care and medical treatments. A place to observe patient compliance with treatment protocols, the availability of supervised nurse attendants yet of doubtful quality, a time and place to better identify changes in the condition of the sick and a place to assess the effectiveness of both drug, drug-dosages and to observe for the “appearance of mischief” of unwanted drug side-effects. These were some of the clear benefits from the relatively new, yet still quite primitive, eighteenth-century institutionalised charity care. Problems involving cross-infection and patient contamination by the unwashed attendant’s hands and unclean instruments readily arose within these frequently dirty communal treatment facilities. Attention to basic personal hygiene issues was indeed often neglected: patients often put to bed on a straw-mattress in their dirty and often infested clothes. This oversight was as much to do with inadequate bathing and washing facilities in most hospitals and infirmaries as with the consequences of systemic inadequate training and ignorance of the nursing
staffs. Overarching these issues was the eighteenth-century ignorance of the linkage between dirt and hygiene-health.

The plan of treatment for the febrile sick, the antiphlogistic regimen, in essence represented the depleting practices of vomiting, purgation and bleeding, which when aggressively practiced was referred to as heroic therapeutics. The regimen consisted of two individual and sequential segments: the so-called sedative regimen followed by the stimulant regimen. Both protocols included the need to first deplete the alimentary tract by vomiting and purging. Each regimen included separate dietary and beverage stipulations, and contained varieties of physical interventions with certain drug prescriptions, together with miscellaneous necessary aids. (Risse 1986 pp. 182-225)

Eighteenth-century medicines were predominantly herbal preparations, recorded in pharmacopoeias and classified according to the various bodily effects each possessed. Commonly dispensed drug types in the latter fifty-years of the century may be catalogued into eight-classes. These were anodynes-analgesics, cathartics, diaphoretics 41, diuretics, emetics, expectorants, mercurial and tonics.

Based on Cullen’s neuropathology model of fever, the first drug to be used was an emetic in order to “throw out the morbid matter” so that the fever should rapidly proceed from the cold to the hot fit. The most popular emetic was tartar emetic consisting of potassium antimonyl tartrate mixed with wine. The tartar emetic was produced by leaving wine in a metal tin cup containing antimony as the alloy for a period of between twelve and twenty-four hours. Antimony in the film of oxide formed on the cup’s inner surface was dissolved by the tartaric acid present in the

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41 Sweat inducing agents
wine. The description and use of an *Antimonyall Cupp* once owned by most households was provided in 1832 to the readers of *The Gentleman’s Magazine*, volume 102. (Hooker 1832 p. 582) Not only a potent emetic, antimony equally induced profuse diarrhoea thereby purging both ends of the alimentary tract. Whilst antimony remained the preferred emetic, increasing use was made of arsenical-induced emesis in the latter quarter of the century. Arsenicals were commonly sold as the *Tasteless Ague Drop*, to compete with the alternative ague-suppressant, the bitter tasting Peruvian bark, and as *Fowler’s Preparation* which consisted of,

‘64 grains of arsenic in a pound of distilled water’. (Fowler 1786 p. 82)

Depending on their intestinal stimulant activity, cathartics were classified as *laxatives*, such as tamarinds and prunes; *purgatives*, such as aloes, rhubarb, senna and jalap;\(^{42}\) or *drastics*, such as *Gauber’s Salts*;\(^{43}\) calomel administered in association with jalap or rhubarb and magnesium sulphate. The *drastics* would reliably cause the patient to “run off by stool” thereby impairing bodily strength.

Rest, bland fluids such as barley water, acidulated fruit juices and cream of tartar, and a *low diet* were immediately prescribed to the fevered sick on entering hospital. A concern expressed then by clinicians was that food would act as a stimulant to the human system whereby ordinary fevers may progress to putrid types if a meat-containing diet was taken. Dietary instructions routinely accompanied the dispensing request for medicines and physical procedures. In the *sedative regimen* a *low or fever*

\(^{42}\) Prepared from the tuberous roots of a Mexican climbing plant

\(^{43}\) Salts of sodium sulphate, tartar emetic or cream of tartar as sodium potassium tartrate
diet lacking all meat was immediately imposed. In lieu patients received bread and milk, a mutchkin 44 of milk a day, porridge of oats and barley or a panada.45 During the convalescent phase the stimulant regimen was introduced with the restoration of a full or regular diet containing a certain amount of meat as beef tea, beef broth and boiled mutton and chicken for both dinner and supper.

Analgesics were principally employed in the sedative regimen for fevers and administered for pain and sleep induction. The most important anodyne was opium prescribed as liquid laudanum 46 or as tincture of opium. In fever management opium found its greatest value in the slow nervous continued fevers that were frequently associated with delirium and agitation. 47 Control of diarrhoea or fluxes was an additional indication, sometimes then administered in the form of clysters 48 containing laudanum. But there seemed few eighteenth-century diseases in which opium was not deemed appropriate drug therapy. (Kramer 1979 pp. 378-80)

III

Of the many physical methods practised in eighteenth-century medicine such as bloodletting by venesection, leeches or cupping; vesicant blistering with cantharides49 and seton implantations; 50 bathing regimens including the pediluvium; 51

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44 Three-quarters of an imperial pint
45 Prepared by boiling bread to a pulp with the addition of sugar and nutmeg
46 paregoric elixir
47 The typhomania complicating typhus and other fevers
48 Enemas
49 Preparation of dried beetles
50 Thread or tape sown into the skin
51 Foot bathing
fomentations in lieu of warm bathing and camphorated oil embrocations;\textsuperscript{52} poultices and plasters; electric shock therapy for paralysis; and urethral dilatation and bladder catheterisation, any or all forms of bloodletting were the most frequent physical intervention and perhaps considered the mainstay of the therapeutic armamentarium. The justification for the removal of blood remained, as it did for the classicists, the need to alleviate the dangerous plethora,\textsuperscript{53} particularly characteristic of inflammatory diseases with their propensity to undergo putrefaction. In eighteenth-century medicine, inflammation was still viewed as having an association with humoral plethora, the robustness of dietary excess. (Niebyl 1977 p. 469)

The Galenic canon of the four humors and their associated four qualities offered a persuasive paradigm for the movements of the organs and for the flow of blood, which was conceived as a unidirectional circulatory movement from the liver to the periphery. Venesection possessed three different effects. A quantitative effect by the removal of excessive blood, the plethora, which was regarded as a bodily burden. By draining off harmful moistures, manifested as abscesses and ulcers, venesection was thereby possessed with a qualitative effect. It also possessed a dynamic effect on the internal circulation of the humors. This was achieved by re-establishing the flow of stagnant humors or to divert them to other areas of the body. To achieve this dynamic effect the choice of individual veins was identified as specific for certain parts of the body. Thus the \textit{vena cephalica} along the inner aspect of the elbow was associated with head pathology. Galen’s blood flow theory was rendered obsolete upon the 1628 publication of \textit{Exercitatio anatomica de motu cordis et sanguinis in animalibus}\textsuperscript{54}

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\textsuperscript{52} Liniments
\textsuperscript{53} An excess of [blood]
\textsuperscript{54} \textit{Concerning the Motion of the Heart and Blood}, abbreviated to \textit{De Motu Cordis}
\end{flushright}
detailing William Harvey’s hydraulic model of circulation. Harvey’s missing pulmonary conduit between arteries and veins within the lung was completed by Marcello Malpighi (1628 – 1694) by his identification of capillaries which he described in his seminal work De pulmonibus observationes anatomicæ in 1661. These two powerful works describing a continuous circulation of blood rendered the elaborate system of deciding which vein to venesect quite meaningless. But the value of venesection had been questioned well before Harvey. The German surgeon practicing in Zurich, Felix Würtz, (c 1510 - 1590) published Wund-Arzney in 1596 with a reprint appearing in 1687, decrying venesection when used in the treatment of the wounded based on his military experiences. The post-Harveian modified theory of venesection was accepted very slowly. Patients continued to demand venesection in accordance with Galenic techniques thereby ensuring the survival of therapeutic phlebotomy. (Ruisinger 2008 pp. 37-40)

From the Cullenian perspective blood removal was an efficacious mechanism to lessen the tension and spasm in the sanguiferous system. The abrupt removal of up to ten-ounces of blood relieved the skin erythema, induced a feeling of faintness often with sweating and such was said to be most evident in the inflammatory ailments. Excessive haemorrhage exacerbated debilitation thereby delaying convalescence and was thought to also prompt the onset of new illness. Venesection was particularly poorly tolerated in the malnourished and already enfeebled urban sick-poor suffering with Cullen’s synochus.

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55 Cardiovascular system
56 Diffuse reddening of the skin
57 Provisionally represented in current nomenclature, louse-borne epidemic typhus fever
Cullen acknowledged other nosographers such as Sauvages, von Linné and Vogel whose classifications and definitions he researched to compile his own. (Smith 1981 p. 122) Bloodletting became increasingly unpopular amongst physicians in the management of *typhus fever* due to the exacerbation of debility. Sir John Pringle, the Army physician, asserted that bloodletting would reliably worsen the specific contagious and debilitating fevers of the institutions of camps, jails, hospitals and ships and thereby he provided a possible diagnostic differentiation from the humoral fevers that were often reported to be improved by phlebotomy. (Niebyl 1977 p. 468)

Some British eighteenth-century authorities on fevers, including the Boerhaavean students Sir John Pringle and Dr John Huxham, viewed fever as “only an effort of nature to free herself of an offending cause”. Also Dr William Buchan MD (Edinburgh) (Buchan 1769) who published the highly popular home-remedy guide at a cost of six-shillings a copy in 1769, regarded spontaneous haemorrhage as a most efficacious cure of disease. (Lawrence 1975 p. 29)

IV

Beyond the British Isles, medicine practised within the British colonial settlements in the two major *hot countries*, the West Indies and British India, was different. Indeed between the two Torrid Zones themselves medical practice in fevers differed appreciably. The difference may be explained in part by the higher incidence of yellow fever in the West Indies compared with the more dominant *fluxes* of dysentery and Asiatic Cholera, and liver diseases which were more common in British India. Compounding the diseases in British India were the seasonal *Gangetic Fevers* \(^58\) that

\(^58\) Malaria (*falciparum* and *vivax*)
contributed to Bengal’s particularly notorious reputation as the most sickly province in British India. Mark Harrison’s extensive writings on the histories of medicine in the subcontinent proposed that the unique Indian environment created a distinctive medical discipline based on specific febrile pathologies and antipyretic treatments. (Harrison 2007)

The monsoonal months, by enhancing the prevalence of malaria, were identified by James Lind as the unhealthiest of all and especially to the newly arrived traveller. The climatic extremes were believed directly injurious to the European constitution inducing putrefaction and as demonstrated on the basis of regular autopsy examinations performed in the Honourable East India Company’s hospitals, commonly resulted in degrees of liver damage. By an undisclosed explanation, in India’s hot climates the febrifacient-induced excessive biliary secretion caused by a diseased liver was believed to presage putrescence. The perceived India-specific febrile pathologies also altered the approach in fever management which from the mid-eighteenth-century was typified by violent purging. Such an extreme therapeutic intrusion was claimed to be necessary to thwart the otherwise typically early demise of the febricitant patient in the hot climates of British India.

The Boerhaavean commitment to bloodletting of the fevered sick was likewise observed by James Lind in the mid-eighteenth-century to be particularly dangerous in hot countries. It was replaced by Peruvian bark, vomiting and antimonial purgation. Bark was then viewed as acting to inhibit the putrid tendency of fevers within hot climates. Dr John Clark, notably averse to bloodletting, was an early and redoubtable
exponent of Peruvian bark which he regarded as an “antiseptic and cordial”\textsuperscript{59} and cordial\textsuperscript{60}

Whilst administration of the bark, seldom as mono-therapy, was far from universal in the British Indian medical community, aversion to bloodletting was nearly absolute until the first quarter of the nineteenth-century. A gradual trend appeared towards the end of the eighteenth-century whereby the pathological dominance of the liver in fevers was attached to treatment endeavours designed to inhibit the liver damage believed to be caused by the excessive biliary discharge. To achieve this reduction in biliary flow involved the supplanting of the antiseptic Peruvian bark by the purgative calomel and ipecacuanha,\textsuperscript{61} a role that had already been established in the treatment of dysenteric fluxes by John Clark. (Clark 1792 p. 185) Dr John Clark regarded mercury, often in high salivating-induced doses, as a specific whether applied externally or given internally. The British Indian medical innovation employing the mercury regimen, though rarely practiced within Britain, was taken up widely by British Army surgeons, but interestingly, not by Royal Navy surgeons on the India Station. (Harrison 2007 pp. 90-9)

V

Through the endeavours of ships’ surgeons, the promotion of personal and communal hygiene in the Royal Navy was far in advance of the British eighteenth-century common man. Lind, Robertson, Blane, Trotter and others all contributed to the development of a hygiene system originally designed to prevent the transmission of ship fever to a ship’s company. Pressed or new lands-men were to be received first

\textsuperscript{59} An anti-putrescent
\textsuperscript{60} A mildly stimulating drug that ‘raised the spirits’
\textsuperscript{61} A dried rhizome (shoots and roots) of a shrub native to Brazil which acts as an emetic
from a dedicated quarantine ship where their clothes were either fumigated or burnt and their bodies were soaped and bathed. This process was almost as effective in ridding the human body louse\textsuperscript{62} as the later employed chemical pediculicides\textsuperscript{63} in the 1940s.

Apart from smugglers, who were often competent seamen, and debtors the Navy admitted nobody from prisons, least of all thieves. Magistrates, on the other hand, found the press useful for disposing of paupers, petty criminals and idiots. Nonetheless, Navy relied heavily on the Impress Service to recruit crews. (Rodger 1986 pp. 170-1) The establishment of the Royal Navy divisional system, beginning in 1775, by Post-Captain Sir Charles Middleton, later Lord Barham (1726 – 1813) Admiral of the Blue and First Lord of the Admiralty, was fundamental to the overall improvement of hygiene, in its broadest meanings, aboard Royal Navy ships. The ship’s company was divided into four divisions each under a lieutenant who was responsible for regular crew inspections. Sea-clothing clean and in good order, clean bodily habitus, clean, aired and dry bedding correctly stowed and the crew’s mess were all regularly inspected. But in spite of the new attention paid to a clean body and the sea-faring clothing, the issue of a standardised uniform to ratings of the Royal Navy did not eventuate until 1857, after the cessation of the Crimean War (1853 – 1856).

In 1791 a physician-chemist in Saint-Denis, Paris, Dr Nicolas Leblanc (1742 – 1806) developed a chemical process for the production of soda ash\textsuperscript{64} and potassium

\begin{itemize}
\item[\textsuperscript{62}] \textit{Pediculus humanus corporis}
\item[\textsuperscript{63}] The pediculicide and insecticide, DDT (dichlorodiphenyl-trichloroethane)
\item[\textsuperscript{64}] Anhydrous sodium carbonate
\end{itemize}
carbonate, collectively termed alkali, which were important chemical elements for the manufacturing process of glass, textiles, paper and, providentially, soap. Soap production provided means for that which then resided within the moral and religious realm, body cleanliness, to be transferred from the domain of cosmetics to that of health, and ultimately to influence man’s concept of infection. (Temkin 1977 p. 468)

Soap lavation was first provided to the Royal Navy in Admiral St Vincent’s Mediterranean Fleet during the year 1796, though by 1815 complaints continued that there was insufficient soap on issue to Royal Navy ships-of-the-line.

