

John Woodall (1570-1643) of the East India Company

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Abstract

Following apprenticeship to a barber-surgeon and service on the continent, John Woodall (1570-1643) joined the East India Company as its first Surgeon-General. He carried out his responsibilities to shipyard employees at Deptford and Blackwall both conscientiously and with considerable empathy. Woodall's *The Surgeon's Mate*, first published in 1617 was, in addition to being a shipboard resource for surgeons and their mates, a very early corporate training manual which, viewed retrospectively, provides unique insights into maritime medicine at the time of the Tudor/Stuart transition. He was responsible for the provision and fitting out of sea-going surgeon's chests, and included several instruments of his own devising, including a cylindrical crown blade trephine and a spatula for removing compacted faeces from the colon, in their inventories. In addition to his medical work, Woodall was a gifted linguist and willing to pursue litigation when he thought it necessary.

Keywords

John Woodall, East India Company, surgeon's chest, trephine, Paracelsianism

The East India Company

The English defeat of the Spanish Armada in 1588 provided an enormous boost to national pride and a burgeoning confidence in maritime activities; it seemed as if the Protestant God was giving His full approval to the Elizabethan cause. Concomitant innovation in naval strategy and tactics, technology (particularly the development and use of cannon) and associated improvements in ship design, led to increasing naval success; the capture of Spanish and Portuguese ships and their cargoes helped both to

fund further marine enterprise and to give increasing traction to the idea that the English could compete successfully for trade in exotic goods. At the time, access to Asian markets was dominated by the Portuguese and, to a lesser extent, the Dutch. Captivated by the potential rewards but cognizant of the potential risk, a group of merchants met on 22 September 1599. They agreed on their stated intention ‘to venture in the pretended voyage to the East Indies (the which it may please the Lord to prosper), and the sums that they will adventure’.¹ The individual subscriptions, pledged and necessary to cover the start-up costs of such a venture, varied from £100 to £3,000 and, with this joint stock ownership model in place, the group applied to Queen Elizabeth for permission to continue the venture with a capital sum of £30,133 6s 8d.² The Queen granted the group a Royal Charter on 31 December; during the following year (1600) further sums were contributed (to a total of £68,373) and the East India Company (EIC) was born.

Medical factors

Long, time-consuming voyages to the Philippine and Indonesian archipelagos and, a little later, the Indian subcontinent, together with regular armed skirmishes with pirates and established traders in the region, led to a similar suite of medical challenges as was experienced during naval voyages. Appointment of shipboard personnel effectively provided a sample of the whole range of routine non-maritime ailments experienced in the home population – infectious diseases in circulation at the time, plus a full cross-section of degenerative diseases and psychological disorders.

Travel to foreign parts and warmer climes meant that a whole range of exotic diseases and parasitic infections might also be experienced. Visits to colder latitudes might lead to frostbite and hypothermia. Victualling was a perennial problem. Both Henry VIII and Elizabeth I were notorious for the slow payment of their debts. Ships were to be provisioned with ‘flesh’, fish and beer, and the matter of scale was always a problem. The slaughter of pigs, sheep and cattle was followed by salting the meat and packing in barrels. Fish was also salted and barrelled. Non-payment of debts led to cost-cutting measures and corruption among the suppliers. Reduced meat and fish content in the barrels (some contained salt only) and inadequately preserved materials, often those which could not be sold on the open market, plus poor-quality cleaning and recycling of the barrels, led to fresh water spoiling and beer going rancid, and meant that the quality of the food available to the sailors was often poor. This in turn, especially when combined with long periods at sea, led to ‘dissolving bowels’ (diarrhoea and/or dysentery?) and a whole host of deficiency diseases, such as the dreaded scurvy.

On top of this were the various conditions that were specific to life and work aboard ship. Accidents with ropework and routine tasks led to friction burns, cuts, scrapes, breaks, bruises and other injuries, while falls from aloft could cause devastating injuries for survivors. Working with the guns led to all sorts of injury, and battle wounds, especially from flying splinters, were commonplace.

¹ Sainsbury WN. (ed). *Calendar of State Papers Colonial, East Indies, China and Japan, Volume 2, 1513-1616*. London: HMSO; 1864.

² Sainsbury. *Calendar of State Papers*, 1864 (Note 1).

Data concerning shipboard mortality during the late sixteenth and seventeenth centuries is sparse.³ Lord Howard of Effingham (1536-1624), the Lord High Admiral, wrote to William Cecil (1520-1598), 1st Baron Burghley, a few days after the defeat of the Armada in May 1588, that

Sicknes and mortallitie begin wonderfullie to growe amongste us ... the *Elizabeth*, which hath don as well as eaver anie ship did in anie service, hath had a great infectione in her from the beginning soe as of the 500 men which she carried out, by the time she had bin in Plymouth three weeks or a month there were ded of them 200 and above.⁴

Almost 600 men from a complement of 2,300 (around 26%) were lost to sickness in Drake's voyage of 1585-1586, and almost half of the 1,200 aboard his 1589 voyage. The first voyage of the EIC, led by Sir James Lancaster in 1601, included 680 men spread through four ships; 180 had died before the homeward voyage was even started and over half of the total had died before the ships had returned to England. The *Bonaventure*, while serving in Home waters in 1623, included only 70 men out of a total of 160 (44%) who were free of sickness and fit for duty. With shipboard sickness and mortality rates so high, there was clearly a need for effective onboard medical care and efficient management of medical provision at the point of embarkation.

John Woodall

Reorganisation of the EIC and associated expansion of trade in 1612, coupled with the medical requirements imposed by the levels of sickness and death discussed above, led to the establishment of the post of Surgeon-General. The first appointee to this new position was John Woodall (Figure 1).

John Woodall, son of Richard Woodall and Mary Ithell, was born in Warwick probably in 1570, although this possible date has been much disputed.⁵ In 1586 Woodall was apprenticed to the barber-surgeon Thomas Hobbins in London. He later rose through the ranks of the Barber-Surgeons company, becoming Examiner (1626), Junior Warden (1625), Warden (1627) and eventually Master (1633).