The not surprising inadequate supply of soap accompanied many provisioning inadequacies and oversights. The failure to purvey specific anti-scorbutics and in the victualling of all foodstuffs, particularly the failure to regularly provide preserved salted vegetables and fresh meat. Bad victualling was one of the causes of the Royal Navy mutinies of 1797. Water storage in water-souring fresh oak casks, usually tainted after only ten-days storage, made the water useful only for cooking or for adding to the permanent ballast in the hold. The lack of drinking water was replaced by beer consumption that too had a limited life of palatability at sea. The length of time a ship could stay at sea was often effectively measured by how long the beer would last, usually only six to ten-weeks. (Rodger 1986 pp. 91-2) The 1745 weekly Navy ration allowed for seven gallons of beer per man, the ration falling in 1811 to one-quart per day. (Drummond and Wilbraham 1959 p. 465) Any fermentation

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65 A compound of natural oils or fats mixed with sodium hydroxide (or other strong alkali), perfume and colourings.
66 Mutiny in the Channel Fleet at the Nore. In part a protest of the Purser’s ‘eights’, the Purser’s right to take one-eighth of the value of each of his stores at the rate of 14 ounces to the pound.
67 1 gallon = 8 pints = 4.55 litres [UK]
68 1.13 litres [UK]
process in beer manufacture, including stored spruce beer obtained from the pine needles of the North American Spruce Pine (*Pinus glabra*), removed the vitamin-C content and contrary to what most eighteenth-century ships’ surgeons believed, small beer contained no anti-scorbutic activity. The re-use of verdigris contaminated copper food-boilers hastened the appearance of scurvy in the crew due to copper accelerating the aerobic breakdown of ascorbic acid. Inert iron pots did not affect the ascorbate content of the food and were ultimately to replace the copper containers, thereby also removing the risk of ingesting verdigris-sourced copper with the boiled food. (Jones and Hughes 1976) Aspects of the long overdue reformations of the *Vicualling* and *Sick and Hurt Boards* are discussed in a later chapter.
CHAPTER 10. THE BITTER TINCTURE OF PERUVIAN BARK

I

Robert Robertson’s professed experience and knowledge of the healing powers of Peruvian bark (*cortex Peruvianus*) in intermittent fevers commenced whilst a surgeon-apothecary apprentice in June 1759 and he subsequently devoted a greater part of his medical career to enquire and extend its therapeutic applications. There were some important eighteenth-century difficulties attending the medicinal usage of Peruvian bark. *Cortex Peruvianus* was harvested from the *Cinchona* tree grown in the Andes Mountains at altitudes of 2,500 meters. The genus is now known to contain four chemically related alkaloids in roughly equal proportions, but only one, quinine, with an effective anti-malarial parasite activity. Whilst forty species of the genus *Cinchona* existed, a Bolivian species, *Cinchona calisaya*, was one of the rarest species and the one with the highest quinine content. (Bruce-Chwatt 1988)

One of the difficulties, which were the cause of increasing confusion as the eighteenth-century unfolded, was the provision and transportation to Europe of an adequate supply of quality dry bark. The source of the richest quinine-containing specie was rapidly and quite early exhausted in the late seventeenth-century. Antonio de la Calancha of Peru discovered the cinchona tree that the Spaniards initially called

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69 Alkaloids are produced by a large variety of organisms, but primarily by plants. Alkaloids are natural products that usually serve a specific biological function. Alkaloids invariably have a bitter taste.
arbol de calenturas, or fever tree, to which Carl Linnaeus later gave the generic name Cinchona in 1742. (Linnaeus 1742) The first exports of bark to Europe began sometime before 1653. (Keeble 1997 p. 285) The specie that remained more readily available and the one that did not suffer degradation with bark transportation was Cinchona succirubra, commonly termed red bark. Conservative estimates suggest that transportation took up to a year from the time of bark harvesting to delivery to the European apothecary, and Spanish records refer to spoilage of bark particularly if stored in damp bags. (Jarcho 1993 pp. 203-4) In a book dedicated to Dr William Saunders, Thomas Skeete described the types of commercial bark that were available in London at the time. (Skeete 1786) He recorded that bark was retrieved from both the tree trunk as well as from branches whilst the fruits and seeds were of no value. Some bark samples were rolled up in short thick quills bearing a rough coat. Other supplies of bark were thin and flat and others were thin and twig-like. Skeete provided a lengthy list of diseases, beside fevers, in which Peruvian bark may be used including “rheumatism, malignant angina or putrid ulcerated sore throat, erysipelas [sic] fever, dysentery and smallpox, dropsy, epilepsy, hysteria, suppurations and gangrene, scrophulous [sic] affections including rickets, Luces Venere 70 and phthisis pulmonalis”.

Because of a marked variability in the quality of the commercial bark available in eighteenth-century Britain, bark quality was graded. This quality classification was based on bark colour, consistency and taste. A 1738 British report recorded the general availability of three species: the white, the red and the yellow that were broadly graded later in 1782 as, “The white having scarce any virtue and the red

70 Syphilis
excelling the yellow”. (Saunders 1782) Dr William Saunders (1743 – 1817) wrote that much of the bark in England during the eighteenth-century was a pale bark, called the common bark. It was infinitely inferior to the old red bark previously readily available to the seventeenth-century pyretologist, Sir Robert Talbor, (bap. 1642 – 1681) baptised a hundred-years before the birth of Robert Robertson. Talbor’s secret use of red bark was described in a small book published in 1672 entitled A Rational Account of the Cause and Cure of Agues, and their Signes Diagnostick and Prognostick also some Specific Medicines prescribed for the Cure of all sorts of Agues. (Talbor 1672) (Talbor 1682)

In 1779 a Spanish ship from Lima was captured and found to contain a cargo consisting almost entirely of red bark cut in large and thick pieces. At Guy’s Hospital 71 Dr William Saunders examined this hoard comparing it with the common bark by chemical means to assess bitterness when diluted or boiled and its astringency after the addition of tincture florum martialium. 72 (Saunders 1782 pp. 21-36) In addition he carried out clinical testing using these samples in cases of intermittent fever and noted that about half the usual quantity of the red bark was needed than the common quilled bark and the red bark also prevented the next febrile fit with greater reliability. Further, it seemed to be equally effective in typhus and other fevers. (Risse 1988 pp. 277-8) Because of the relative low supplies and the high cost of the reliable red bark, and as Robertson suspected whilst visiting New York during January 1777, adulteration of bark not surprisingly became common during the century. The small and circumscribed area of tree cultivation in the northern Peruvian Andes exacerbated the scarcity of Peruvian bark throughout Europe.

71 Guys Hospital founded 1721 by Thomas Guy (1644 – 1724)
72 Ferric chloride
A further difficulty appeared as the century progressed. The bark was used indiscriminately and unsuccessfully for a wide variety of fevers and diseases. As a result the perceived efficacy as a potent antipyretic was thereby diminished. Its bitter taste and emetic qualities, even when mixed with milk, were not infrequently a clinical hindrance to the successful completion of dosage regimens. Whilst at Greenwich Hospital Robertson carried out many experimentations and trials in an attempt to obviate these side effects by producing fermenting bark and Peruvian bark gingerbread. Quality bark required no major modifications to dosages and duration of administration, but the substitution of inferior bark or, sometimes, the use of other non-quinine containing look-alike barks, hindered complete medical acceptance of the bark. The main look-alike was the Peruvian Balsam Tree, referred to in the Quechua language in Peru as quina-quina, that exuded a balsam used by the Incas for treating wounds and which the Vatican authorised as Holy Chrism.\footnote{Balsam mixed in olive oil, one of three holy oils necessary for the sacrament of confirmation}

Antimony salts remained a common alternative or addition to the prescribing of Peruvian bark and the two drugs remained popular with eighteenth-century British medical prescribers. Saul Jarcho surmised, however, that the ultimate obstacle to bark supplanting all other febrifuges was doctrinal. The traditional classicist view, still widely held, was that perceptible evacuations were essential to the cure of fevers and that a drug classified in the pharmacopoeia as a hot variety, as was the bark, was considered a contraindication in dissipating a fever. The bark’s strong link with Catholicity may also have contributed to inhibit the widespread utilisation of this febrifugal agent during the eighteenth-century, more noticeably in England. (Jarcho
Further, some critics suspected that the bark fixed noxious humors internally thereby exacerbating the benefit from the bark in the long-term. (Maehle 2008 p. 65) In British India the primacy of bark therapy was ultimately supplanted by mercury in the belief that mercury prevented liver diseases and putrescence, which were common complications of febrile illnesses observed in British India.

II

Since the time of Charles I (1600 – 1649) Royal Navy surgeons had been provided with an increasingly inadequate allowance to offset their costs in obtaining necessary chests of instruments and drugs. The cost of the drugs was established by the Society of Apothecaries and by 1781 the government’s allowance for drugs and instruments had been fixed at £62. As part of the 1796 reformations of the Royal Navy Medical Department some drugs were provided free. Following the several recommendations made by Sir Gilbert Blane, Dr Thomas Trotter, and particularly by the earlier suggestions submitted by Dr Robert Robertson in 1781-2, by January 1805 all drugs including Peruvian bark were to be supplied free to all surgeons. But not surgical instruments that still had to be supplied by the individual naval surgeon and the Royal College of Surgeons of London continued to dictate the type, size and number of surgical utensils that the surgeon must carry on board. (Lloyd and Coulter 1961 pp. 15-6, 54)

Robertson upbraided the Navy, though not identifying that service by name, for the failure to introduce measures first recommended by Lind in his 1757 text, *An Essay*
on the Most Effectual Means of Preserving the Health of Seamen, and which was reiterated in the next three editions published in 1762, 1774 and 1790 to,

‘cease the dangerous practice of suffering the men to sleep ashore from the ships on the very sickly parts of the coast of Africa’.

(Harrison 2011 pp. 65-84)

Robertson introduced a practical measure to complement Lind’s proscription to overnight sleeping ashore by dispensing a strong wine tincture of cinchona bark to the men every morning before they went ashore. After first obtaining his captain’s approval, Robertson proceeded to undertake a trial of disease prevention employing a single morning dose of tincture of bark derived from a solution containing one-pound of bark powder dissolved in a quarter-cask of wine. Robertson’s report on the successful outcome of the preventive experiment conducted over some weeks was despatched by his enlightened captain to the Secretary of the Board of Admiralty, for onward consideration by the Commissioners for the Sick and Hurt Board. Their Lordships subsequently amended Robertson’s regimen by perhaps an unnecessary wastage by the substitution of a drachm \(^{74}\) of bark dissolved in a gill of wine \(^{75}\) to be given as a single dose morning and evening. Furthermore, as a result of Robertson’s intercession, the Admiralty authorised that wine and bark be purchased at the government’s expense and to be made available, in the first instance, to all His Majesty’s ships cruising the Windward Coast of West Africa. \(^{76}\)

The innovative use of prophylactic bark within squadrons stationed in hot climates that Robertson pioneered had been previously recommended by only one other British

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\(^{74}\) 1/16\(^{\text{th}}\) ounce, avoirdupois, or 1.77 grams

\(^{75}\) Quarter of an imperial pint or 142 mls

\(^{76}\) The coast lines of present-day Ivory Coast, Liberia and Sierra Leone
author: James Lind. Lind’s preventive protocol would appear to have been either forgotten or unknown by both the Navy Officers of the Admiralty and the Commissioners of the *Sick and Hurt Board* until Robertson’s 1772 report sent whilst aboard *HMS Rainbow*. In later discussions with Lind concerning Robertson’s preventive regimen, Lind advised Robertson, who then became aware for the first time, that Lind had already indicated in his 1790 edition of *An Essay on the Most Effectual Means of Preserving the Health of Seamen*, a recommendation of a similar use of a “bitter bark”. By way of explanation for the basis of his preventive trials using the bark, Robertson recorded that he had first observed that people resident on the coast of Africa took a tincture of bark in wine or water in the morning as a *stomachie*. 77 (Robertson 1792 pp. 190-3) Possibly unknown to Robertson and written at an earlier date in 1762, are the observations by the Dutch physician, Dr Solomon de Monchy (1716 – 1794), who recorded that the English residents in the West Indies took, at the slightest appearance of a “malignant fever” and here the author included scurvy, two-ounces each day of an infusion prepared from,

‘8 ounces of bark, 4 ounces of orange peel in a gallon of brandy as a preservative against fever’.

(de Monchy 1762 pp. 171-2)

As part of the 1796 Royal Navy Medical Department reforms the government nonetheless delayed the issuing of Peruvian bark to all ships operating in all *hot countries*. Due perhaps to a measure of government parsimony to the significant expense of the bark, the general issuing was not finally achieved until 1808 when the 24th article of the Instructions to Surgeons stipulated the responsibility to implement

77 A *stomachie* was used as an aperitif, to enhance the appetite
the program of Peruvian bark prophylaxis rested with the ship’s surgeon. (Lloyd and Coulter 1961 pp. 334-5)

A contemporary reference to Robertson’s preventive use of Peruvian bark was provided by Dr William Turnbull in a book published in 1805, titled *The Naval Surgeon Comprising the Entire Duties of Professional Men at Sea to which are surjoined A System of Naval Surgery and A Compendious Pharmacopoeia*. This publication by a former Royal Navy ship’s surgeon provided a lengthy history of Royal Navy medicine. Amongst other authors, Turnbull remarked about Robertson’s publication (1777) in which Turnbull highlighted the benefits of keeping regular journals containing the diseases and treatment of patients under Robertson’s care, ‘is recommended by this experienced physician, who now superintends Greenwich Hospital, to the attention of junior doctors’.

(Turnbull 1806)

Turnbull further reported, albeit incorrectly reflecting perhaps some unfamiliarity with Lind’s 1790 copy of *An Essay on the Most Effectual Means of Preserving the Health of Seamen*,

‘The use of bark, as a preventive of contagion, seems to have been first recommended by Dr Robert Robertson before it was introduced to Public Notice by Dr Lind’.

(Turnbull 1806 p. xvi)

Following sea duties aboard *HMS Juno*, Robertson transferred to *HMS Edgar*, recently built at the Woolwich Naval Dockyard on the 24th May 1779. The 74-gun *Edgar* was 165 feet long and 45 feet in beam. The ship’s company of six to seven
hundred men were berthed on the gun or lower deck, their 14-inch wide hammocks slung fore and aft. (Rodger 1986 p. 61) Upon a call at Gibraltar, where Robertson transferred seamen suffering ship fever to the Navy Hospital, Sir Gilbert Blane was then temporarily superintending the hospital. Blane, a Scot from a wealthy merchant family, was also an ardent advocate of comparative statistics and tabulations. After studying under William Cullen at Edinburgh, Blane later transferred to Glasgow to graduate in August 1778 by proxy. This fact was recorded later by his contemporary and perhaps critic Dr Thomas Trotter, the year before Blane was appointed the personal physician to the health preoccupied Admiral George Rodney (1718 – 1792). With Rodney, Blane sailed in 1779 to the West Indies via Gibraltar to be later appointed as the Physician to the Fleet in the West Indies. Acutely aware of this unusual entry into the Navy with an immediate appointment to a senior post, Robertson commented that,

‘Dr Blane, who was never in the navy before, I recommended the bark treatment of fever at the [Gibraltar] hospital, which was adopted, and also the bedding should be aired every day in the sun’.

(Robertson 1789 p. 266)

Similar to Robertson’s later naval career, Blane too had a further period of navy service when he was appointed to the prestigious and influential position as a Commissioner for the Sick and Wounded Seamen from 1795 until the Peace of Amiens in 1802. In the third edition of Observations of the Diseases of Seamen printed in 1799, Blane acknowledged Robertson’s significant contribution to the development of a more effective program for the administration of the bark by naval surgeons that Robertson had practiced aboard HMS Rainbow, thus,
In consequence of Mr Robertson’s representations of the effects of bark in curing and preventing the fevers of the Coast of Africa, the ships of war fitted out for the coast of Guinea had been supplied with the bark gratuitously and Government extends this bounty to all the tropical [sic] stations.

(Blane 1799 p. 208)

III

Robertson wrote little if anything about any failures he experienced with Peruvian bark treatment and some of his cures with the bark may have been but temporary improvements, yet he placed his personal faith in the bark on two occasions. Whilst a surgeon’s mate aboard the 4th-rate, 32-gun, HMS Adventure on the Jamaica station, he became sick in September 1766 with a “slow nervous type [of fever]” which resisted common evacuations, saline draughts, James’s Powder, gentle aperients, clysters and refrigerants. “I recovered by taking the bark”. (Robertson 1790 p. 69)

Dr Robert James (1703 – 1776) developed a powder in 1748, containing antimony and phosphate of lime, the contents of which he did not divulge at the time. It was a potent diaphoretic, cathartic and used widely as a febrifuge. James acquired the early interest and support of the Admiralty in his medicine, whereby they later instructed Dr James Lind to study its effects and suitability for use in fever managements at sea. Lind’s report was entirely non-committal but included a comment that the bark was more efficacious. Notwithstanding, James’s Powder continued to be included in the naval surgeon’s list of drugs until 1794, when the Admiralty instead provisioned

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78 Blane footnoted ‘It was extended to the West Indies in 1796’.
79 A drug or lotion used to allay a fever; a cooling medicine.
*pulvis antimonialis* \(^{80}\) and *acidum vitriolicura* \(^{81}\) instead of the old *James’s Powder* and *elixir of vitriol* \(^{82}\) for fever treatments. (Lloyd and Coulter 1961 p. 333) The second occasion that Robertson successfully treated himself with the bark was in June 1774 as surgeon aboard *HMS Rainbow* when again at Jamaica. By that time on *Rainbow* he was administering the bark earlier, more liberally in all varieties of fevers and achieving successful outcomes such that in 290 fever patients treated with the bark, he had not one death. (Robertson 1790 pp. 78, 80)

The theories of treatment that Robertson developed during the second half of the century, and more particularly during the years of the American War of Independence, placed Robertson’s views in close alliance with the philosophies propounded by an earlier and eminent British fever authority, Dr John Huxham (1692 – 1768). Huxham wrote a seminal work in 1750, *An Essay on Fevers and their Various Kinds*, in which he had adopted the careful practice of bark therapy by formulating *Huxham’s Tincture*. This common and effective febrifuge contained cinchona bark, serpentaria, \(^{83}\) cochineal and saffron \(^{84}\) mixed in spirit. (Worth Estes 1990) This popular and potent antipyretic medicine together with Huxham’s authoritative writings determined him as Britain’s foremost fever specialist by the mid-eighteenth-century.

Robertson’s experience and the proven reliance of Peruvian bark for the treatment of both intermittent (or remittent) fever and continued fevers in residents of the Temperate and Torrid Zones was a marked change in direction for British eighteenth-

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\(^{80}\) Powdered antimony

\(^{81}\) Mixture of sulphuric acid, alcohol, ginger and cinnamon used as a tonic and appetite enhancer.

\(^{82}\) Sulphuric acid

\(^{83}\) *Dracunculus vulgaris*, Virginian snakeroot

\(^{84}\) *Genus Crocus*
century, and even Continental, therapeutic practices. The earliest exhibition of high and frequent dosing with bark in fevers contracted in *hot countries* was believed by Robertson to be absolutely essential in order to achieve minimal mortality rates. During his civilian practice at Hythe between 1783 and 1789, a township subject to seasonal malaria outbreaks, Robertson commented that the late presentations by fevered patients often *in extremis*, were the cause of his very much less satisfactory therapeutic outcomes with the bark.

A Manchester physician and demographer, Dr Thomas Percival (1740 – 1804) a graduate of Leiden, read a report to the Royal Society, London, in March 1767, describing eleven experiments he had conducted on the Peruvian bark. (Percival 1767) His objectives were to determine what preparations of bark were available in which the drug was made more palatable yet still maintaining the bark’s potency. He compared the efficacies of a simple cold infusion of bark, an decoction, an extract, a tincture and a fine triturated bark infusion. Percival’s findings were straightforward. Both the decoction and infusion of the bark were *astringent* but relatively unstable and suitable only for immediate use. Whilst not referring to Percival’s 1767 paper, Robertson later renewed the pharmaceutical enquiries into the bark which he published in a 1799 pamphlet (Robertson 1799) and another in 1812. (Robertson 1812)

During his tenure as Physician-in-Charge at the Royal Hospital, Greenwich, Robertson extended his researches into cinchona bark. The first small booklet,

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85 Extract of bark dissolved in water  
86 Concentrated extract derived from bark dissolved in boiling water  
87 Extract of pulverised bark dissolved in water  
88 Substance with sharp or bitter taste
published in October 1799, Robertson described several methods for preparing bark in a *fermented state*. A hot decoction of bark was fermented by the addition of *barm* \(^89\) and mixed with various sweeteners. The freshly brewed sweetened liquid bark permitted far greater patient acceptance of the otherwise bitter nauseating bark powder mixed with wine of the earlier prescriptions. (*ibid.* pp. 5-14)

Appearing in the first edition of volume four of *Synopsis Morborum* in 1810 and then reprinted as a separate small booklet two years later (Robertson 1812), Robertson wrote the directions for preparing *Peruvian bark gingerbread*. This combined the tonic attributes of two bitters, cinchona and ginger, \(^90\) prepared in a treacle-containing bread stored in tin canisters as a ready supply to treat large numbers of fever sufferers. Robertson, in response to the mid-1809 disaster that befell the British Expeditionary Force sent to capture Flushing on the Island of Walcheren and nearby Antwerp further up the River Scheldt, \(^91\) produced a large portable and stable supply of a palatable source of immediately available bark to distribute to the mainly sick Army personnel. By the end of six-months, of the initial large force of 40,000, 4,000 had died and 11,500 were hospitalised with fevers. The diseases have since been attributed to the combination of the early appearance of a rapidly progressive virulent typhoid fever with later morbidities and mortalities super-added by aestival endemic malaria, known in the Low Countries as *Polder Fever*. Contaminated waters from the Scheldt bearing effluent from the open sewer drains of the large city of Antwerp in French-controlled Belgium spread into the water sources of the marshes around Walcheren Island down river. So serious was the medical disaster that the British government

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\(^{89}\) The froth lying over fermenting malt liquors used to leaven bread and ferment other liquors

\(^{90}\) Root of *Zingiber officinale*

\(^{91}\) Also R. Schelde; Fr. R. Escaut.
despatched a three-man commission headed by Sir Gilbert Blane in October 1809. Blane reported that the gingerbread bark had been uniformly ineffective and the commission unanimously recommended immediate evacuation of the survivors. (Feibel 1968) The waters of the River Medway joining the Thames estuary at Sheerness, on the Isle of Sheppey, in a similar manner spilt effluent-rich pollution into the groundwater of nearby Sheerness, the site of a large Royal Naval Dockyard. When combined with the high seasonal vivax malaria outbreaks, this led to the marshy Isle of Sheppey acquiring an equally insalubrious reputation as Walcheren. Robertson’s repute as a bark-prescribing practitioner was little if at all adversely affected by the apparent failure of the bark gingerbread therapy in the Walcheren epidemic.

IV

In addition to effecting a cure of the intermittent fever, Robertson’s seeming success in the cure of ship’s fever, a common specie of continued fevers, using a cinchona regimen which he devised, must be regarded also as an advance in fever treatments. He showed by comparative statistics that cinchona therapy was far superior to the antiphlogistic regimen and he demonstrated further that the regimen was hazardous to health when administered to cases of ship’s fever contracted in either the Temperate or Torrid Zones.

His success with cinchona administration in cases of ship fever, as implied by the eighteenth-century medical interpretation and use of the term cured whose meaning could range from only a temporary improvement in a patient’s status through incomplete improvement to an actual and sustained recovery, requires some
clarification. A thirty to thirty-three fold increase in mortality was sustained within the febrile members of the crew who Robert Robertson sent from *HMS Juno* to the New York and Rhode Island military hospitals in 1776. At these hospitals the sick were treated by *antiphlogistics* only. He inferred that the mortality was directly as a consequence of the therapy and not from ship fever. His further implication was that Peruvian bark was not materially harmful to the febrile sick and completely avoided the need for antecedent purging. Robertson was in no doubt that *antiphlogistic regimens* were always potentially hazardous.

How did Robertson achieve success in treating outbreaks of ship fever at sea when the treatment consisted predominantly of cinchona bark, when available, together with general supportive measures? Possible explanations would include that not all patients diagnosed as ship fever indeed suffered from this disease, which retrospectively was presumably outbreaks of epidemic typhus. Closely related fevers, caused by agents which are members of the same class as epidemic typhus, the *Typhus Group Rickettsioses*, (Walker and Raoult 2011) evince very similar clinical manifestations, are common in warm coastal climates, are spread by different vectors such as animal ticks 92 or the rat flea, 93 and are typified by vastly lower mortality rates than epidemic body louse-borne typhus. These may have been labelled as ship fever. In the Torrid Zone, *falciparum* or *vivax* malaria, yellow and dengue fevers could have contributed to some of the alternative febrile states that may have been included in Robertson’s classification as ship fever. In the Temperate Zone, *vivax* malaria spread by the ubiquitous European mosquito *Anopheles atroparvus*, and other inter-current viral

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92 Genus *Ixodes*  
93 Northern rat flea: *Nosopsyllus fasciatus*. Oriental rat flea: *Xenopsylla cheopis* the vector of *Yersinia pestis* the causative organism of plague.
illnesses could also be responsible for generic fever outbreaks and thereby could also have been included under the label of ship fever.

Nonetheless, Robertson like his naval contemporaries, was quite competent in diagnosing many common febrile disorders such as chickenpox, diphtheria, erysipelas, *fluxes*, influenza, measles, mumps, smallpox and other infectious diseases. He was likewise capable of recognising haemorrhagic yellow fever, known to him as *black vomit* or *Vomito Negro* or by the Cullenian terminology, *typhus icteroides*. Milder forms of yellow fever as well as the milder dengue fevers, often associated with spontaneous recovery, may also have been unwittingly misconstrued as ships fever. So too less virulent strains of Epidemic Typhus, with much lower mortality rates, would account for a cure when given bark therapy. Co-infection with typhus fever and either bark-sensitive *falciparum* or *vivax* malaria could also have been a likely possibility for a cure by the bark. Finally, the bark may have evinced a psychological benefit of improved wellbeing: the placebo effect.

Given correctly, as early as possible and at timed intervals for long enough, good quality cinchona bark is effective exclusively against malarial parasites. Full remissions of non-malarial fevers treated with cinchona bark reflect recovery largely assisted by the development of specific immunological mechanisms to, and the low virulence of, the infecting agent. Immunological systems may have thus reflected the entrenched eighteenth-century medical belief in *vis medicatrix naturae*, Nature’s preservative power. In spite of a paucity of information regarding Robertson’s probable treatment failures with the bark, it is reasonable for Robertson to have
attributed *cure* in non-malarial fevers following the prescribing of cinchona, to the bark’s “bitterness and salutary action on the blood”.

Like many distinguished physicians in England Robertson achieved success with the bark in a range of non-malarial fevers. Two eminent protagonists of cinchona usage were the Newcastle physician Dr John Clark who wrote of the benefit of Peruvian bark in scarlet fever with ulcerated sore throat (Clark 1780) and the distinguished London physician Dr John Fothergill (1712 – 1780) who similarly found the bark of benefit in his account of the sore throat attended with ulcers in a much earlier publication. (Fothergill 1748)

As to the proposition that Robertson’s conception of fever remedy was an advance in the eighteenth-century British construct of fevers, the researched evidence is supportive. His program of prevention of intermittent fevers in the tropics by trial-proven prophylactic dose of good quality Peruvian bark, a program that he believed did not previously exist, was an advance in British late eighteenth-century medicine. The adoption of this protocol by the Royal Navy, after some delay by the Admiralty whose concerns about costs of the bark were predictable, as a standard precaution for crew members on wooding-watering parties ashore and boat crews in the *hot climates*, and for successfully petitioning the Admiralty for the Peruvian bark to be supplied by the government *gratis*, is an advance and improvement in the daily healthcare of eighteenth-century Royal Navy ships’ companies.

As to the assertion that Robertson was a fever specialist both within the Royal Navy as well as outside the service in the latter half of the century, the following is
supportive to that premise. Dr John Millar, another eminent British fever specialist, wrote a treatise on remitting (intermittent) fever in 1779 that included correspondence from five prominent British physicians that were provided by way of testimonies for the efficacy of the bark. Testimonies received from Dr William Heberden (1710 – 1801) wrote of only a single patient given the bark in 1768; Dr John Fothergill also described a patient treated in 1769; Dr John Clark who quoted from his 1773 book *Observations on Diseases in Long Voyages to Hot Climates*; Dr John Lettsom who first adopted the practice of the bark in 1773, yet curiously did not provide the number of cases to Dr Millar which were successfully treated thereafter with cinchona at the Aldersgate Street Dispensary. Finally Sir John Pringle reported not of his personal experience of prescribing bark but of the good response to the bark by those on James Cook’s ship *HMS Resolution*, between Cape of Good Hope and the South Island of New Zealand between November 1772 and March 1773. (Millar 1779 pp. 189-206) (Hough 1994 pp. 202-8) Such perhaps was the extent of the relative lack of knowledge and inexperience of the properties and benefits of the bark in the mid-eighteenth-century Britain that within several years Robertson, and very few others, had become fully cognisant of the curative properties of Peruvian bark.
Robertson’s regular prescribing of his preferred febrifuge, Peruvian bark, commenced quite early in his medical career, as did his experimental testing regimens using the drug in the Navy. At that time the medicinal significance of the bark, Jesuit’s Powder, extending from the latter half of the seventeenth-century, throughout the eighteenth-century up until 1820 remained so great that the bark became probably the most important therapeutic agent in the pharmacopoeia. (Ackerknecht 1962 p. 410)

Cinchona alkaloids were one of eleven potent drugs known before the nineteenth-century. Members of this group included the inotropic cardiac glycoside, digitoxin, derived from foxglove⁹⁴ first administered in the late 1770s by a physician in Lichfield, Shropshire, Dr Erasmus Darwin, MB Cambridge (1731 – 1802) (Fulton 1934); ethyl alcohol, morphine, hyoscine⁹⁵ and ephedrine known to the ancients; atropine from belladonna,⁹⁶ ergotamine from ergot⁹⁷ and emetine from ipecacuanha,

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⁹⁴ Extracted from the foxglove, *Digitalis purpurea*
⁹⁵ Extracted from *Solanaceae* (nightshades) plant family
⁹⁶ Extracted from *Solanaceae* family member, *Atropa belladonna* (‘deadly nightshade’)
⁹⁷ A fungus grown on rye and related plants. Most prominent member of the ergot fungi is *Claviceps purpurea*
known in the early modern period (c. 1500 – 1800); cocaine, as coca leaves, \(^9^9\) and quinine, as Peruvian bark, imported from South America during the seventeenth and eighteenth-centuries. (Weatherall 1993 p. 920)

In a list containing 240 articles on materia medica, pharmacotherapy and poisons contained in the Philosophical Transactions of the Royal Society of London from the years 1700 to 1799, 14 papers, representing 5.8 per cent, were devoted to Peruvian bark and were published between the years 1704 and 1784. Papers on this specific were ranked behind works on mineral waters (10.4 per cent), vipers and other serpents (7.9 per cent) and lithontriptics (6.3 per cent). \(^1^0^0\) (Maehle 1999 p. 11) In 1820 two Paris chemical analysts of vegetable alkaloids, Joseph Caventou (1795 – 1877) and Pierre-Joseph Pelletier (1788 – 1842) collaborated to isolate quinine, the Peruvian bark alkaloid, the prototype of all specifics. The term specific, as applied to remedies, by the early nineteenth-century had the following connotation,

‘If by a specific we mean an infallible remedy, it [Peruvian bark] cannot indeed be considered as intitled [sic] to that appellation; but in so far as it is a very powerful remedy […] it may with great propriety be denominated a specific’.

(Morris and Kendrick 1807 vol. II)

Robertson’s fourteenth sea posting was to HMS Juno, from the 23\(^{\text{rd}}\) January 1776 to the 21\(^{\text{st}}\) September 1778, during the early years of the American War of Independence. Due to the exigencies of wartime supplies during a North Atlantic cruise Robertson’s

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\(^{98}\) Contained in the root of flowering plant, Carapichea ipecacuanha, native to Brazil

\(^{99}\) Extracted from Erythroxylum coca and E. novogranatense

\(^{100}\) Kidney and bladder stone dissolvents
stocks of the expensive Peruvian bark had lasted only eight-months, from April to December 1776. Robertson recorded that in January 1777 the bark cost,

‘in New York a guinea per pound, a price sufficient to tempt sellers to adulterate it’.