Details concerning his early life are sparse. He probably did not complete his apprenticeship, normally a period of seven years, since in 1589 he joined the regiment of Lord Willoughby (1555-1601). His duties as a young military surgeon took him on campaign in support of the protestant Henry IV of France against the Holy League (Catholic League of France) in Normandy – part of the French Wars of Religion which marked the enmity between Catholics and the Huguenots. Rather than returning home

³ Underwood EA. Naval medicine in the ages of Elizabeth and James. *Annals of the Royal College of Surgeons of England*. 1947; 1: 115-135.

⁴ Underwood. Naval medicine, 1947 (Note 3). p.119.

⁵ Kirkup J. (ed) *The Surgion's Mate, 1617 by John Woodall. Surgeon-general to the East India Company*. Bath: Kingsmead; 1978. xii; Tyrkkö J. 'Weak Shrube or Underwood': The unlikely medical glossator John Woodall and his glossary. In: McConchie R, Tyrkkö J. (eds). *Historical Dictionaries in their Paratextual Context*. Berlin: De Gruyter; 2018. p.261-283.

following the year-long conflict, Woodall remained on the continent. By his own account, he spent ‘divers yeares in travell in forraigne nations, for the gaining of knowledge and experience in calling’.⁶ It seems that Woodall lived and worked for eight years in Poland and then in Germany, possibly at Stade, a Hanseatic port near Hamburg.⁷



Figure 1. Portrait of John Woodall, line engraving by George Glover from the frontispiece of Woodall, *The surgeons mate*, 1639 (Note 6). Wellcome Collection. Attribution 4.0 International (CC BY 4.0).

Although further details are sketchy, it seems that Woodall spent more time in Poland, Germany, Holland and France, establishing medical practices from 1591 to 1599 and 1601 to 1602. In 1603 he married Sarah Henchpole and established a successful and lucrative medical practice in Wood Street in the City of London, earning a good reputation during the 1603 outbreak of plague. When James I established an embassy in Poland, Woodall joined the British delegation as a surgeon and made himself

⁶ Woodall J. *The surgeons mate or military & domestique surgery*. London: printed by Robert Young for Nicholas Bourne, and are to be sold at his shop at the south entrance of the Royall Exchange; 1639. See Preface.

⁷ Kirkup. *The Surgion's Mate*, 1978 (Note 5). xiii.

additionally useful as a translator. Here, he impressed Sir Thomas Smythe (or Smith, c1558-1625), First Governor of the EIC (1603-1621), Treasurer of the Virginia Company (1609-1620) and an active participant in the Muscovy trade. In 1612 Sir Thomas appointed Woodall to serve as Surgeon General to the EIC.

The post of Surgeon General did not prevent Woodall from also pursuing his surgical career elsewhere. While still in Poland, in 1510 he applied for a position at St Bartholomew's, the most important London hospital of the early seventeenth century, and he was appointed on 19 June 1616. Woodall attended St Bartholomew's twice a week, on Mondays and Thursdays, dividing the rest of his time between the EIC, work at Christ's and Thomas Sutton's Hospitals, and his personal business endeavours. Woodall's most famous colleague at St Bartholomew's was the physician and anatomist William Harvey (1578-1657), eight years his junior.

The Surgeon General

The duties of the Surgeon General of the EIC are outlined in *The Lawes or Standing Orders* (laws CLII to CLVII inclusive) published in 1621.⁸ These demanded that the Surgeon General and his Deputy should lodge at the shipyard so that one of them would be available to

... give Attendance every working day, from morning untill night, to cure any person or persons who may be hurt in the Service of this Company, and the like in all their Ships riding at Anchor at Deptford, and Blackwall and at Erith.

In examining the sick both on land and aboard docked ships, they were to report 'all such persons whom they shall finde decrepit, lame, uncleane or unable to the Companys service' to appropriate authorities ready for dismissal. In accordance with the Guild to which they belonged, the Surgeon General and his Deputy were to maintain respectable appearances of the workforce by cutting the hair of the various workers every 40 days. In order to make it difficult for this process to be avoided, it was to take place 'at Breakfast or Dinner times', come rain or shine, and out in the open 'where no man may loyter or lye hidden'. A levy of two pence per month was charged to the dockworkers and other personnel for these services, and seemingly paid directly to the Surgeon General. He was also required to advise the Company on the hire of 'skilfull and honest Chirurgions and their mates', training the appointees as necessary, especially in respect of the medical chests and their contents which all ships were obliged to carry. It was also the task of the Surgeon General to furnish and stock these chests, making one available at all times for dockyard use and all others available for inspection by any 'Committees, Doctors, Apothicaries' whom the Company might appoint to the task. He should also keep and present appropriate associated accounts and receipts.

In 1607 it was first reported that the Deptford Yard (Figure 2) had been secured for the EIC on a lease for an annual rent of £30. Expansion of trading activities over an increasing area of Asia required a larger fleet of ships; the ships purchased to service

⁸ Anon. *The Lawes or Standing Orders of the East India Company*. London: E. Alde; 1621.

the Company's needs early on in its history were insufficient to cope with the volume of tonnage which the EIC ambitiously envisaged handling and moves towards the freighting of chartered ships were unsuccessful. Consequently, the EIC embarked on a programme of building its own ships, which soon necessitated additional facilities. The site for the yard at Blackwall was purchased in 1614. Owning the land had the advantage that rent payment was not required, while Blackwall yard had the added benefit of lying farther downstream than the Deptford yard. This was important because at low tide the navigable channel into Deptford was barely deep enough for ships of larger tonnage whose keels scraped the bottom sediment. In the event, Deptford became the main yard for shipbuilding, while Blackwall dealt mainly with repairs. Together, however, they became major local employers; one projection in 1621 suggested that, in addition to 2,500 'marriners', around 500 general labourers and skilled craftsmen (caulkers, carvers, joiners, smiths and so forth) would be required. The Blackwall site also hosted ancillary trades, setting up iron foundries for making ship's anchors and other metal ware, spinning houses for the manufacture of cordage, and a wide range of storage facilities.⁹ Each of these activities had its own set of associated occupational hazards and diseases.



Figure 2. *The East India Company's Yard at Deptford*, circa 1683. BHC 1873, Caird Collection, oil on canvas. © National Maritime Museum, Greenwich, London.