(Robertson 1783 p. 178)

This New York price compared unfavourably with the peace-time value of the bark of 17s 8d a pound, a price charged at Apothecaries Hall in 1769 during Robertson’s cruise to West Africa in the Weasel. At that time Robertson routinely prescribed up to 10 ounces of bark in each case of fever. (Robertson 1792 p. 194) The total dose of 10 ounces was typically prescribed by Robertson in incremental doses of 10 grains each hour. 101 (Robertson 1790 p. 199)

In the absence of Peruvian bark Robertson substituted a combination of antiphlogistic medications, with little or no bloodletting, and recorded in his surgeon’s journal observations as to the merits of the two therapeutic interventions. Listed in three tabulations in Observations on Jail, Hospital or Ship Fever Robertson indicated the superiority of the bark over other medicines in fevers treated aboard HMS Juno. (Robertson 1789 pp. 242-3) Of 216 patients treated with the bark on board between the 4th April and the 31st December 1776, 1 died. This represents 0.46 per cent, a ratio not used by eighteenth-century natural philosophical diarists. Of the 296 fevered patients subsequently treated with “all other methods” whilst aboard, 6 died. This proportion of 6 in 296, or “1 in 49”, equates to 2.0 per cent, a little over a four-fold increased mortality rate. Likewise of 36 fever sufferers sent from HMS Juno to the New York Hospital and treated with “camphire etc”, 5 died: a 13.8 per cent mortality.

101 avoirdupois:1.0 ounce = 437.5 grains
From 26 sent to the Rhode Island Hospital and treated with “antimonials etc”, 4 died: a 15.4 per cent mortality. In the earlier 1783 edition of *Observations on Jail, Hospital or Ship Fever*, Robertson recorded only 24 sailors were sent to the Rhode Island facility including one that “went from a prize [ship] and I did not see him”, as well as of the four deaths “one was from a prize and I did not see him”. (Robertson 1783 p. 228) Whilst the numbers are relatively small, nonetheless both sets of treatments administered ashore were associated with between a thirty and thirty-three-fold increased mortality rate when compared with Robertson’s treatment using the bark alone on board the *Juno*.

The understanding of experimentation in the eighteenth-century does not overlap with current perceptions. On one plane Robertson sought to assess the efficacy and modes of administration in acute onset fevers as well as to establish new knowledge in fever prevention using Peruvian bark. He did not hypothesise as to how the bark was effective though he devised new regimens as to when and how much bark was applicable in febrile disease.

Robertson’s earliest experiences in the use of Peruvian bark were recorded in his first publication. (Robertson 1777) Here he included an excerpt of his account of the fevers on board *His Majesty’s Sloop Weasel* between the 13th June and the 8th September 1769 whilst cruising the Windward Coast of West Africa. This coastal area included the area known as Senegambia centred on the Senegal and Gambia River settlements. (Curtin 1964 pp. 93, 97) Aboard the *Weasel* Robertson identified two broad types of fever. A remittent fever more effectively controlled with bark monotherapy, and a fever in a “malignant form”, which he treated with conventional
antiphlogistics. The two fever types commonly appeared in the same person, yet he noted that most of the men who died of the more fatal malignant variety had never travelled before to the *hot climates*. This informative 1777 report aboard *Weasel* was later quoted in detail by James Lind in his 1777 edition of *An Essay on Diseases Incidental to Europeans in Hot Climates*, and further summarised two-years later by Dr John Millar in *Observations of the Management of the Prevailing Diseases in Great Britain*. (Millar 1779)

At a later time whilst serving aboard *HMS Juno* cruising the North Atlantic and North American Station, Robertson first routinely administered the bark whilst stocks permitted in cases of the continuous fever, described by him as ship fever. His notations were divided into three periods that he tabulated in *Observations on the Jail, Hospital or Ship Fever*. (1783) The first time zone was from the 4th April to the 31st December 1776 wherein he treated 216 cases of fever, with 4 deaths, amongst a total number of 463 patients. The second list represented the entire year of 1777 involving a similar number of fever cases of 241, involving 12 deaths, amongst a total of 546 patients. The final list covers the period from the 1st January to the 30th July 1778, just short of two-months before he quit *HMS Juno*. In the last period he treated a much lower number of fever patients, some 55 amongst only 187 patients, without a death.

He collectively summarised these three charts recording a total of 512 fever cases that included 7 deaths on board and 69 cases sent to hospital, 3 of the latter suffered with “small-pox”, with an in-hospital mortality of 9, representing a total mortality of 3.1 per cent. (Robertson 1783 pp. 138-46) He qualified the on-board mortality figure with the fact that two of the deaths were “in a desperate state before they applied for
assistance” and the other met with an accident, thereby suggesting nil mortality amongst 199 cases of ship fever treated with bark on board the Juno. (Robertson 1783 p. 236) All these findings were new knowledge within the Royal Navy Medical Department and a substantial addition to the eighteenth-century British medical literature.

Robertson’s data support his contention that bark-treated seamen aboard fared much better than those admitted to two hospitals in North America and treated “under all other methods”. His arithmetic observations in constructing comparative statistics persuasively strengthen his contention that Peruvian bark was of significant benefit to crews suffering intermittent fevers, presumably malaria, in the West Indies. So too the bark provided seeming benefit to those with continuous fevers, presumably yellow fever, in the West Indies. In addition he later showed bark to be also of benefit when administered to febricitant crewmen in the northern hemispheric waters of North America suffering from continuous fever known as ship fever, presumably epidemic typhus. As to Robertson’s observations there is a modern therapeutic paradox: quinine-containing bark is not known to cure either yellow fever or typhus. Seemingly Robertson’s crew were thereby infected with less virulent strains of these two infecting agents each attended with a zero mortality.

The significance attached to Robertson’s work, and those of the few like-minded British physicians, in keeping accurate and continuous registers of diseases he treated whilst at sea is that it provided persuasive data that a given therapy, cinchona bark, if properly administered could reliably and reproducibly effect a cure of fevers. Biased reasoning and conjecture of the misinformed practitioner, a feature of eighteenth-
century medical thinking in fever care, were thereby nullified. Yet the construction of only partial registers of the monthly state of the sick list would have derived skewed and distorted results: perhaps worse than no record at all. In this regard Robertson, together with Blane, were considered the innovators within Royal Navy medicine in the provision of valuable statistical formulation of material. In *Observations on Fevers which arise from Marsh Miasmata and from other causes in Europe, Africa, West Indies and Newfoundland*, Robertson documented the nature of disease observed at sea and ashore at Hythe during a thirty-year period. (Robertson 1807) Whereas Blane on the other hand restricted his observations to a much briefer period of three-years, from 1780 to 1783, whilst Physician to the West Indies Fleet. (Blane 1785) But Blane’s records were incomplete having been accessed from hospital returns, whereas Robertson’s reports, unlike Blane’s, were more useful since they precisely collated mortality rates to a specific ship. (Lloyd 1965 pp. 132-3)

Comparative clinical studies using Peruvian bark had been investigated within the British medical academy during a similar period that Robertson’s endeavours had been undertaken in the Navy. Robertson’s studies had to a great extent been the result of enforced scarcities of the expensive bark during the American War of Independence wherein he compared the bark with the much cheaper and far less efficacious *antiphlogistic regimen*. Francis Home (1719 – 1813), a former Army surgeon and later, in 1768, the Professor of Materia Medica at the University of Edinburgh, investigated patients with intermittent fevers in the Edinburgh Royal Infirmary. During the decade 1769 to 1779 Home experimented among different small groups of febrile patients using a different premise to Robertson. Home compared the use of Peruvian bark given shortly before a febrile fit following the
directions of the authoritative *Schedula Romana* published in 1649, with giving the bark just after a fit of intermittent fever as recommended by the pyretologist, Francesco Torti (1658-1741) as outlined in his seminal 1712 publication *Therapeutice Specialis*. Dr Thomas Sydenham had devised a similar program of bark administration whereby an electuary of one ounce of finely powdered bark, divided into twelve-doses, one dose taken every four-hours was commenced immediately after the paroxysm. (Jarcho 1993 pp. 148-9) When the bark was given immediately after a fit there were no further paroxysms. Home tried both methods, of the bark given before and after a paroxysm, at different times in the same patients, in what today is termed a *crossover trial*, with similar clinical outcomes. Home further correctly identified the main effect of the bark was by its absorption into the circulating blood and not via any effects on the stomach and nervous system as taught by William Cullen. (Maehle 2013 pp. 150-1)

Perhaps unaware of Home’s work (Home 1780), Robertson nevertheless exhibited similar methodological awareness by providing comparative quantitative but retrospective analysis of the bark’s efficacy. Besides affirming that the bark was equally efficacious in treating fevers in Africa, America and various parts of Europe, and superior to the antiphlogistic plan, Robertson did not write specifically of his observations as to the effects of giving bark immediately before or after a febrile paroxysm. However, he did suggest that by giving the bark as early as possible it may be possible to forestall the febrile paroxysms. His “invariable rule” was,

‘to give the bark liberally and early, so early as, in a manner, to prevent the fever, and to be guided only by its effects, without regarding its colour, the

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102 A medicinal paste or lozenge of powder mixed with honey to make a thick paste suitable for taking a dose on the tip of a knife
quantity or number of doses’. (Robertson 1789 p. 493)

Yet both Robertson and Home reached similar conclusions whereby more precise
dose protocols were developed in the treatment of both intermittent and continuous
fevers, thereby avoiding the wastage of a valuable yet scarce therapeutic resource.
Maehle (Maehle 2008) described the experimental work on the mode of action of
Peruvian bark that had been undertaken in the latter seventeenth-century and
eighteenth-century. The Parisian iatrochemical physician, Jacques Minot, reported in
1691 that intermittent fevers depended on an excess of acid in the blood and chyle. 103
Because Peruvian bark inhibited the coagulation of these fluids, Minot concluded that
the bark acted as an acid neutralizer. Published in 1753, Sir John Pringle reported that
the bark and other substances prevented putridity in pieces of meat, egg yolk and
blood. He concluded that bark was an effective antiseptic 104 and recommended it for
the treatment of intermittent fevers and in the putrid fevers and mortifications. 105
(Pringle 1753) Later in 1797, Friedrich Alexander von Humboldt (1769 – 1859) a
Prussian geographer-naturalist, wrote of his experimentations, Experiments on the
Irritated Nerve and Muscle Fibre along with Conjectures about the Chemical Process
of Life in the Animal and Plant World (trans.), on isolated nerve-muscle preparations
and demonstrated that Peruvian bark restored the tonus and irritability of relaxed
muscle fibres thereby conforming with William Cullen’s view that it was a general
 tonic.

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103 Milky fluid of lymph and emulsified free fatty acids formed in the small intestine and transported in the thoracic duct.
104 Anti-putrid
105 Gangrene
Attending the therapeutic implications for Peruvian bark’s paramount role in the
treatment of intermittent fevers by carefully constructed registers of disease,
Robertson’s case notes on his observations of ship fever provide perhaps the most
detailed clinical description of typhus fever then available in the eighteenth-century.
(Robertson 1783 pp. 149-76) From this detailed overview of ship fever Robertson was
able to provide clinical characteristics of the disease that had previously not been
identified. He emphasised the long duration which an outbreak may afflict a ship and
quoted a disease duration of two-years. Individual sufferers too were ill for a long
time with usually a protracted recovery punctuated by frequent febrile relapses.
Emphasis was placed on the extreme variability of the appearance of skin eruptions,
the petechiae \(^{106}\) that were far from a constant accompaniment, \((ibid.\) pages 175-6\)
and the occasional emergence of dominant symptoms of severe headache and ocular
irritation by light exposure. \(^{107}\)

Robertson documented the comparative statistics by way of tabulation as was the
custom of a small but growing number of similar critical British medical observers, a
group that included Dr William Black, Sir Gilbert Blane, Dr John Clark, Dr John
Lettson, Dr James Lind, Dr John Millar, Sir John Pringle and others. As far as Royal
Navy medicine is concerned, Robertson and Blane were the two innovators. The
popularity of table designers, described by Ulrich Trohler as protostatistical or
\textit{arithmetic observations}, \((Trohler\ 2000)\) received significant impetus following the

\(^{106}\text{Small superficial skin haemorrhages}\)
\(^{107}\text{Consistent with a present diagnosis of typhus meningo-encephalitis}\)
publication of Dr William Black’s book dealing with medical arithmetic. Black’s An Arithmetical and Medical Analysis of the Diseases and Mortality of the Human Species was published in 1789 to correct a previous edition that he cancelled in 1788, (Payne 2004) wherein diseases and casualties, births and mortalities could be mathematically described and compared. His term medical arithmetic was a paraphrase on the title of the celebrated book by an earlier physician and statistician, who had been an Irish administrator, Sir William Petty’s (1623 – 1687) The Political Arithmetic.

Dr Robert Robertson designed and undertook long-term retrospective analyses using crude comparative statistics to assess the efficacy of Peruvian bark versus antiphlogistic remedies in the cure of latter eighteenth-century fevers. The present day understanding of clinical trials embraces three characteristics. They are to be comparative, randomised and include either a single, double or triple blind assessment. Study in vital statistics is reckoned to date from the English demographer, John Graunt’s (1620 – 1674) Natural and Political Observations Mentioned in a Following Index, Made Upon the Bills of Mortality (1662). Today blind or masked assessment remains a critical component of modern medical and scientific research methodology. After the final results have been analysed in terms of a comparison between two groups, the trial is then un-blinded in order to derive inferences. The major goal is to achieve ceteris paribus: all other things being equal. (Lilienfeld 1982 p. 3) Blind assessment had been a continuous and complex scientific and social enterprise for more than two hundred-years. Originally the blindfold or curtain helped to eliminate the threat of imagination and bias and served as insurance against fraud or trickery. In the eighteenth-century blind assessments began as a means to detect fraud by
mainstream scientists and physicians to counter the delusions and charlatanism of irregular medicine. In this role to deter unconventional healers, blind investigations and sham interventions were first waged against Franz Anton Mesmer (1734 – 1815) who alleged the existence of a new healing “fluid” in nature that he called “animal magnetism”. (Chalmers and Trohler 2000 pp. 389-94)

Similar to James Lind’s scurvy experiment twenty-nine years previously, Robertson aboard *HMS Juno* in 1776 utilised simple comparative statistics in an effort to demonstrate a difference between a cure of fevers with Peruvian bark versus the *antiphlogistine regimen*. Since neither Robertson nor Lind included a control group of healthy normal age-matched individuals nor set trial objectives, they had not therefore conducted a controlled trial of therapy. Whilst Lind did select a group of comparable patients each suffering from severe scurvy, provided dietary interventions under the same conditions and at the same time to each sailor in a prospective manner, he nonetheless failed to inform why he included citrus fruits as an experimental diet. Robertson’s approach differed from the Lind model by retrospectively analysing his cases, which may not have represented a homogenous cohort of identical fever species, which he treated over periods ranging from months to years, and therefore not all at the one time. However, Lind did provide eighteenth-century medical enquiry with an important research tool that hitherto had been largely overlooked. In *A Treatise of the Scurvy* (1753) Lind reviewed all the writings on the scurvy from 1541 to 1753. He commenced his thesis with a systematic review of the literature, amounting to about eighty works. Robertson, on the other hand, cited the main medical writers of the seventeenth and eighteenth-centuries, but not in any systematic manner. Lind and Robertson, like many similar eighteenth-century philosophical
enquirers, are more correctly described as medical experimenters. Nonetheless, the persuasive effect of the accumulated numerical evidence lent soundness and strength of argument to both their publications.

Robertson conceded that James Lind had stimulated Robertson’s interest in Lind’s other passion of medical research, that of fever causation and treatment. Robertson and Lind shared a commonality in their fever experimentations. Both published success rates obtained in one disease grouping, namely fever, using one known and successful method delivered all at one treatment site over a given time. In Lind’s case this was at Haslar Hospital. Robertson was perforce restricted to his ships. Lind recorded his findings on fever management in 1763, which included the introduction of strict isolation and treatments in separate fever wards, with a second edition in the next year, contained in two papers read before the *Philosophical and Medical Society of Edinburgh*. (Lind 1763) Lind was particularly interested in the management approach to fevers in the West Indies and relied on descriptions and reports provided in Robertson’s papers, even before Robertson had published some of them, publishing them in the third edition (1774) of Lind’s *An Essay on the Most Effectual Means of Preserving the Health of Seamen* (pages 54-63). (Trohler 2003)

The eighteenth-century British physician whose work conformed closer to the present concept of clinical trials was Dr William Watson (1715 – 1787), a philosopher and physician to the London Foundling Hospital (1741 – 1950s), providing *hospitality* “for the education and maintenance of exposed and deserted young children”. Watson’s enquiries involved the merits, if any, of the practice of prescribing medical
preparations prior to smallpox inoculation. In 1767 he experimented with thirty-one non-immune high-risk children between the ages of six and eleven-years old, using as a control a similar aged group of children given no mercury, as calomel, as preparation before the variolation. Watson demonstrated that mercury, then popularly and widely used pre-inoculation, provided no additional benefit or protection to the child receiving the inoculum. Importantly he further advised against smallpox inoculation for children younger than three-years of age who may not adhere to the proper after-care. (Watson 1768) Present day analysis using the Kruskal-Wallis test, (Kruskal and Wallis 1952) a non-parametric method comparing independent groups, has shown that there were no significant differences between any pre-treated and no pre-treated children or between any of the sources of the inoculum Watson used. (Boylston 2002)

III

Robertson’s other experimental work involved methods to inhibit the spread of ship fever from a contagious source invariably centred on infested pressed men taken from Royal Navy guardships. He outlined such an event aboard HMS Edgar in July 1780 where he gained his captain’s permission to fumigate the ship with tobacco. Seven tubs each containing two-pounds of tobacco mixed with sulphur and vinegar, to prevent the tobacco from being taken by the crew, were lit throughout the lower decks

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108 The practice known as variolation, whereby the introduction of live smallpox virus (variola major) bearing material (the inoculum) was made into the superficial skin layers of a localized body site to induce immunity to smallpox (rendering life-long immunity, unlike the limited immunity following Jenner’s cowpox vaccination)

109 Mercurous chloride

110 A recently introduced additional method of ship fumigation
for a three-hour fumigation. He repeated this process on five separate occasions over a period of six-weeks and reported on the 17th August 1780 that,

‘the number of fever patients is now reduced to four, and that for the last twelve days only four fever patients have complained’.

(Robertson 1783 p. 244)

With agreement of the captain, Post-Captain J Elliot, Robertson proposed that the Admiralty should be informed of this seemingly successful protocol to prevent the spread of ship fever in the hope that it might be adopted throughout the Royal Navy. Elliot notified the Admiralty and summarised the experimental outcome as,

‘the good effects of fumigating often with that plant appeared evident to me’.

The National Archive: ADM 1/1762

The following year, 1781, the surgeon of HMS Prudent also successfully performed tobacco fumigation and likewise informed the Admiralty by direct correspondence to Lord Sandwich (1718 – 1792), First Lord of the Admiralty. 111 There is no record that either reports received any response from their Lordships. (The National Archive: ADM 110/29) Robertson reported in a later edition of Observations on Fever that there were two new cases of fever,

‘from [men] going down into the fore cockpit while the ship was smoking [sic] with tobacco’.

(Spinney 1964)

Whether by brimstone burnt in pots and the burning of bedding and infested clothes as proposed by Lind and adopted by the Sick and Hurt Board in 1756, or the 1782 authorised practice of using hot lime wash in addition to the pots of smoking sulphur

111 John Montagu, 4th Earl of Sandwich, was First Lord of the Admiralty on three separate occasions: 1748-51; 1763-63; 1771-82.
or charcoal, or burning gunpowder or tar, or Robertson’s adopted technique of
smouldering vinegar-sulphur impregnated tobacco set about the lower decks, or the
potentially dangerous process of producing toxic fumes by pouring vitriol over
powdered nitre, \(^{112}\) the sum benefit of any or all of these fumigation techniques, the
benefits of which hardly two surgeons agreed, was probably to abruptly lower the
ship’s rat population. The significant risk of starting a ship fire added to the adverse
aspects of eighteenth-century ship fumigation procedures.

The beneficial effect of fumigations on lowering the body lice population, having
regard to the body lice marked sensitivity to dehydration and elevated body
temperatures, is also questionable. Indeed the simple delousing method successfully
and routinely employed in the latter half of the eighteenth-century Royal Navy of
bathing the new crew members and boiling or burning infested clothing before their
arrival to a new ship, would have reliably ensured the destruction of the extremely
host-specific and exclusively haematophagous \(^{113}\) human body louse which die within
five-days following human blood deprivation. (Bechah, Capo et al. 2008) Whilst
lavation, though not with any scheduled regularity when on board, was clearly
beneficial for the initial control of lice spread ‘tween decks, the other environmental
naval reforms so earnestly espoused by Lind, Robertson, Blane and Trotter that of
ship ventilation measures, were of little or no benefit for the control of lice-borne or
other insect vector-borne diseases. By significantly lowering the ambient
temperatures ventilation may have induced seamen to be even less inclined to wash or
change clothes. Ventilation, however, was of value in controlling ubiquitous air-borne
diseases, such as the widespread infections of tuberculosis, influenza and pneumonia.

\(^{112}\) Saltpetre or potassium nitrate steeped in sulphuric acid

\(^{113}\) Blood-feeding
The almost unfettered expansion of the British Empire during the eighteenth-century brought to British medicine a heightened awareness of the perceived adverse effects of climate, atmospheric and meteorological phenomena as aetiological factors in disease formation, particularly fevers contracted in the tropics, the so-called *hot countries*. Together with environmental medicine, these factors will be further described in this chapter.

A term not used till the nineteenth-century, the *tropical region*, or Torrid Zone between the Tropics of Cancer and Capricorn, had been settled by tropicopolitan Europe for centuries. Exploratory expeditions had been undertaken from Britain, Denmark, France, The Netherlands, Portugal and Spain. Whilst the region was first systematically researched by the bio-geographer Alexander von Humboldt later in the nineteenth-century, more commonly in the eighteenth-century it was referred to as the region of *hot countries* or *hot climates*.

Robertson compiled large collections of climatic information presented in meticulous tabulations during nearly thirty-years of sea voyaging. Recordings of weather observations was then not an uncommon task performed by naval surgeons, but
Robertson and his naval colleagues Dr Leonard Gillespie (1758 – 1842) and Sir Gilbert Blane, together with Dr John Clark, who had worked in Bengal from 1768 to 1771, were particularly mindful and diligent in this practice. Meteorological data contributed to lengthy discourses in the introduction to eighteenth-century medical books devoted to long voyages to *hot countries*. (Lind 1768) (Clark 1792) Meteorology was a scientific pursuit of many eighteenth-century medical men and a popular past time for the non-medical observers to ascertain linkages between the environment and disease in an attempt to confirm the traditional concept of miasmatic aetiologies. (Hannaway 1993 pp. 298-300) Meteorological medicine greatly interested the eminent fever specialist Dr John Huxham whilst at Plymouth who kept daily records for over thirty-four years during the first half of the eighteenth-century. Likewise, Dr Thomas Short (c. 1690 – 1772) made similar records at Sheffield for over thirty-years reporting his observations and conclusions in *New Observations on the Bills of Mortality* (Short 1750), and who became an expert on the medicinal uses of mineral waters. Dr John Fothergill, a celebrated London physician, anonymously published weather details between 1751 and 1754 in the most popular eighteenth-century periodical, *The Gentleman’s Magazine*.  

A climatic or atmospheric concept of disease was espoused by nearly all eighteenth-century physicians. As in former times, eighteenth-century physicians gave very due weight and attention to the weather as well as to diet, exercise and sleep in a manner of their concern with positive health as with sickness, with prevention rather than therapeutics. The interest in the measurement of the atmospheric pressure and air

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114 Mortality statistics prepared following the 1603 outbreak of Plague and superseded in 1836 under the *Births and Deaths Registration Act* (1836)  
115 The magazine was published monthly from 1731 to 1907. The first printer, editor and publisher was Edward Cave (1691 – 1757)
density was pioneered by Dr John Arbuthnot (bap. 1667 – 1735) in 1733 who believed the human body continually absorbed air through external pores as well as breathing it. To him the skin thus constituted a major absorptive function as well as a major excretory site for the daily insensible transpiration of food and drink. Because Arbuthnot showed that the properties and qualities of the air were constantly changing, he thought emanations from the earth could be thereby biologically important. Arbuthnot’s work preceded the definitive experimentations on the properties of air by the dissenter Joseph Priestley who observed that air was a mixture of ‘airs’ or gases each with different properties. Only twenty per cent of the air according to Priestley was ‘eminently respirable air’ which the French chemist, Antoine Lavoisier (1743 – 1794), an authority within the new pneumatic chemistry, would later term oxygen. (Hannaway 1993 p. 305) The fast developing pneumatic chemistry spawned medicinal interests in artificial mineral waters, aerial therapy establishment and spas.

Epidemics were perceived as commencing with an elaborate set of conditions, such as ambient temperature, unusual weather and especially extremes or deviations from normal, anything environmental that appeared to impact the communities at risk and thus may be the remote cause of pestilence. (Richmond 1980 p. 89) Humoral pathology underlying classicist notions about the influence of climate on human health, character and temperament, so-called climatic determinism, was not incorporated in the medicine of the environment. Within environmental pathology air remained the external agent capable of provoking disease and described earlier by Sydenham as a catalytic force. Later in 1733, John Arbuthnot argued that air could by itself be a sufficient cause of disease in An Essay Concerning the Effects of Air on Human Bodies (reprinted 1751, 1756 and 1815). (Riley 1987 pp. 14-6)
Although the Scottish philosopher-historian David Hume (1711 – 1776) cast doubt on climatic determinism in his 1748 essay Of National Characters stating, “that men owe any thing of their temper or genius to the air, food or climate”, it was certainly espoused by James Lind in a publication concerning diseases suffered by Europeans in hot countries. (Lind 1768) The origins of climatic determinism, later in the nineteenth and twentieth-centuries to be known as environmental or geographical determinism, were in the Hippocratic corpus. The basic tenet of climatic determinism was the particular affect that climate had on influencing the psychological development of individuals which became manifest in the behaviour and culture of the society that those individuals formed. Nonetheless, both James Lind and John Clark were interested in the effects of environment on the development of disease pathology: environmental medicine. They considered the air and temperatures of many parts of British India to be amenable to long-term European residence through adapting after a period of seasoning. Colonial societies in hot countries filled by newly arrived immigrants, white and black from all world regions, were exposed to early high mortality rates amongst the immigrants that were ascribed to exposure to the new climate. Physiological readjustments were required, often accompanied by fever, the seasoning fever, in order to become climatically seasoned.

The eighteenth-century term seasoning antedated the nomenclature of acclimater that was first used in 1776 by the French writer G T F Raynal in Histoire philosophique et politique des établissements et du commerce des Européens dans les deux Indes. The words acclimatation and acclimation entered the English language around 1820, and as acclimatisation later in the 1840s as the science of acclimatisation developed.
Theories of European acclimatisation in the tropics, “the white race in the tropics”, which embraced race theory, geographical pathology and global politics, was a much later nineteenth- and twentieth-century phenomenon. (Anderson 1996 p. 63) Plants and animals had been geographically exchanged long before the process was defined as a systematic and experienced activity in man. Plantation crops, including cinchona and tropical species, had been undertaken since 1759 at Kew and similarly, under the curatorship of the Comte de Buffon (1707 – 1788), at the Jardin du Roi from 1739. (Anderson 1992 pp. 135-7) Cinchona had also been transplanted to the Chelsea Physic Garden, London, in the late seventeenth-century together with the sweetener agent used by Sir Richard Talbor in his secret Ague preparations and described by the seventeenth-century physician-herbalist Nicholas Culpeper (1616 – 1654), as the Chinese plant, sweet wormwood or *Artemisia annua*. (Dobson 1998 pp. 78-9)

Colonial and *hot climate* medical texts underscored the existence of distinct maladies linked with such environments which required a determined reappraisal of the relevance of European medical thinking when applied to disease in the *hot countries*, yet at the same time the literature expressed optimism for the successful assimilation of Europeans into the Torrid Zone. In support of this contention of unique *hot climate* illnesses an Army surgeon, Robert Jackson (1750 – 1827), carried out observations in North America and the West Indies that led him to propose a two-component fever classification. (Jackson 1798) He identified an ‘epidemic fever’ due to over-crowded insanitary circumstances typical of urbanised Britain and Europe and common throughout the world, and an ‘endemic fever’ due to decomposing vegetation and prevalent in *hot countries*. Mark Harrison posited that there is a very close similarity between Jackson’s proposed nomenclature and the extant fever classifications of
periodic (intermittent and remitting) and continued fevers. Similar differences in tropical disease states and their clinical intensities had also been reported by the Army physician, Dr John Hunter (1754 – 1809), in Jamaica during the years 1781 to 1783. (Harrison 1996 pp. 70-4) Most seventeenth- and eighteenth-century medical writers seeking to explain the differences between Indian and European constitutions seldom used the term ‘race’, instead they cited the traditional classicist views of attributing physical and other differences to environmental factors, particularly climate. (Harrison 1999 p. 13)

Eighteenth-century medical beliefs, held particularly by James Lind and John Clark, forecasted that acquired acclimatisation would occur, and perhaps in certain places rapidly, to the point where Europeans would be no more vulnerable to fevers in hot countries than were the indigenes. Such seasoning supported optimism about European settlement in the hot countries, in spite of Lind’s reservations that hot countries were “full of perils”. Sir Gilbert Blane was less sanguine regarding the European’s ability to adapt to the climates of the prosperous sugar producing islands of the West Indies. He stated that two risks, “most pernicious and fatal practices”, attended especially the newly arrived Europeans to the islands,

‘intemperance and horse riding or walking in the sun which soon shorten their lives’.

(Blane 1799 p. 110)

Anglo-Indian medical men in the eighteenth-century unanimously condemned European lifestyles as inappropriate in hot countries and recommended certain indigenous practices. Whereas Europeans in the West Indies, on the other hand, eschewed such practices and declined any adoption of slave culture herbal and
protective customs in spite of the local natives achieving relative immunity from malaria and yellow fever, although by largely adaptive genetic mechanisms.

By the beginning of the nineteenth-century, however, there was increasing pessimism concerning the veracity of *seasoning* expressed by a growing conviction that immunity to tropical maladies could not be acquired passively by merely residing in *hot countries* or by investigating attributes of indigenous medicine. (Harrison 1996 pp. 90-2) Such sentiments antedated texts written by James Thomson (Thomson 1820) in Jamaica and William Twining (1790 – 1835) in Calcutta (Twining 1835) who were among the first to specify the nature of racial immunity and susceptibility to disease and to construct a racial pathology with notions of racial hierarchy. (Harrison 1996 pp. 82-4)

II

The first English book devoted to ‘tropical medicine’, a discipline not then recognised, was published in 1679 by Dr Thomas Trapham MD Leiden, who had arrived in Jamaica in 1673. His book, *A Discourse on the Health of the Island of Jamaica. With a provision therefore calculated from the air, the place and the water, the custom and manner of living* described the endemic diseases of the West Indies emphasising the paucity of smallpox, the absence of scurvy and plague, and the infrequency of consumption. (Ashcroft 1979) Conditions were to be much changed in the eighteenth-century where Jamaica was said to have a notorious “fatal climate”. (Blane 1799 pp. 92-3, 130) This acquired un-healthiness reflected the introduced haemorrhagic fever,
yellow fever, transferred from the sylvatic\textsuperscript{116} cycle of the disease in equatorial rainforests in sub-Saharan Africa by the slave trade to the West Indies and the North American continent. The term ‘tropical medicine’ was first used in 1897 in an attempt to unify the three disparate schools of study: naval medicine, colonial medicine and the work of the Indian Medical Service. (Worboys 1976 pp. 78-9)

The meteorological permutations of hot countries such as those identified and recorded by Robert Robertson, James Lind, John Clark and other writers including the Dutch physicians Dr James Bontius (1592 – 1631) (Bontius 1769) in the East Indies, and Dr Solomon de Monchy in the West Indies (de Monchy 1762) were considered to be especially pertinent in the causation of fevers. Lind emphasised the protective value of fresh air in the macroscopic case of miasmatic marsh vapours but also in the microscopic instance of contagion spread from person to person, especially within confined spaces between decks aboard ships. (Bynum 1981 pp. 141-2) The use of the word miasma by eighteenth-century writers meant both vaporous exhalations, as from putrefying organic matter, and particles suspended in the atmosphere. Thereby both vapours and particles were considered potentially harmful to health. A multiplicity of particulate and vapour matter thus joined a variety of meteorological phenomena together to fashion an explanation for the cause of disease. (Riley 1987 pp. 13-6)

What made an environmentalist explanation of epidemic causation seem more persuasive than a humoral explanation was the very difficulty of using a single theory to account for both individual disease and epidemic outbreaks of fevers. Sydenham’s

\textsuperscript{116} One of three transmission cycles of YF virus. Sylvatic is the predominant cycle and is maintained among monkeys by tree hole-breeding mosquitoes in the jungle canopies where humans are incidentally infected with YF virus.
concept of sporadic cases of plague, for instance, he assumed were to be uninfluenced by the atmosphere or environmental constitution and to be produced by contagion. He further proposed that only epidemics were caused by an atmospheric or environmental constitution. Yet the contagion theory of the earlier sixteenth-century overlapped the environmental theory of the eighteenth. Not only emanations from the earth but also emanations from diseased people, corpses, rotting organic matter and other sources might add to the atmospheric constitution the properties to precipitate an epidemic. (Riley 1987 pp. 17-8)

III

Robert Robertson’s weather records taken at sea were diligently tabulated in ten columns that he titled, The Diary of the Weather and State of the Sick List, although a weather diary was not a compulsory log that a ship’s surgeon was directed to complete. Robertson’s first two columns were typically devoted to the year, months, days and hours of observation invariably taken at the same hour three times each day. Robertson’s readings were recorded during the Civil or Calendar Day timed from midnight to midnight as distinct from the Astronomical Day or Solar Day used by astronomers which is timed from noon to noon and thereby a whole day later than the Ship’s Day. 117 Ambient temperatures were recorded using a travelling thermometer calibrated with the Fahrenheit scale that had been introduced by Daniel Fahrenheit (1686 – 1736) in 1724. Robertson’s fourth column listed either the latitude or the names of certain land locations at which his measurements of the angle of the midday sun had been obtained. Likewise longitude, calculating the time difference between

117 Ship’s Day is the day allowed for loading or unloading
the local midday, with the sun at its zenith, and Greenwich time as registered on the ship’s standard maritime chronometer, was listed next. The chronometer was of a design pre-dating the more accurate and highly secret sea watch that the Yorkshire watchmaker John Harrison (1693 – 1776) created and which underwent its first sea trials of longitude recordings in 1761. The “moon age” was documented during each of the four phases of the moon’s illumination during each calendar month. Robertson’s schema, however, was to date the age of the moon numerically from one to thirty-days.