The Surgeon General was also responsible for EIC personnel at Erith, a small port on the south bank of the Thames Estuary farther downstream from Blackwall, where in 1512 Henry VIII had opened a short-lived naval dockyard which closed in 1521. During the early seventeenth century, India-bound EIC ships were manned and stowed at anchorage there.

⁹ Chaudhuri KN. *The English East India Company: The Study of an Early Joint-Stock Company 1600-1640*. London: Routledge; 1999. p.99.

Woodall's medical credentials, previous experience, personal qualities and administrative capabilities seemed to fit him for the roles to which he had been appointed. Governance of the EIC was carried out through ten committees, each of which reported to the Court of Directors. Woodall's name makes regular appearances in the Court Minutes and the entries help to build a picture of the man who led the medical arm of the Company; they give a flavour of the work he was doing (and sometimes claiming recompense for) and the way in which he argued for better conditions for elements of the workforce, both individuals and trades. On 26 April 1633, for example, the plight of the saltpetre refiners, who were frequently ill, was brought to the attention of the Court; saltpetre (nitrate of potash, potassium nitrate, KNO_3), was a major constituent of gunpowder. The sickness experienced by the workers was believed by Woodall to be due to their starting work without a suitable breakfast. He petitioned the Court to 'allow them some hot caudles to eat before they fell to their work to keep out the steam and smoke, which otherwise will get into their stomachs and in short time kill them, their bodies being already sunk and much impaired'. On 26 September 1623, Woodall successfully claimed £4 19s 4d 'for curing John Martin, who fell from the main-yard of the *Charles* and broke his leg', while ten years later (December 1633) he received £30 after complaining that he had not been recompensed in over three years for curing

... above 50 persons, many of great diseases, as broken legs and arms, broken skulls, bones out of joint, and other great wounds and bruises, and disbursed money for their diets, paid women to attend them, and otherwise put to charge by water and land and carrying them to hospitals and curing them there.

On 2 December 1626, he sought advice over 'persons lately hurt in the *Jonas* by that unhappy accident of powder' being 'directed to endeavour their speedy cure', and in the same month was ordered to treat 'Andrew Anderson, who in weighing an anchor of the *Jonas* broke his leg', and 'Anthony Noke, mariner, who was dangerously wounded in a cruel fight in the *Star*, and lost the use of one of his legs'; gratuities were ordered to be paid to these unfortunate patients.

Litigation

Woodall was not above criticism. Indeed, he seems to have possessed an argumentative and aggressive streak. The Court Minutes for 23 February 1625 record that Woodall had been 'remanded to prison by the Lord Steward, to the hazard of his utter undoing'. Sir Humphrey Handford (1565-1625), one of the founders of the Merchant Company and a Sheriff of London, asked the Company to work on securing Woodall's release. However, since

It was conceived that this last commitment was through some private enemies of Woodall, and though the Court desired his release they willed he should use his own best means first, and if that succeed not they will move the Lord Steward for his release.

Late in 1637, Woodall complained to the Court of Chivalry that a fellow barber-surgeon Richard Morris ‘at the Court of Assistants in the hall of the Company of Barber Surgeons in London ... had struck him with his fist and said that he “was a knave, a scurvie rascall, and that I lyed”, which was provocative of a duel’. A preliminary hearing, finding that there was a case to answer, placed Morris in custody. In a counter suit, Morris claimed that Woodall had accused him of lying ‘like a base stinkeing fellowe’. The occasion was the swearing in of a new Master at the Company. Woodall remonstrated that he had been provoked by Morris’s actions – striking him on the head and hurling insults at him. Morris responded that he knocked Woodall’s hat off since the gathered company was standing bareheaded as a mark of respect for the reading of the Oath of Supremacy, during which ceremony Woodall was asleep. The proceedings further raised the spectre of a drunken duel which Woodall supposedly fought with a Polish gentleman while on military service with Lord Willoughby.

The Surgion’s Mate (1617)

As a medical man, John Woodall is perhaps best known through his publications. The earliest of these was *The surgion’s mate, or A treatise discovering faithfully and plainly the due contents of the surgions chest* first published in 1617, with a second, enlarged folio edition in 1639 (Figure 3) and a third edition in 1655, twelve years after his death.¹⁰

Woodall gives the impression that writing the book was a matter of expediency and efficiency rather than a duty imposed on him by the EIC, writing ‘being wearied with writing for every Shippe the same instructions a new, I held it my best course to put them in print, which done, will serve ... till some of deeper judgement write better’.¹¹ Adopting a modestly self-effacing and somewhat deprecating stance, and being conscious of his lack of formal training, he writes as ‘a weak shrube or underwood, desirous to be shrouded from terrible blasts by great Cedars’.¹² He clearly wanted to cultivate the highest standards in those to whom he was writing – a sense of high calling, responsibility, careful maintenance of shipboard hierarchical discipline and protocol, adaptability and the determination to make the most of all opportunities for learning and self-improvement

In his summary of the duties of the surgeon’s mate as he saw them, Woodall noted their first responsibility was to God and then to the chief surgeon ‘towards whom he must be carefull to behave himselfe wisely, lovingly, and diligently’. He should ensure that the contents of the surgeon’s chest were in a constant state of organised readiness for immediate use (‘Plasters spread, Splints armed, Needles prepared ...’) and should be solicitously proactive rather than merely responsive in his approach to his potential patients (‘daily to visite the Cabines of men, to see who hath any sicknesse or Imperfection’). In addition to reading, Woodall recommended that ‘knowledge in his

¹⁰ Woodall J. *The surgions mate, or A treatise discovering faithfully and plainly the due contents of the surgions chest*. London: Printed by Edward Griffin for Laurence Lisle, at the Tygers-head in Pauls Church-yard; 1617.

¹¹ Woodall. *The surgions mate*, 1617 (Note 10). See ‘To the Benevolent Reader’.

¹² Woodall. *The surgions mate*, 1617 (Note 10). p.6.