Plotted wind directions together with wind-force, indicated by a number of asterisks, were tabulated in the next column. A series of dots ranging from a single dot up to a cluster in the shape of a diamond reflecting the heaviness of rainfalls and dew was presented next and then a column described as the “appearance of the atmosphere” wherein the presence or absence of cloud formations were entered. The last column headed “Remarks and State of the Sick List” contained a synopsis of the daily number of sick and only a brief record of the daily course of particular cases.

Whilst Robertson made occasional comments and notes concerning the weather reports as they may have related to the health status of the crew, he at no time made any attempt to document any regular and meaningful conclusions in order to correlate changes in the meteorological observations with significant alterations in the medical condition of the crews at sea. In this regard Robertson did not draw any meaningful conclusions in the same manner as Sir Gilbert Blane who utilised information and figures from his elaborately compiled tables. Blane, for example, exhaustively analysed and compared the mortality figures obtained in 1782 from the five military
hospitals in the West Indies and amongst other findings, showed that \textit{fluxes} in which he believed climate made the greater difference to the death rates, more often attacked those recovering from scurvy and that the \textit{fluxes} did not appear in those cases treated on board their ships nor those hospitalised cases where,

‘great care was taken to separate infectious diseases from the others’.

(Blane 1799 pp. 158-69)

Robertson’s failure to document any correlation between changeable weather conditions with either the incidence or prevalence of disease, or with the appearances of new varieties of illness, or with significant increases or decreases in mortality rates amongst ship’s crews, may be considered in retrospect a certain detraction from the otherwise highly informative medical treatises constructed by Robertson.

A further criticism of Robertson’s data was described in \textit{The Origins and Fate of James Currie’s Cold Water Treatment for Fever}. John Forrester commented that the widely travelled physician, Dr Robert Robertson, recorded vast numbers of environmental temperatures, but at no time documented body temperatures. (Forrester 2000 p. 62) This omission, at odds with the regular practice of clinical thermometry practiced by Dr James Currie (1756 – 1805), may have reflected a naval policy that no clinical mercury thermometers were included in the late eighteenth-century surgeons’ chest. Furthermore, the rigors of sea travel may have enhanced the chance of damage to these relatively expensive and fragile instruments. Uncharacteristically Robertson, who at times privately purchased stores of costly Peruvian bark for various ship’s companies, did not purchase his own thermometers. Nonetheless, Robertson was more than able to recognise the febrifuge sick without the aid of eighteenth-century thermometry.
During the eighteenth-century weather and health continued to be perceived as clearly and immutably linked. Some European countries were deemed to have unhealthier weather conditions than others. “Hungary, the most sickly climate in all Europe” was an opinion recorded by James Lind in *A Treatise of the Scurvy* (1753) noting that “epidemical distempers begin constantly to rage in the hottest months”. Epidemic disease had resulted in a conservatively estimated 40,000 dead amongst the Austrian troops from fevers during the 1717 and 1718 aestival campaigns against the Turks. (Lloyd 1965 pp. 52-3) Certain cities were likewise notorious for sickness. Rome was widely known for its summer fevers as a consequence of the close proximity of the low-lying malarial areas of the Compagna surrounding the city. Particular locales were also to be avoided in the “sickly seasons”. Of particular notoriety was Flushing on Walcheren Island at the mouth of the Scheldt in Belgium and Sheerness on the Isle of Sheppey at the mouth of the Medway in England. The explanations offered for these un-healthy islands were either “the mixture of particular winds or the nearness of bodies of water”. Climate, environment and the atmosphere remained essential causal co-factors and were fundamental to the understanding of eighteenth-century febrile diseases.
PART 4  MEDICAL EXPERIMENTER, ATMOSPHERIC MEDICINE AND NAVAL REFORMER

CHAPTER 13.  ROBERTSON’S POLITICAL ACTIVITIES IN THE LATE 18TH CENTURY REFORMATIONS OF THE ROYAL NAVY MEDICAL DEPARTMENT

Quite early in his career Robertson recognised the great manpower and efficiency benefits to the Royal Navy by improving the crews’ health whereby in addition to the reduced loss of life of experienced and seasoned sailors there would also be a curtailment of the practice of over-crewing high-rated ships-of-war at the outset of their voyages. The long-standing policy of taking on board large numbers of extra crew in order to offset the expected numerous deaths at sea predominantly from fevers and disease further exacerbated the over-crowding of potentially infested and sickly men ‘tween-decks. The functioning of the Royal Navy Medical Department, both administratively and professionally was, for Robertson’s entire sea service career, in need of a thorough overhaul. Yet the far-reaching reformations instituted by the Admiralty commenced fitfully as late as the mid-1790s.

In parallel with Robertson’s suggested naval reforms of fever prevention and hygiene programs, he was an ardent correspondent on other matters with the Admiralty and the Sick and Hurt Board. During 1770 and 1771 after he returned from Africa aboard the Weasel, Robertson wrote a series of letters to the Sick and Hurt Board on methods to improve the functioning of the medical department, penned whilst aboard his next ship HMS Aeolus. Later whilst aboard HMS Edgar in the years 1781 and 1782, he
again petitioned the Admiralty with a lengthy submission titled *A Political View of the Indigent Establishment of Navy Surgeons* outlining the manifold deficiencies of naval surgeon’s pay and conditions with a plan of reform. Amongst many issues he remonstrated as to,

‘why medical practice, especially in fevers and scurvy, is not more successful in His Majesty’s navy’.

(Robertson 1789 pp. 328-9)

He added a further complaint regarding the gross under-staffing of the *Sick and Hurt Board* \(^{118}\) and the “indigent and penurious establishment of the medical department of the Navy”. Robertson’s submission, which he referred to as a series of hints for the Admiralty, and “printed without my name”, subsequently lay dormant till 1795-6 at which time he was belatedly summoned to attend Captain Sir Andrew Snape Hamond (1738 – 1828), the Comptroller of the Navy known as the Third Sea Lord, from 1794 to 1806, who was also a Commissioner for the *Sick and Hurt Board*.

The years 1795-6, soon after the commencement of the Revolutionary Wars of the First and Second Coalitions (1793 – 1802), found the rapidly enlarging Royal Navy in urgent need to enlist to the many vacancies for surgeons and surgeon’s mates. To this end Hamond recommended that Robertson’s 1781-2 plan be only partly adopted and promulgated in 1796. This abbreviated program according to Robertson was deemed a “very inferior plan”. Robertson’s original 1781-2 plan was wide ranging and constructed in twenty-one articles. It touched upon pay and allowances for physicians and ship’s surgeons, the supply of medicines, instruments and certain necessaries free of charge by government, eligibilities for half-pay, pensions and other administrative

\(^{118}\) In 1779 the staff at SHB Head Office consisted of a Secretary, four Clerks, a Messenger and a Soupmaker
matters. The overall plan was recorded by Robertson in his 1810 publication *Synopsis Morborum* volume two. (Robertson 1810) It is fortunate that Robertson, as had some other correspondents with the *Sick and Hurt Board*, provided their own records of memorials and letters to and from the Board, since *The National Archives*, London, have no records of letters to and from the *Sick and Hurt Board* between the historically important years of 1765 to 1794. (Lloyd and Coulter 1961 p. 380) This twenty-nine year period covered part of the Seven years War, all of the American War of Independence, the incidental Nootka Sound Crisis \(^{119}\) or the *Spanish Armament* from January to October 1790 and the *Battle of the Glorious First of June* (1794). \(^{120}\)

Robertson continued his reformatory program whilst Physician-in-Charge at Greenwich whereby he further proposed to the First Lord of the Admiralty \(^{121}\) in a letter dated 9\(^{th}\) April 1804, a nineteen-point plan entitled *The Draft of the Plan for Increasing the Advantages and Improving the Situation of the Medical Officers of the Navy*. In part, Robertson stressed the fact that Army surgeons received a higher salary and consequently many Navy surgeons left the Navy and joined the Army Medical Department. In *Synopsis Morborum* Robertson recorded that his 1804 plan, with only slight amendments involving further increased salary levels for surgeons of hospitals and dockyards than which he had proposed, was legislated on the 23\(^{rd}\) January 1805. The estimated cost of the 1805 medical reforms of increased pay rates, the provision of free drugs and a naval uniform for surgeons was £41, 726. 9s. 2d. Robertson did not include in his plan a proposal for the issue of instruments to surgeons *gratis* which

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\(^{119}\) Vancouver Island, Canada

\(^{120}\) The first naval battle in the war with Revolutionary France fought by Lord Howe’s fleet some 400 miles in the Atlantic Ocean

\(^{121}\) Admiral John Jervis, First Earl St Vincent (1735 – 1823), First Lord of the Admiralty from January 1801 to the 14\(^{th}\) May 1804.
was to remain the responsibility of Naval surgeons till the *Admiralty Committee on the Training of Naval Medical Officers* in 1899 recommended that instruments and other impedimenta should be supplied by the *Naval Stores Department*. (Lloyd and Coulter 1963 p. 41)

Concurrent with Robertson’s written representations for pressing reforms to the Royal Navy Medical Department were those of a younger, having been baptised the year Robertson enlisted in the Royal Navy, and energetic advocate of reform, Dr Thomas Trotter (bap. 1760 – 1832). Whereas Robertson confined his reformatory ideas and suggestions to a printed submission to the Admiralty early in 1781-2 and thereby unavailable to public scrutiny, Trotter on the other hand much later in 1790, published for sale to the public a pamphlet pertaining to the Admiralty, entitled *Review of the Medical Department in the British Navy with a Method of Reform Proposed*. (Trotter 1790) Trotter expressed the opinion that a board of naval surgeons would be far more suitable in order to assess competencies of prospective naval surgeons than the current surgical examinations at *Surgeon’s Hall*, London. Further, naval physicians should assess the usefulness of the medicines carried in the surgeon’s chest and not the *Society of Apothecaries* and that the drugs should be issued free. (Lloyd and Coulter 1961 p. 31) In the first volume of Trotter’s major work *Medicina Nautica* published in three-volumes in 1797, 1799 and 1803 with a second edition printed in 1804, contained information on the low salaries paid to naval surgeons, the paucity of their pensions and the strict regulations regarding the ineligibilities for half-pay in times of peace. This information may have been partly responsible for the Admiralty, alarmed at the shortages of qualified surgeons in the West Indies epidemic of 1795, introducing a salary increase of £1 a month and the free issue of some medicines.
Robertson’s opinion of the selective reforms promulgated in 1795 was that they were quite inadequate.

In the first volume of Trotter’s *Medicina Nautica* very similar grievances were recorded to those already contained in Robertson’s 1781-2 twenty-one article plan that had been neglected by the Admiralty, differing only in the extent of the proposed increased pay scales for surgeons and physicians. The close similarity between the representations thus far made by both Robertson and Trotter was shown again in 1801, the year before Trotter was invalided from the service after suffering “a rupture” 122 with an annual pension of £200, in Trotter's lengthy memorial to Lord St Vincent, First Lord of the Admiralty. This too contained a litany of suggested pay levels to surgeons of various seniorities, surgeons in various rates of ship and physician’s pay at sea and in hospitals. (Trotter 1804 vol III, pp. 35-46)

Robertson’s memorial to Lord St Vincent dated the 9th April 1804 followed seamlessly from the thrust of his original 1781-2 proposals which had been sadly shelved for fourteen-years by the Admiralty. It would appear that Robertson and later Trotter, two vigorous reformists, had unwittingly identified and offered written corrective advice about precisely the same serious defects within the late eighteenth-century Royal Navy Medical Department. Yet Thomas Trotter’s contributions in the pre-1805 reformations had received a much greater emphasis and discussion by contemporary historians than the earlier and equally important correspondence by Robert Robertson. (Vale and Edwards 2011) (Lloyd 1965) (Lloyd and Coulter 1961)

122 Inguinal or groin hernia. Inguinal and other abdominal wall hernias were a common injury amongst crews in the eighteenth-century Royal Navy and the Merchant Service
By the end of 1796 some important improvements were belatedly implemented by the Sick and Hurt Board. The Admiralty agreed to supply some of the most expensive and useful medicines, including Peruvian bark, free of charge to surgeons, but not their instruments. Malt of wort was replaced by lemon juice as the preferred anti-scorbutic and was finally made a general issue to all ships. Much in response to the Fleet Mutinies at the Nore in 1797, pay rates for all seamen including all classes of surgeon’s mates were improved, the latter received a rise of 5s. 6d. per month. No increases were forthcoming for surgeons with the consequence that upon the renewal of war in May 1803, after the breach of the short lived 1802 Treaty of Amiens, few surgeons returned to the Navy. The surgeons, like cartographers and navigators, continued to press ahead with their efforts to achieve recognition of their scientific expertise in preventive medicine and for promotion within the Royal Navy Medical Department. Ultimately in January 1805 Admiralty’s orders regulated that surgeons were to be warrant officers of wardroom rank, equal to lieutenants though subordinate to them, and surgeons were to appear in the official List of Sea Officers for the first time in 1814. They were granted a distinguishing uniform with insignia that by the year 1825 was regularly worn by all surgeons. Surgeons’ pay was to be henceforth according to their seniority and not according to the rating of the ship. Likewise half-pay when their ships were decommissioned, was due to all surgeons, not the most senior. (Crimmin 2009 pp. 102-3)

Robertson, who to his credit remained conspicuous though firm and respectful in his correspondences with Admiralty, continued persevering for the long overdue
administrative reforms to the Royal Navy Medical Department well into the latter quarter of the eighteenth-century Royal Navy and a little beyond.
CONCLUSION

The thesis about Robert Robertson has been prepared within the primary context of the eighteenth-century understanding of febrile diseases in Britain. By 1800 the notion of the natural resolution of disease as a reliable and predictable panacea had become less acceptable to practicing physicians and surgeons and the therapeutic promises of the care-cure art of medicine, particularly within the class of fevers, were perhaps more persuasive to the suffering communities of Britain. The medical understanding as to the causes of fevers remained unchanged by the end of the century whence medical thought continued to rely on the plausibility of humorist theories dating from the Hippocratic Corpus. The centrality of the eighteenth-century concept of disease remained one’s constitution whilst the aetiology of fevers had not significantly advanced beyond the sixteenth-century theory of contagium animatum, the aerosolised or direct transfer of imperceptible infectious particles. Within Britain’s eighteenth-century communities, fevers dominated the forebodings of the impoverished multitudes much as cancer remains an anathema to modern man.