Recognised as one of the first corporate training manuals in existence,¹³ *The Surgeon's Mate* is also the first book-length work in English dedicated to maritime and tropical medicine.¹⁴ Space precludes deeper analysis here but the volume reveals some interesting insights into Woodall's progressive and humane approach to contemporary medical problems and practice. Despite his lack of formal medical training, Woodall seems to have been well read, drawing on the works not only of classical authors including Dioscorides and Galen and those from the medieval Arabic tradition (Avicenna and Mesue), but also his immediate intellectual predecessors including William Clowes (1544-1604), Jacques Guilliemau (1550-1613), Jean de Renou (1568-c. 1620), Johann Wecker (1528-1586) and Paracelsus (1493-1541), along with contemporaries (William Harvey). He also collected information and receipts 'from learned Physitians, and expert Surgeons amongst my good friends heere and there as I could gather them'.

Woodall's own experience was also brought to bear, the whole intended to establish a comprehensive approach to the care and treatment of the sick under the aegis of the EIC surgeons and their staff. Among the medical receipts and comments on surgical interventions are some innovative suggestions. He brought focus to bear on the problem of scurvy, 'this lamentable disease', commenting on its nature, supposed cause, signs and symptoms and possible treatments. After many suggestions, he concluded that 'bitter and sower medicines preuaile most to the cure of this greefe', especially 'Iuce of Lemons, of Limes, Citrons, and Oringes'.¹⁵ The EIC generally adopted Woodall's advice, at least up to 1625, and a special order for lemon juice to supply their fleet was placed in February 1627,¹⁶ but a dispute with the supplier subsequently led to new arrangements being made.¹⁷

Woodall was also an innovator of surgical instruments and techniques. He invented a cylindrical crown blade trephine, something like a hole saw, which was used to cut a circlet of bone from the skull. The circular blade of the trephine was steadied against the potentially slippery skull by means of a centre guide pin, and the blade itself was tapered to prevent inadvertent invasion of the dura mater and armed with teeth that would permit cutting in both directions. The T-shaped handle was fashioned in a 'crane's wings' style¹⁸ and allowed the instrument to be used with only one hand, leaving the other free to be used to steady the patient or hold the head. They also contained levators with which to pry up the depressed components of the skull fracture. Woodall illustrated the instrument itself in the second edition of *The Surgeon's Mate* (1639), together with

¹³ Tyrkkö. 'Weak Shrube or Underwood', 2018 (Note 5). p.272.

¹⁴ Churchill WD. Bodily Differences? Gender, Race and Class in Hans Sloane's Jamaican Medical Practice, 1687-1688. *Journal of the History of Medicine and Allied Sciences*. 2005; 60: 391-444.

¹⁵ Woodall. *The surgions mate*, 1617 (Note 10). p.77 & 201.

¹⁶ Keynes J. John Woodall, Surgeon, his Place in Medical History. *Journal of the Royal College of Physicians of London*. 1967; 2: 16-33.

¹⁷ Carpenter K. *The History of Scurvy and Vitamin C*. Cambridge: Cambridge University Press; 1988. p.21.

¹⁸ González-Darder JM. *Trepanation, Trephining and Craniotomy: History and Stories*. Cham: Springer Nature; 2019. p.115-116.

a diagram of it in use; he offered the sage advice that the procedure should be practiced on a calf's skull before trying it on a human patient (Figure 4).¹⁹

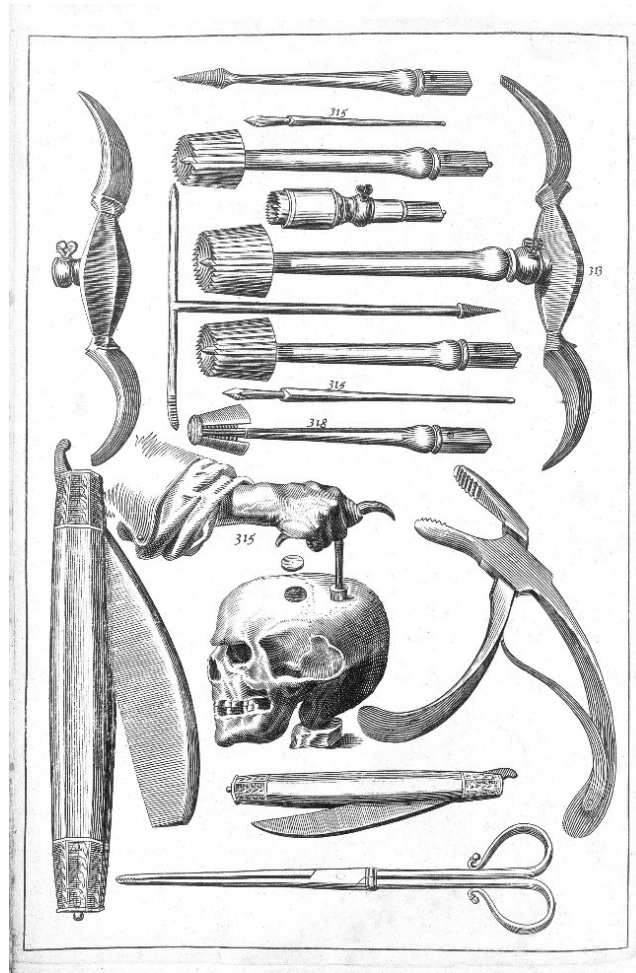


Figure 4. Trephining instruments from Woodall, *The surgeons mate*, 1655 (Note 38). Woodall's trephine is labelled 313. Wellcome Collection. Attribution 4.0 International (CC BY 4.0).

Woodall also commended 'an instrument newly devised by me selfe' – the 'Spathula mundani'.²⁰ This was to be employed in cases of 'extreame costiveness', a condition which he indicates 'often happeneth to sea men'; if compacted faeces in the colon could not be dislodged or dispersed through the use of laxatives and purges, their presence 'so inflameth, and excoriateth, yea and sometime putrifieth the Arse-gut' that it could lead to the death of the patient. Woodall's instrument was around 15cm long. One end was flattened and spatulate, used for mixing medicines, while the other was

¹⁹ Woodall. *The surgeons mate*, 1639 (Note 6). p.317.

²⁰ Woodall. *The surgeons mate*, 1617 (Note 10). p.14.

slightly spoon-shaped, perforated, and terminated in a knob; once greased and slightly warmed, this was inserted into the anus and used to draw out the faeces.