After joining the Royal Navy in 1760 during the first year of the long sixty-year reign of George III, Robertson served continuously till the termination of hostilities of the War of American Independence in 1783 and went ashore on half-pay to practice in Hythe, Hampshire. Robertson’s town of Hythe should not be confused with the larger township of Hythe, one of the Cinque Ports, located in Kent. Perhaps in recognition of the scholarly work contained in his first two publications, his seemingly unblemished and lengthy service record, his humane clinical care and

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123 The Confederation of the Cinque Ports originally consisted of five ports, two Antient Towns, eight Limb townships and other supporting towns and villages
successful and acknowledged expertise with Peruvian bark in the treatment of fevers, by his correspondences with the Admiralty where he presumably became known, but more likely directly as a result of his seniority within the small group of physicians in the Royal Navy Medical Department during the late 1780s, he was promoted to the influential appointment of Physician-in-Charge at Greenwich in 1790. It thus seems unlikely at this time that he enjoyed any significant patronage, in or outside the Navy, to assist his advancement to the post of the Senior Physician in the Royal Navy.

Robertson’s naval medical career was unusually long composed of twenty-nine-years of sea duties and another twenty-two as a physician-administrator at Greenwich. His length of service well exceeded that of Robertson’s friend, colleague, mentor and correspondent, Dr James Lind, who spent nine-years at sea followed, after a ten-year break, by a further twenty-five-years as the Physician-in-Charge at the Royal Hospital, Haslar, from 1758 to 1783.

Robertson’s literary style, whilst persuasive and containing perhaps lengthy chronicles, was typified by his inclusion of the new medical arithmetic. He demonstrated the safety and effectiveness of cinchona bark by applying a simple comparative analysis with the extant antiphlogestic regimen. This basic mathematical model enabled him to demonstrate that the regimen was far less effective and potentially more harmful in the latter eighteenth-century treatment of both intermittent and continuous fevers. Applying similar experimental methods he demonstrated that in addition to prohibiting the overnight sleeping on the shores of the West Indies and the West Coast of Africa by boat, wooding and watering crews, the “wooders and waterers”, together with advocating the employment of local native labour for these tasks, that the addition of a prophylactic morning dose of cinchona
bark prevented febrile disease. Engaging in the growing eighteenth-century medical practice of making regular and careful meteorological observations, Robertson’s extensive twenty-nine-year long climate analyses together with his manifold clinical case histories of both the fevered sick as well as the distempered ill stamp him an empiricist. His unique drug experimentations at sea arithmetically assessed by comparative analysis and regularly submitted in reports to the Admiralty containing accurate conclusions and proposing innovative change to the duties of naval surgeons at sea, relegate him more correctly as a learned natural philosopher.

He continued his work on the fundamental pharmaceutical properties and characteristics of cinchona bark whilst at Greenwich Hospital. Following a series of fully documented comparative testing of different bark formulations, he produced in 1799 a far more palatable preparation that ensured a greater patient compliance with bark treatments. This he termed fermented bark. For the immediate dispensing of bark to large cohorts of fevered military personnel, Robertson successfully manufactured a stable non-degradable, easily transportable and sweet Peruvian bark gingerbread. This contained an effective Peruvian bark dose per serving and was first made available to treat outbreaks of fevers, albeit of presumed multiple aetiologies, amidst the large 1809 British Army Expeditionary Force to Walcheren Island situated just off the coast of French-occupied Belgium.

To address the first question posed in the introduction to the thesis. Was Robertson’s concept of using Peruvian bark as a mono-therapy in the cure of both intermittent and continued fevers in the Temperate Zone and in hot countries innovative and an advance in medical knowledge of the late eighteenth-century? Whilst Robertson’s
initial therapeutic practices with Peruvian bark to assist him arriving at a suitably effective yet non-toxic dosage regimen would seem today quite primitive, yet in the eighteenth-century setting his prescribing methods with the bark proved to be a new means of fever management in the late eighteenth-century. Importantly he was ultimately able to affirm the benefits of a sound, easily and accurately administered, reliable, safe and dependable, Peruvian bark febrifugal regimen. Peruvian bark was never a cheap option or always available in optimum quality, but it was a highly efficacious agent for the treatment of intermittent fevers and, in addition, Robertson demonstrated the bark’s apparent benefit in the treatment of continuous fevers, especially ship fever of presumed epidemic typhus origin.

Robertson’s additional protocol, also based on experimental observation, of devising a safe and effective preventive regimen using Peruvian bark in *hot countries* was up to that time an entirely novel and original concept of using a drug as a prophylaxis. In both the *cure* and the prevention of these fevers, Peruvian bark therapy was a transformation in the management of eighteenth-century fevers. Furthermore, the use of the bark became an alternative model to the extant and far more threatening *antiphlogistic regimen*.

To another question posed as to whether Robertson’s experimental innovations in the use of the bark were of any assistance in unravelling the prevailing confusion amongst medical practitioners as to when and how to use the bark? Recalling the dearth of experience in using the bark as revealed by five eminent British physicians in the latter eighteenth-century \(^{124}\) as documented by Dr John Millar in *Observations on the*

\(^{124}\) see page 126
Management of the Prevailing Diseases in Great Britain (1799; pp. 189-206) it is certain that Robert Robertson’s clinical experience and experimental data utilising the bark and his subsequent descriptive narratives added new knowledge to the then medical world. An important practical consequence to Robertson’s more correct use of the bark in intermittent fever was to place a limit on the wastage of the valuable agent in diseases in which Peruvian bark was either not indicated or contraindicated. In this manner, Peruvian bark shared with the cardiac glycoside, digitalis, the property of precise disease specificity: quinine cured malaria as digitalis markedly improved the “dropsy” of heart failure. Yet both drugs were ultimately used as cure-alls and both were championed for the management of diseases as widely variable as rheumatism and consumption.

To the final point of uncertainty posed in the thesis introduction as to whether Robertson’s doctrine of Febrile Infection was of sufficient merit and ingenuity to claim inclusion within the leading theories of the day. Retreating from Cullenian nosography and neuropathological fever theory, Robertson’s doctrine of one genus of fever was neither innovative nor utilitarian. Furthermore, his concept of a single fever genus was likewise expounded by several fever physicians of the day, many of who had practiced medicine in hot countries. Nor was the doctrine of any specific merit since it provided no new medical knowledge about fevers, relying as it did entirely on extant classicist doctrines.

Neither was Robertson the only physician propounding cinchona bark therapy as a febrifuge in latter eighteenth-century Britain. Sir Gilbert Blane, Dr John Clark, Dr Erasmus Darwin, Dr John Fothergill, Professor Francis Home, Dr James Lind, Dr
John Millar, Dr Thomas Percival, Sir John Pringle, Dr William Saunders and others were equally persuaded by its benefits. Robertson within the Royal Navy devised effective and dependable bark protocols for both cure and prevention that had not previously been evolved or chronicled by the mid-eighteenth-century. Robertson published quite early the potential hazards of the doubtful anti-pyretic antiphlogistic regimen as an alert to medical practitioners. Robertson at the same time proposed a far safer and more effective alternative febrifuge drug, which became popular for only a relatively short time in the history of the latter eighteenth and early nineteenth-century British medicine. In the development of medicine in hot countries Robertson’s contribution to the cure and prophylaxis of malarial fevers in hot countries by the early use of quality bark, which he had successfully convinced government to provide gratis, were thereby significant achievements.

Indications that there was an improvement in the overall health of the Royal Navy during the hundred-years to 1800 can be gauged from briefly examining the health outcomes of two major naval deployments. In November 1800 Admiral Lord St Vincent returned to England at the end of an eight-month cruise successfully blockading the fortified French seaport of Brest. From a fleet complement of 28,000 a mere sixteen men required hospitalisation. (Crimmin 2007 p. 183) The very low sickness rate during St Vincent’s scurvy-free prolonged cruising was at odds with the far different outcome to Commodore George Anson’s (1697 – 1762) circumnavigation in the years 1740 to 1744. As much the result of the initial poor state of health in some of the crews, from tardy victualling which included the issue of the so-called standard antiscorbutic elixir of vitriol, from an outbreak of calenture fever during the Pacific cruise, frequent adverse sea states prohibiting berthing and
ANCHORAGE, but then overwhelmingly from scurvy which attacked the crews of each of the six ships in the convoy, the expedition all but collapsed. Out of 1,955 men who departed from England, 1,051 died, most of them from scurvy. (Lloyd and Coulter 1961 pp. 293-8) It was to Lord Anson, then First Lord of the Admiralty, that Dr James Lind presciently dedicated the first edition of Treatise of the Scurvy in 1753.

From 1779 the sick rates in serving Royal Navy personnel fell from 1 man in 2.45 to 1 in 10.75 by 1813 and the death rates dropped over the same period from 1 in 42, which in percentage terms is by a factor of three and a half times, to 1 in 143. (Mathias 1975 p. 81) But these improved parameters could not be attributed exclusively to advances in eighteenth-century medicine. By 1800 scurvy had all but been eliminated in the Royal Navy, but continued well into the nineteenth-century within the merchant service, (Cuppage 1994 p. 88) smallpox could be prevented by Dr Edward Jenner’s (1749 – 1823) new vaccination technique,\(^\text{125}\) and malaria represented by the intermittent or remittent fevers was successfully treated by cinchona bark. However, within British Medicine, apart from the relief of acute gout by colchicine\(^\text{126}\) (Jones 1810) and the little known treatment of cardiac oedema\(^\text{127}\) by digitalis (Darwin 1780) (Withering 1785), the treatment of diseases, particularly the species of fevers, remained largely unaltered by the end of the eighteenth-century.

It was in the province of hygiene that the Royal Navy successfully combatted the high mortality and morbidity rates of the earlier century’s mistakes and oversights within

\(^{125}\) Vaccination, from the Latin vacca a cow, with cowpox containing tissue. The important need for subsequent booster vaccinations was to await investigations in the nineteenth-century

\(^{126}\) Extracted from plants of the genus Colchicum, C autumnale, first isolated by the French chemists, Pierre-Joseph Pelletier and Joseph Caventou, in 1820

\(^{127}\) “Dropsical cases” with swollen legs
health care. Such improvements embraced the provision of fresh food sources including specific antiscorbutic citruses, the more successful preservation of foodstuffs such as salted vegetables and portable soup and the conversion from water souring fresh oak casks to inert iron tank water storage. Likewise copper cooking-pots, usually contaminated by toxic verdigris which also hastened the degradation of any ascorbic acid contained in the vegetables, (Jones and Hughes 1976 pp. 80-1) were changed to iron containers. Supervised personal cleanliness and changes in ship cleansing procedures, more effective ‘tween-deck ventilation mechanisms, quarantining, cleaning later by soap and the issuing of new slops to all pressed and landsmen prior to their distribution to the squadrons and fleets. New and more effective ship fumigation regimens. The establishment of Captain Sir Charles Middleton’s (1726 – 1813) ship divisional system, consisting of four divisions, that had been codified into prescriptive naval rules by the 1790s. Fundamental to the system was that ship’s officers personally inspected crew groupings as to their clean clothes, their messes and clean, aired and dry bedding. The growing acceptance of the responsibility for the crew’s well-being was to be undertaken by the commanding sea officers together with the adoption of other belated hygiene and health reformations.

By century’s end, whilst exhibiting the typical paternalism of the times, Admiral Sir Roger Curtis (1746 – 1816) endorsed a traditional view that, “the fatherly care of a commander is the seamen’s best physician”, extracted from Curtis’ twenty-four page

128 Ascorbic acid content in mg per 100 g material: orange juice 40-60; lemon juice 40-80; lime juice 20-30. Note rose hips 70-1000 and Carpobrotus glaucescens leaves (Sydney area, Pigface) 3,343.0 (Cuppage F E 1994; p.124; 128)
129 A form of dried beef stock in a slab or cake introduced in 1756 for the sick, prepared in the Soup House (Lloyd and Coulter 1961; p. 87)
130 Consisting mainly of copper carbonate and copper chloride
131 Later Admiral Baron Barham of Teston, First Sea Lord of the Admiralty from 1794 to 1806
pamphlet entitled *The Means Used to Eradicate a Malignant Fever.* (Curtis 1791) All these factors provided a significant enhancement in the level of health and safety in His Majesty’s ships thereby contributing to a more efficient and robust Royal Navy, albeit one still bedevilled by seemingly uncontrolled alcohol excesses, above as well as below decks.

Yet by 1800 the Navy and Army remained the most dangerous employments in Britain where deaths regularly exceeded the next most hazardous occupation, the mining industry. By the start of the nineteenth-century the Royal Navy generally mustered healthier sailors than found within the over-worked, under-paid and malnourished British urban common lot. Those living in over-crowded, unventilated, unheated, ill-lit, undrained and unsanitary accommodation devoid of a water supply, and who were without medical care. But as Patricia Crimmin warned,

‘the warship of 1800 was still potentially the engine of disease it had been in 1700’.

(Crimmin 2007 p. 196)

Robertson, like his mentor and friend Dr James Lind, was an agent of enquiry and curiosity. His clinical thoughts and treatments, experimental data and meteorological observations were recorded accurately, completely and without interruption. His mathematical tabulations and simple comparative statistics were persuasive and supported his basic tenet: Peruvian bark was a safe and sure febrifugal remedy in both the northern hemisphere and in *hot countries.*
The thesis research has not revealed any apparent explanation for Robertson’s seeming omission from previous historical analysis within the annals of the Royal Navy Medical Department. Nonetheless, his career had been an atypical trajectory. In the latter eighteenth-century Royal Navy Medical Department, such a person as Robert Robertson was an exceptional individual. A clinician-experimenter -- a distinctly different naval surgeon. Dr Robert Robertson, his life and works, warranted a more complete historical assessment and perhaps thereby enabling him a new positioning within the intellectual leadership of the latter eighteenth-century Royal Navy Medical Department.

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Risse, G. B. (2005). New Medical Challenges During the Scottish Enlightenment. Amsterdam, Editions Rodopi B. V.
Robertson, R. (1777). "A physical journal kept on board His Majesty's ship Rainbow, during three voyages to the coast of Africa, and West Indies, in the years 1772, 1773, and 1774 to which is prefixed a particular account of the Remitting Fever which happened on board of His Majesty's Sloop Weasel on the coast in 1769."
Robertson, R. (1783). Observations on the Jail, Hospital, or Ship Fever. London, Murray, J.
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Robertson, R. (1790). An essay on fevers : wherein their theoretic genera, species, and various denominations, are, from observation and experience ... in Europe, Africa, and America, and on the intermediate seas, reduced under their characteristic genus, febrile infection : and the cure established. London Robinson, G. G. J. & J.
Robertson, R. (1790). An essay on fevers; Wherein their Theoretical Genera, Species, and Various Denominations are, from observations and experience, for thirty years, in Europe, Africa and America, and on the Intermediate seas, reduced under their
characteristic genus, febrile infection, and the Cure is established on Philosophical Induction. London, Robinson, G. G. J. and J. Robertson, R. (1792). Observations on fevers and other diseases, which occur on voyages to Africa and the West Indies. London Murray, John. Robertson, R. (1799). "Directions for administering Peruvian bark in a fermenting state, in fever, and other diseases in which Peruvian bark is proper; and more especially in such cases as the Formulae of the Bark are rejected by the Stomach, or nauseated by the Sick with some Experiments to ferment the Peruvian bark with different sweets."


Robertson, R. (1807). Observations on Fevers which arise from Marsh Miasmata and from other causes in Europe, Africa, West Indies and Newfoundland with Occasional Remarks on the Principal Diseases Incident to Seamen. London, Cadell, T.