Amputation was normally either carried out by cutting through living tissue above the necrotic zone (giving rise to a dangerous amount of bleeding), or by successive cauterisations of any gangrenous tissue using a red-hot poker until living tissue was reached, as indicated by the patient feeling the pain of the cauterisation. Woodall advocated amputation close to the border between the healthy and mortified tissue, or *sphacelus*, and boasted that he had successfully taken off hundreds of limbs and appendages in this way without the death of a patient.

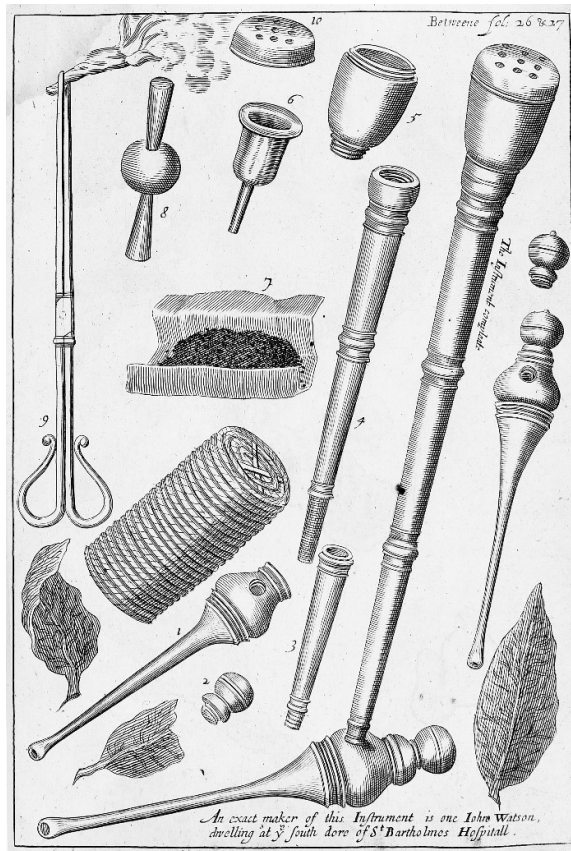


Figure 5. Woodall's *Enema fumosum* from Woodall, *The surgeons mate*, 1655 (Note 38). Wellcome Collection. Attribution 4.0 International (CC BY 4.0).

Keynes indicates that Woodall was also the inventor of the *Enema fumosum* or fumous glister (Figure 5) but comments that 'this curious product of Woodall's brain need not be taken too seriously'.²¹ The instrument had seven components and was designed to deliver a 'Glister of smoake'. Woodall commended it as being 'most comfortable, pleasant, profitable and easier to be perceived', useful in curing 'many grievous infirmities' in both domestic and military settings, especially iliac passion

²¹ Keynes. John Woodall, 1967, (Note 16). p.29.

(obstruction), ‘gripings, tortions’ and ‘other distempers of the bowel’.²² The instrument was used to deliver medicinal vapours of tobacco, nutmeg, myrrh and a variety of other, mostly aromatic materials.

Surgeons' Chests

Woodall was responsible for the EIC surgeons' chests. It seems, however, that he was furnishing such chests even before he joined the EIC as Surgeon General. During his lifetime, Woodall invested in the EIC, Virginia and Somers Island Companies. The Virginia Company received its charter in 1609 and Woodall was active in the shipping of medical materials on their behalf. Indeed, the records of the Virginia Company show that in May 1609 ‘George Liste servant to John Woodall’ was ‘sent ouer by him with a Chest of Cheurgery sufficiently furnished’;²³ the chest was received at Jamestown. Excavations at Jamestown have yielded an example of Woodall’s *spatula mundani* and a trephine blade and shaft.²⁴

Fulfilling his duties on appointment as Surgeon General of the EIC, John Woodall proceeded to compile lists of instruments and medicines for surgeons’ chests, and to develop a system of regulations concerning their use which he presented formally in *The Surgion’s Mate*.²⁵ The question of the detailed recommended contents of the surgeons’ chests expanded to include input from apothecaries, surgeons and physicians from 1620 onwards.²⁶ Quality control was becoming a problem; in 1615 the EIC received a complaint from one particularly irate captain that the drugs in his onboard chest were woefully substandard; some had rotted, others were made of ‘kitchen stuff’, and others were mis-labelled (their labels indicated several different drugs, yet all the contents were identical). Clearly, some improvement in quality control was required. From February 1620, two physicians, Drs Torye and Raven, were appointed to monitor the completeness and quality of the chests and their contents, with Woodall providing the materials, before they were sealed and sent to Gravesend for loading aboard ship.

After a period from 1623 onwards, when it was decided that all the contents should be provided by a single apothecary appointed by the EIC, things quickly got very complicated, and the competing interests of the many parties involved made it difficult

²² Woodall. *The surgeons mate*, 1639 (Note 6).

²³ Kingsbury SM. *The Records of the Virginia Company of London. Volume 3, Documents 1*. Washington: Library of Congress; 1933. p.23.

²⁴ Historic Jamestowne 447-JR and 41-GS, respectively. Nathalie P. & Alan M. Voorhees Archaearium Archaeology Museum, Jamestown Rediscovery, Historic Jamestowne Visitor Centre, 1368 Colonial Parkway, Jamestown, Virginia 23081, USA; Kelso W, Straube B. *1996 Interim Report on the APVA Excavations at Jamestown, Virginia*. Richmond: Association for the Preservation of Virginia Antiquities; 1997. p.20; Bruwelheide KS, Owsley DW, Straube BA, May JE. Evidence for Early Seventeenth-Century Surgery and Dissection at James Fort, Virginia. In: Nystrom, KC (ed), *The Bioarchaeology of Dissection and Autopsy in the United States, Bioarchaeology and Social Theory*. Basel: Springer; 2017. p.41-60. See Figs. 3.8b & d.

²⁵ Woodall. *The surgions mate*, 1617 (Note 10).

²⁶ Appleby J. New light on John Woodall, surgeon and adventurer. *Medical History*. 1981; 25: 251-268.

for Woodall to exercise his duties.²⁷ In 1626, the Company of Barbers and Surgeons was paid a fixed allowance of £10 per chest to supply the needs of both the Army and the Royal Navy; Woodall was asked to supervise the system. An economically favourable working solution to the difficulties within the EIC was achieved in 1629 – ‘it was resolved to rely on the honesty of Woodall and the judgement of the Surgeon that examined them’.²⁸ Woodall continued to make up the chests and to supply the materials for them, sometimes having to appeal to the Council of the EIC for payment of outstanding debts for the service. The supplying of these chests was a good source of income for Woodall; even when he was dismissed from the EIC for reasons of economy in 1635, he retained his monopoly of supplying the Company with medical chests until his death in 1643.

The chests themselves have received detailed consideration elsewhere.²⁹ So far as I am aware, none of Woodall’s original chests have survived to the present day. In order to accommodate the list of items insisted upon by John Woodall, each chest, probably wooden and iron-bound, must have been substantial. The separate Plaster Box was effectively a first aid kit containing three plasters and eight instruments – including forceps, spatulas, lancets, needles, and a uvula spoon. The plasters varied in type but often were designed to treat wounds, burns and scalds, pain and skin complaints (including symptoms of sexually transmitted diseases). The Salvatory contained ointments separated into eight separate compartments; the individual preparations were chosen for their efficacy in treating burns, scalds, wounds, sores, ulcers, abscesses, fistulas and the like, and also in some cases for their analgesic properties. The Barber’s Box contained all the instruments needed for hair trimming and shaving, as well instruments for cutting corns, completing dental work and cleaning wax from the ears. Larger pieces of medical equipment including close stools, scales, mortars and pestles, cupping glasses, were probably also kept separate.

The chest itself contained a specially arranged set of surgical instruments housed in the lid – items for cutting, drilling, dismembering, cauterising, opening, exposing, holding and probing. (Figure 6). Altogether, the chest and associated plaster box probably held at least one hundred surgical instruments.³⁰ The main body of the chest was divided into three compartmentalised layers and used for storing medicines. A folding plan gives an idea of the arrangement (Figure 7).³¹ Two hundred and seventy animal, vegetable and mineral materials are identified, 170 of which were designated named compartments in the upper and lower layers; the middle layer must have accommodated the remaining 100 or so items.³²

²⁷ Appleby. *New light*, 1981 (Note 26).

²⁸ Appleby. *New light*, 1981 (Note 26). p.256.

²⁹ Longfield-Jones GM. John Woodall, Surgeon General of the East India Company. Part I: Events Leading to Woodall’s Appointment. *Journal of Medical Biography*. 1995; 3: 11–19; Longfield-Jones GM. John Woodall, Surgeon General of the East India Company. Part II: A consideration of the provision made for treating injuries and diseases at sea. *Journal of Medical Biography*. 1995; 3: 71-78.

³⁰ Kirkup. *The Surgion’s Mate*, 1978 (Note 5). xviii.

³¹ Woodall. *The surgeons mate*, 1639 (Note 6).

³² Kirkup. *The Surgion’s Mate*, 1978 (Note 5).

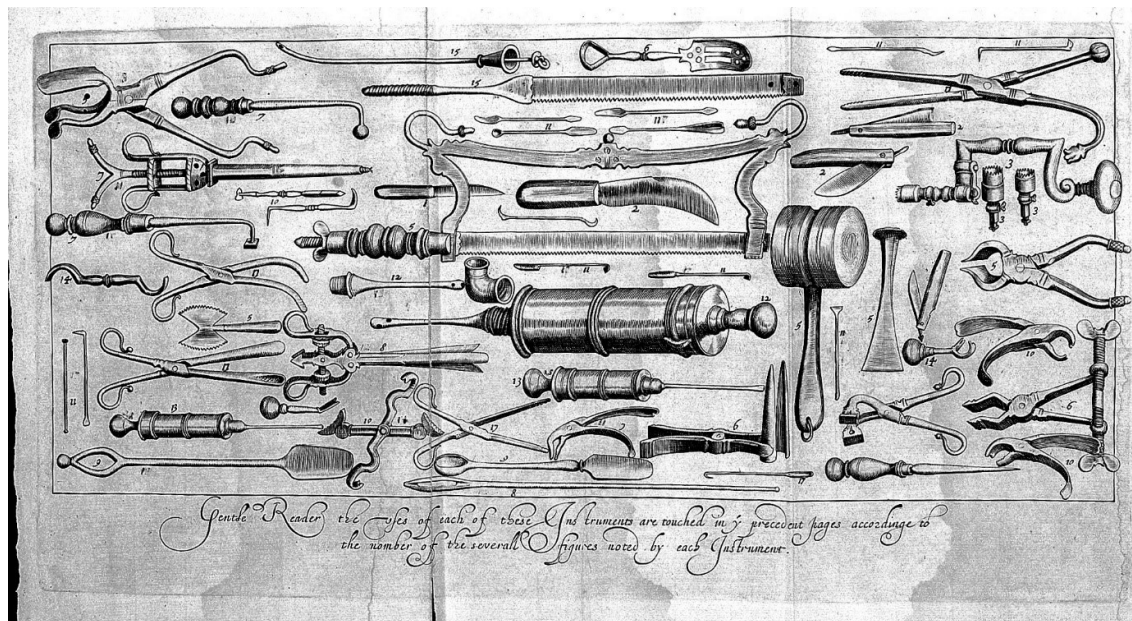


Figure 6. Surgical instruments from Woodall, *The surgions mate*, 1655 (Note 38). Wellcome Collection. Attribution 4.0 International (CC BY 4.0).

Woodall recognised that some medicaments commonly used ashore were not suitable for use at sea, and that those that formed part of the surgeon's dispensatory varied in terms of how long they could be stored before spoiling. Indeed, as part of his advice to the young surgeon about keeping a journal, he suggested they keep a note of 'what medicines keep their force longest, & what perish soonest'.³³ Many (107) of the medicaments stored in the chest were Galenic simples, conveniently stored in dried form and used to balance the humors, usually according to the Aristotelian system of opposites. Euphorbium, for example, is described as being 'hot and drie almost in the fourth degree ... whereby tough and cold phleame with choller, and water are taken away'.³⁴ The various leaves, seeds, flowers, roots, barks, gums and mineral and animal materials employed in this way generally had long histories of use stretching back to classical times.