Robertson, R. (1810). Synopsis Morborum: A summary view of observations on the principal diseases incident to seamen or soldiers, whether engaged in actual service or retired from it, carefully abridged and digested, from the latest ed. of the author's works, in four volumes. Designed chiefly for the use of young professional practitioners in the navy and army. , Cadell and Davies.

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## Chronology of Medical Publications by Senior Royal Navy Physicians in the Latter Eighteenth - Century

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>1753</td>
<td>A Treatise of The Scurvy in Three Parts, containing an Inquiry into the Nature, Causes, and Cure of that Disease, together with a Critical and Chronological View of What has been Published on the Subject.</td>
<td>2nd ed 1757 3rd ed 1772</td>
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<tr>
<td>18th May 1754</td>
<td>A Letter to the Scot’s Magazine, Edinburgh, The Danger of Using Some Earthen Vessels</td>
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<tr>
<td>1757</td>
<td>An Essay on the Most Effectual Means of Preserving the Health of Seamen in the Royal Navy.</td>
<td>2nd ed 1762: Including a Simple Method of Supplying Ships with Fresh Water by Distillation. 3rd ed 1774: Including a Dissertation on Fevers and Infections with New Observations on the Jail Distemper and the Proper Methods of Preventing and Stopping its Infection. <strong>Dr James Lind</strong></td>
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<td>4th ed 1779: Including</td>
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<tr>
<td>1763</td>
<td>Two Papers on Fevers and Infections which were Read before the Philosophical and Medical Society in Edinburgh, 1763.</td>
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<td></td>
<td>2nd ed 1764</td>
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<td>1768</td>
<td>An Essay on Diseases Incidental to Europeans in Hot Climates with the Method of Preventing their Fatal Consequences, including, A Means of Preventing a Want of Provisions at Sea.</td>
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<td></td>
<td>2nd ed 1771, 3rd ed 1777, 4th ed 1788, 6th ed 1806</td>
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<tr>
<td>1772</td>
<td>A Treatise on the Putrid and Remitting Fever which raged at Bengal in the Year 1762.</td>
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<td>1777</td>
<td>A Physical Journal on Board HMS Rainbow during Three Voyages in the Coast of Africa and the West Indies in the Years 1772, 1773 and 1774</td>
<td>Dr Robert Robertson</td>
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<td>1780</td>
<td>Pamphlet: A Short Account of the Most Effective Means of</td>
<td>Sir Gilbert Blane</td>
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<td>Year</td>
<td>Author</td>
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<td>1781</td>
<td></td>
<td>Preserving the Health of Seamen. Booklet: An Address to the Officers serving in His Majesty’s Ships of War in the West Indies and America.</td>
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<tr>
<td>1783</td>
<td></td>
<td>A Short Account of the Most Effectual Means of Preserving the Health of Seamen, particularly in the Royal Navy.</td>
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<tr>
<td>1785</td>
<td></td>
<td>Observations on the Diseases of Seamen. 2&lt;sup&gt;nd&lt;/sup&gt; ed 1789 3&lt;sup&gt;rd&lt;/sup&gt; ed 1799</td>
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<tr>
<td>1786</td>
<td>Dr Thomas Trotter</td>
<td>Observations on Scurvy: with a Review of the Theories lately advanced on that disease and the opinions of Dr Milman refuted.</td>
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<td>1789</td>
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<td>Observations on the Jail, Hospital or Ship Fever from the 4&lt;sup&gt;th&lt;/sup&gt; April 1776 until 30&lt;sup&gt;th&lt;/sup&gt; April 1789, made in various parts of Europe and America and on the Intermediate Seas.</td>
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<tr>
<td>1790</td>
<td>Dr Robert Robertson</td>
<td>An Essay on Fevers wherein their Theoretic Genera, Species and Various Denominations,</td>
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<tr>
<td>1790</td>
<td>Dr Thomas Trotter</td>
<td>Pamphlet: A Review of the Medical Services of the British Navy with a Method of Reform Proposed.</td>
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</table>
are, from observation and experience, for Thirty Years, in Europe, Africa and America, and on the Intermediate Seas, reduced under their characteristic genus, Febrile Infection, and the Cure is established on Philosophical Induction.

1792

Observations on Fevers and Other Diseases which occur on Voyages to Africa and the West Indies. Meteorological and Physical Observations, made in 1769, 1772, 1773 and 1774, on the Coast of Africa and in the West Indies.

1795

Observations on Scurvy: with a Review of the Theories lately advanced on that disease and a New Theory Defended, on the approved method of cure, and the induction of Pneumatic Chemistry: being an attempt to investigate that principle in recent vegetable matter, which alone, has been found effectual in the treatment of this singular disease: and from thence to deduce more certain means of prevention than has been adopted hitherto.

Dr Thomas Trotter

Pamphlet: Remarks on the Establishment of the Naval Hospitals and Sick Quarters with Hints for their Improvement.
<table>
<thead>
<tr>
<th>Year</th>
<th>Author</th>
<th>Description</th>
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<tbody>
<tr>
<td>1797</td>
<td></td>
<td>Medical and Chemical Essays, containing additional observations on Scurvy; Communication from NSW on Scurvy; the Case of the Blue Boy; Thoughts on Decomposition of Water.</td>
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<tr>
<td>1797</td>
<td></td>
<td>2nd ed 1796</td>
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<tr>
<td>1799</td>
<td>Dr Robert Robertson</td>
<td>Directions for Administering Peruvian Bark in a Fermenting State, in Fever, and Other Diseases in which Peruvian Bark is proper; and more especially in such cases as the Formulae of the bark are rejected by the stomach, or nauseated by the sick with some Experiments to Ferment the Bark with Different Sweets.</td>
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<tr>
<td>1800</td>
<td></td>
<td>Booklet: Suspiria Oceani, a Monody on the Death of Lord Howe, KG, Admiral of the Fleet.</td>
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<tr>
<td>1803</td>
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<td>Volume III: Medicina Nautica.</td>
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<tr>
<td>Year</td>
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<tr>
<td>1804</td>
<td>4th ed 1810</td>
<td>An Essay, Medical, Philosophical and Chemical, on Drunkenness and its Effects on the Human Body.</td>
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<tr>
<td>1805</td>
<td>A Proposal for Destroying the Fire and Choak-damps of Coal Mines and their Production explained in the Principles of Modern Chemistry addressed to the Owners and Agents of Coal Mines etc.</td>
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<tr>
<td>1806</td>
<td>Dr Thomas Trotter</td>
<td>A Second Address to the Proprietors and Managers of Coal Mines on the Means of Destroying Damp in Confutation of Two Pamphlets, lately circulated in the neighbourhood of Newcastle.</td>
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<tr>
<td>1807</td>
<td>Dr Robert Robertson</td>
<td>Volumes I to IV: Observations on Fevers which arise from Marsh Miasmata and from other causes in Europe, Africa, West Indies and Newfoundland with occasional remarks on the Principal Diseases Incident to A View of the Nervous Temperament being a Practical Enquiry into the increasing Prevalence, Prevention and Treatment of those Diseases currently called Nervous, Bilious, Stomach and Liver Complaints, Low Spirits and Gout.</td>
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<tr>
<td>Year</td>
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<td>Author</td>
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<td>1810</td>
<td>Volumes I and II: Synopsis Morborum: A Summary View of Observations on the Principal Diseases Incident to Seamen or Soldiers, whether engaged in actual service or retired from it, carefully Abridged and Digested from the Latest Edition of the Author’s Works in four volumes. Designed chiefly for the Use of Young Professional Practitioners in the Navy and Army.</td>
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<tr>
<td>1812</td>
<td>Booklet: Directions for Preparation and Administering Peruvian Bark Gingerbread as a Preventive and Cure of Tertian and Remitting Fevers.</td>
<td>Dr Robert Robertson</td>
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<tr>
<td>1819</td>
<td>The Elements of Medical Logick, illustrated by Practical Proofs and Examples, respecting the Contagious Nature of Yellow Fever.</td>
<td>Sir Gilbert Blane</td>
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<td></td>
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<td>Dr Thomas Trotter</td>
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<tr>
<td>1822</td>
<td>A Practical Plan for Manning the Navy and Preserving our Maritime Ascendancy without Impressment.</td>
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<td>Select Dissertations on Several Subjects of Medical Science, including the Comparative Health of</td>
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<tr>
<td>the Navy in 1779 and 1814, with Proposals for its Farther Improvement. (in 1 Volume)</td>
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<tr>
<td>2nd ed in 2 Volumes, 1833.</td>
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APPENDIX 1.

SHIPS SERVED BY ROBERTSON DURING HIS NAVAL CAREER


<table>
<thead>
<tr>
<th>SHIP NAME</th>
<th>SHIPS’ SERVICE</th>
<th>MAIN ARMAMENTS</th>
<th>RATING</th>
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<tbody>
<tr>
<td>HMS Adventure</td>
<td>(1741-1770)</td>
<td>32 guns</td>
<td>4&lt;sup&gt;th&lt;/sup&gt; Rate</td>
</tr>
<tr>
<td>HMS Aeolus</td>
<td>(1758-1796)</td>
<td>32 guns</td>
<td>5&lt;sup&gt;th&lt;/sup&gt; Rate Frigate</td>
</tr>
<tr>
<td>HMS Arrogant</td>
<td>(1761-1801)</td>
<td>74 guns</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt; Rate</td>
</tr>
<tr>
<td>HMS Blenheim</td>
<td>(1761-1807)</td>
<td>90 guns</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Rate</td>
</tr>
<tr>
<td>HMS Cornwall</td>
<td>(1761-1780)</td>
<td>74 guns</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt; Rate</td>
</tr>
<tr>
<td>HMS Deal Castle</td>
<td>(1746 - )</td>
<td></td>
<td>5th Rate Frigate</td>
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<tr>
<td>HMS Diligent</td>
<td>(? - 1777)</td>
<td></td>
<td>Schooner</td>
</tr>
<tr>
<td>HMS Edgar</td>
<td>(1779-1814)</td>
<td>74 guns</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt; Rate</td>
</tr>
<tr>
<td>HMS Fox</td>
<td>(1775-1779)</td>
<td>28 guns</td>
<td>6&lt;sup&gt;th&lt;/sup&gt; Rate Frigate</td>
</tr>
<tr>
<td>HMS Juno</td>
<td>(1757-1778)</td>
<td>32 guns</td>
<td>5&lt;sup&gt;th&lt;/sup&gt; Rate Frigate</td>
</tr>
<tr>
<td>HMS Preston</td>
<td>(1757-1785)</td>
<td>50 guns</td>
<td>4&lt;sup&gt;th&lt;/sup&gt; Rate</td>
</tr>
<tr>
<td>HMS Prince of Orange</td>
<td>(1734-1772)</td>
<td>70 guns</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt; Rate</td>
</tr>
<tr>
<td>HMS Rainbow</td>
<td>(1747-1802)</td>
<td>44 guns</td>
<td>5&lt;sup&gt;th&lt;/sup&gt; Rate Frigate</td>
</tr>
<tr>
<td>HMS Romney</td>
<td>(1762-1804)</td>
<td>50 guns</td>
<td>4&lt;sup&gt;th&lt;/sup&gt; Rate</td>
</tr>
<tr>
<td>HMS Salisbury</td>
<td>(1769-1796)</td>
<td>50 guns</td>
<td>4&lt;sup&gt;th&lt;/sup&gt; Rate</td>
</tr>
<tr>
<td>HMS Terpsichore</td>
<td>(1760-1766)</td>
<td>24 guns</td>
<td>6&lt;sup&gt;th&lt;/sup&gt; Rate Frigate</td>
</tr>
<tr>
<td>HM Sloop Weasel</td>
<td>(1745-1779)</td>
<td>16 guns</td>
<td>Sloop</td>
</tr>
</tbody>
</table>
## APPENDIX 2. CHRONOLOGY OF ROBERTSON’S NAVY SERVICE

Reference: The National Archives: ADM 29/1/205 (from 1760 to 1788)

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Ship</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1760</td>
<td>Enlistment</td>
<td></td>
<td>Surgeon’s Mate</td>
</tr>
<tr>
<td>24(^{\text{th}}) January 1761 to 10(^{\text{th}}) November 1762:</td>
<td></td>
<td><em>Prince of Orange.</em> Surgeon’s Mate</td>
<td></td>
</tr>
<tr>
<td>1(^{\text{st}}) March 1763 to 27(^{\text{th}}) February 1764:</td>
<td></td>
<td><em>Terpsichore.</em> Surgeon’s Mate</td>
<td></td>
</tr>
<tr>
<td>?</td>
<td>?</td>
<td><em>Edgar.</em></td>
<td>Surgeon’s Mate</td>
</tr>
<tr>
<td>17(^{\text{th}}) August 1764 to 5(^{\text{th}}) January 1766:</td>
<td></td>
<td><em>Cornwall.</em> Surgeon’s Mate</td>
<td></td>
</tr>
<tr>
<td>6(^{\text{th}}) June 1766 to 17(^{\text{th}}) July 1768:</td>
<td></td>
<td><em>Adventure.</em> Surgeon’s Mate</td>
<td></td>
</tr>
<tr>
<td>10(^{\text{th}}) July 1768 to 16(^{\text{th}}) ? 1768:</td>
<td></td>
<td><em>Preston.</em> Surgeon’s Mate</td>
<td></td>
</tr>
<tr>
<td>17(^{\text{th}}) November 1768 to 20(^{\text{th}}) May 1769:</td>
<td></td>
<td><em>Diligent</em> Surgeon</td>
<td></td>
</tr>
<tr>
<td>21(^{\text{st}}) May 1769 to 5(^{\text{th}}) January 1770:</td>
<td></td>
<td><em>Weasel.</em> Surgeon</td>
<td></td>
</tr>
<tr>
<td>6(^{\text{th}}) January 1770 to 6(^{\text{th}}) April 1771:</td>
<td></td>
<td><em>Aeolus.</em> Surgeon</td>
<td></td>
</tr>
<tr>
<td>? June 1771 to 10(^{\text{th}}) June 1771:</td>
<td></td>
<td><em>Arrogant.</em> Surgeon</td>
<td></td>
</tr>
<tr>
<td>14(^{\text{th}}) June 1771 to 25(^{\text{th}}) September 1777 [sic]</td>
<td></td>
<td><em>Rainbow.</em> Surgeon</td>
<td></td>
</tr>
<tr>
<td>17(^{\text{th}}) September 1775 to 15(^{\text{th}}) December 1775:</td>
<td></td>
<td><em>Deal Castle.</em> Surgeon</td>
<td></td>
</tr>
<tr>
<td>16(^{\text{th}}) December 1775 to 22(^{\text{nd}}) January 1776:</td>
<td></td>
<td><em>Fox.</em> Surgeon</td>
<td></td>
</tr>
<tr>
<td>23(^{\text{rd}}) January 1776 to 21(^{\text{st}}) September 1778:</td>
<td></td>
<td><em>Juno.</em> Surgeon</td>
<td></td>
</tr>
<tr>
<td>25(^{\text{th}}) May 1779 to 7(^{\text{th}}) May 1782:</td>
<td></td>
<td><em>Edgar.</em> Surgeon</td>
<td></td>
</tr>
<tr>
<td>12(^{\text{th}}) June 1782 to 21(^{\text{st}}) December 1782:</td>
<td></td>
<td><em>Romney.</em> Surgeon</td>
<td></td>
</tr>
<tr>
<td>1(^{\text{st}}) January 1783 to 7(^{\text{th}}) April 1783:</td>
<td></td>
<td><em>Blenheim.</em> Surgeon</td>
<td></td>
</tr>
<tr>
<td>7(^{\text{th}}) April 1783 to 8(^{\text{th}}) March 1786:</td>
<td>ashore on half-pay at Hythe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8(^{\text{th}}) March 1786 to 28(^{\text{th}}) November 1788:</td>
<td></td>
<td><em>Salisbury.</em> Surgeon</td>
<td></td>
</tr>
<tr>
<td>(three limited trips each year, 1786, 87, 88: paid off 28(^{\text{th}}) November 1788)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1790 to 1807:</td>
<td></td>
<td>Physician-in-Charge, Royal Hospital, Greenwich</td>
<td></td>
</tr>
<tr>
<td>1814 to 1819:</td>
<td></td>
<td>Physician-in-Charge, Royal Hospital, Greenwich</td>
<td></td>
</tr>
</tbody>
</table>