Compound medicines including unguents, oils and electuaries must have been prepared ashore by an apothecary. Some were very complex concoctions, often with much redundancy incorporated, but highly revered because of their associations and histories. They were often seen as alexipharmics. Examples include the *Aqua coelestis* of Pietro Matthioli (1507-c1577) – 'a principall Antidote or preservative against all poisons ... so that either recieved into the body, or but onely smelled unto, it helpeth very much against infections' – plus a variety of theriacs and Mithridatium.³⁵ Woodall pointed to the extremes of temperature, poor diet, variable constitutions and dispositions

³³ Woodall. *The surgions mate*, 1617 (Note 10).

³⁴ Woodall. *The surgions mate*, 1617 (Note 10). p.95.

³⁵ Woodall. *The surgions mate*, 1617 (Note 10). p.54.

of the men under testing and dangerous conditions of physical hardship, plus the 'venemous vapours and euill dispositions of the air' which prevailed at sea, as being combatted and eased by such preparations.³⁶

Electuarium Diatrion piperion.	Pulvis re- string. mi- nus.	Ung. con- tra ignem.	Unguen- tum Mar- tium.	Vng. Dia- pomphe- ligos.	Elect : Diafor- dium.	Mel Depura- tum.	The lowest part of the Chest.	Lixiri- um capi- tale.	Syrupus Rosarum.	Balsa- mum ar- tific.	Oximet.	Acetum Rosarum.	Aqua Ab- sinthii.	Aqua Rosa- rum rub.					
Theriaca Diatess.	Vnguentum Dialthea.	Axungia Cervi.	Vnguentum Egyptia- cum.	Vng. Au- reum.	Conser- Rosarum.	Rhabarb. elect.		Oleum Lilium.	Oleum Limon.	Mel Rosarum.	Oleum cha- momili.	Oleum Rosarum.	Aqua Angelica.	Aqua plantag.					
Theriaca Lond :	Vnguentum Albom.	Axungia Percina.	Vnguentum Potabile.	Linam. Arcti.	Conser. Barbar :	Conser. Frucl- torum.		Acetum Rosarum.	Oleum Terchin.	Ol. Lum- bricorum.	Oleum Sambaci :	Oleum Anethi.	Aqua Ly- moniorum.	Aqua Car- dii bened :					
Terebinth. Venetia.	Vnguentum Papaleon.	Vnguentum Arragon.	Vnguentum Pectorale.	Oleum Lauri.	Conser. Cidonio.	Pulpa Tamarin- dorum.		Oleum Scorpio.	Oleum Petre- oli.	Ol. Lum- bricorum.	Oleum Abinthii.	Aqua Ci- namomi.	Succus Ly- moniorum.	Aqua Mentha.					
Vnguentum Basilicon.	Vnguentum Aposoloru.	Vnguentum Aureum.	Vnguentum Al.Camph.	Vnguentum nirium.	Vnguentum Dialthea.	Vnguentum Populeon.	Vnguentum cons. igne.	Vnguentum Pectorale.	Vnguentum Potabile.	Vnguentum Arragon.	Vnguentum Mariatum.	Linamen- tum Arcti.	Mel Sapa- nis.						
Vnguentum Egyptiac :	Syr. Rosarum.	Syr. Viola- rum.	Mel Rosarum.	Mi- sibri- dat.	Dia- for- dium.	Conf. Hama- mech.	Crocus Mart.	Pilula Cochia- gia.	Rha- barba.	Agri- cum.	Mam- mia.	Aloes.	Myr- rha.	Maf- stich.	Cam- phora.	Troch- Alba.	Lique- ritia.	Vnguentum Dispan- pholis.	
Axungia Porci.	Syr. Papa- veris.	Syr. Lique- ritia.	Mel Rosarum.	Theri- aca. Pen- Londi :	Theri- aca. Londi :	Dia- for- dium.	Conf. Alker- mes.	Pilula Agreg.	Cam- bogia.	Scamo- nium.	Sper- maCati.	Terra Sigil- lata.	Merca- Subli- mat.	Praci- pit.	Euphor- ium.	Pul- Bene- dictus.	Argen- tum vivu.		
Axungia cervi.	Syr. Limo- nior.	Syr. Frucl.	Syr. Diam.	Elect. de ovo.	Land. opiat.	Dia- catha- licon.	Elect. Diatr. Piper.	Pillu. Enpha.	Pillu- Ancea.	Sibi- um.	Opium.	Crocus.	Bolus verus.	Cina- brum.	Hiera- picra.	Sal Ni- tri.	Sal Abfin- thii.	Tutia T.T.	Vng. contra scorbuto.
Species Di- atrion pipe- rion.	Species Di- atesseron.	Terebinth : Clara.	Conserua Rosarum.	Conserua Anthos.	Conserua Barberoru.	Conserua Fruclloru.	Conserua Cidonio.	Pul. rostrin- gens major.	Pulvis Arthreicus.	Pulpa Tamarind.	Succus Liquiritia.	Mithridat.							

Loving Reader, this explanation is more for putting the Artific in memory
of what may be then of what must be in his Chest; for although there
may seeme many particulars, yet there wanteth at the least forty
more, that may not in true method be omitted in a due pro-
portion; as namely, all the instruments for manuell
uses and operations, all the most usefull of which
are expressed in an Index following the Pre-
face in the beginning of the booke.

Place this Chest, betwixt Fol. 26 and 27.

Figure 7. Layout of the interior of the surgeon's chest from Woodall, *The surgeons mate*, 1639 (Note 6). Wellcome Collection. Attribution 4.0 International (CC BY 4.0).

The first preparation cited by Woodall is the *Emplastrum stipticum Paracelsi*, a plaster designed by Paracelsus (1493-1541) to treat a variety of wounds and skin conditions.³⁷ This colourful pioneer of iatrochemistry poured scorn upon the traditional Hippocratic treatment of balancing the humors using a variety of techniques, including bleeding, purging and the use of medicinal simples whose qualities or 'vertues' were carefully judged. Instead, he believed that the therapeutic essence of various medicinally useful materials should be released by alchemical means from the useless dross surrounding them, resulting in purified materials whose dosage could more easily be standardised. Paracelsus also introduced the concept of three principles, namely sulphur, mercury and salt, spiritual elements which he believed invested all material things and determined their properties and compositions. Woodall was clearly much engaged with

³⁶ Woodall. *The surgions mate*, 1617 (Note 10). p.58 (mis-numbered p.44).

³⁷ Woodall. *The surgions mate*, 1617 (Note 10). p.40.

Paracelsus's ideas, appending some theoretical notes, poetry, and a very useful (to later researchers trying to understand alchemical texts) table of alchemical symbols to his work (Figure 8). These contributions were expanded in the second (1639) and third (1655) editions of *The Surgion's Mate*.³⁸ He also recommended several additional recipes for powders and opiates from the works of Paracelsus, as well as referring to the work of his followers including Oswald Croll (c1563-1609), Josephus Quercetanus (Joseph Duchesne, c1544-1609) and Martinus Rulandus (Martin Ruland the Younger, 1569-1611).³⁹ Indeed, Woodall recommends that all 'Chirurgions ought to be versed in ... the Chymick Art, or the Art of Alchymie'.⁴⁰

260		CHARACTERS.	
Terra.		Earth	Commonly taken for potters earth to make Lute of.
Tigillum.		A melting pot	A pot wherewith Gold-finishs and other Artifts use to melt metals or medicines in, called also a Crucible.
Talcum.		Talke	This minerall is scarce well known yet, the oyle thereof is much extolled for beautifying the skinne.
Tutia.		Tutty	A medicine commonly knowne, and is made of the fume of Copper, or of Copper by combustion.
Tartarus.		Argall	Is the Lees of wine dried, which makes many profitable medicines, artificially prepared.
Tumores.		Tumors	And also any Apoptum or swelling, wherefoever in mans body.
Turbith Minerall.		Turbith Minerall	This with some additaments artificiall, well prepared, is precious in the cure of the French pox.
Ulcus.		An Ulcer	This is the ancient Character for an Ulcer, & some Authors, have used the same for a wound.
Vitriolum.		Coppra	It is best which is made of Copper.
Vitrum.		Glasse	It is used for a Glasse Still, and also for any other kinde of glasse.
Vrina.		Vrine	Mans urine or childrens urine, it is commonly used in Alchymie, and some use it in fomentations, and otherwise in Chirurgery and Physicke.

Figure 8. Page of alchemical symbols from Woodall, *The surgeons mate*, 1617 (Note 10). Wellcome Collection. Attribution 4.0 International (CC BY 4.0).

³⁸ Woodall. *The surgeons mate*, 1639 (Note 6); Woodall J. *The surgeons mate or military & domestique surgery*. Printed by Iohn Legate, for Nicholas Bourne, and are to be sold at his shop at the south entrance of the Royall Exchange; 1655.

³⁹ Debus AG. John Woodall, Paracelsian Surgeon. *Ambix*. 1962; 10: 108-118; Debus AG. *The English Paracelsians*. London: Oldbourne; 1965.

⁴⁰ Woodall. *The surgeons mate*, 1639 (Note 6). p.234.

Final Remarks

The Surgion's Mate was not Woodall's only publication. *Woodalls viaticum: the path-way to the surgions chest* was a specialist treatise on wounds written for military surgeons engaged in the contemporary war against France.⁴¹ That and his *Treatise of gangrena* were both issued as part of the second and third editions of his seminal work.⁴² The following year he published a chapbook entitled *The cvre of the plague by an antidote called aurum vitæ* which promoted a remedy of his own design.⁴³ This 'Cordiall Powder made of Gold' was fashioned according to a secret recipe – one of the tell-tale signs of a quack nostrum – and harkening back to Woodall's days on the Continent, where he resided with a landlord in Holland who 'earned a dishonest living by making mithridate of nine instead of seventy-five ingredients and by concocting a false Venice treacle put up in pewter boxes'.⁴⁴ Woodall sold the *aurum vitæ* on his return to London, and left instructions in his will for its disposal.⁴⁵ The cure was supposedly very gentle in its effect, being only mildly sweat-inducing (sudorific) and, besides curing cases of the plague in only 24 hours, it was supposedly also to be effective against a variety of fevers, smallpox and agues. Preparations were credited with a shelf life upwards of seven years, and were advertised as being safely tolerated by young, old and even pregnant women.⁴⁶

In conclusion, John Woodall was an important character in maritime medical history at the time of the Tudor/Stuart transition. A man of many talents, at the same time as keeping a proprietary eye on the secret recipe of his *aurum vitæ*, plus the production and distribution of preparation, he carried out his duties as first Surgeon-General of the EIC with administrative acumen. Also a man of contrasts, his empathetic approach to those directly and indirectly under his care was counterbalanced by an aggressive and litigious streak. At different times a foreign adventurer, linguist, diplomat, physician, administrator, author, inventor, innovative surgeon and Paracelsian, John Woodall's life took many twists and turns but his enduring legacy, *The Surgion's Mate*, was a ground-breaking compilation which did much to influence the progressive professionalisation of the shipboard surgeon and equip him for his duties. Woodall's influential manual for EIC surgeons was an indispensable asset to those who relied upon it and has been recognised as one of the 'epoch-making books' in British Surgery.⁴⁷

⁴¹ Woodall J. *Woodalls viaticum: the path-way to the surgions chest*. Imprinted at London; 1628.

⁴² Woodall. *The surgeons mate*, 1639 (Note 6).

⁴³ Woodall J. *The cvre of the plague by an antidote called aurum vitæ*. London: Printed by E.P. for Nicholas Bourne; 1640.

⁴⁴ Tyrkkö. 'Weak Shrube or Underwood', 2018 (Note 5). p.263.

⁴⁵ Appleby. *New light*, 1981 (Note 26). p.258.

⁴⁶ Woodall. *The cvre of the plague*, 1640 (Note 43).

⁴⁷ Power, D'A. *Epoch-Making Books in British Surgery*. 5. *The Surgeons Mate* by John Woodall. *British Journal of Surgery*. 1928; 16, 1-5.

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