

# John Woodall, Surgeon, his place in medical history

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I believe that none of my predecessors has ventured to devote a Fitzpatrick Lecture to the life of a surgeon, nevertheless medicine and surgery are not so strictly divorced as to disqualify a surgeon from being celebrated in the College of Physicians. I am sure that Dr Thomas Fitzpatrick would not have disapproved. He was a man of wide interests and sympathies, as Dr Newman made clear in his *Unofficial Fitzpatrick Lecture* in 1958. Medical history knows no boundaries, and I am anxious to demonstrate that both medical and surgical disciplines were faithfully served and advanced by John Woodall, whose place in history has never been fully realised. Others have written of him, notably Sir Norman Moore, Sir D'Arcy Power, and Colonel Donald Macdonald, but no one has emphasised sufficiently the importance of his contribution, made nearly 350 years ago.

The basic facts of Woodall's life have long been established, chiefly by Sir Norman Moore. He was born in Warwick about 1556 (the exact year is not known) and lived until 1643, so that his life spanned nearly 87 years. The greater part of this long period was devoted to his profession. The volume of his collected writings published in 1639 contains a contribution by his friend, George Dunn, a Warden of the Barber-Surgeons' Company, who recited some of the facts of his life in doggerel verse. Woodall also referred in his own writings to various incidents in his career. As a young man he was a military surgeon, serving under Lord Willoughby de Eresby in the wars of Henry of Navarre at Dieppe and elsewhere, in 1589. He then lived for a time in Poland and in Germany. His knowledge of the languages of these countries led to his acting as interpreter to an embassy sent by Queen Elizabeth to Stoad (? Stade) in North Germany, and a few years later, for the same reason, he was sent by King James to Poland on public business. Woodall also told how he resided for a time in Holland in the house of a Dutchman who lived by making counterfeit drugs such as mithridate and Venice treacle. This man confessed to Woodall that his mithridate had but nine simples in it, and that he 'had pewter boxes marked so artificially as no man could discover them to be other than right Venice ones'.

Woodall was therefore a much travelled and experienced man of affairs when he returned to London in 1599 and was admitted to the Barber-Surgeons'

Company. He claimed that during his many years abroad he had acquired exceptional experience in treating bubonic plague, primarily in order to make a living. In the course of this he had invented a specific remedy for plague containing gold, called *Aurum vitae*. Of this he kept the secret. During the great plague in London, in the first year of King James's reign, he remained at his post and was available to all who needed his help. He was there also during the later visitations up to 1638, when he was rewarded with special certificates by authorities in Westminster and Northampton testifying to the efficacy of his remedy. It was no doubt profitable to be able to peddle a reputed remedy for plague, a disease for which the combined experience and resources of the Fellows of the College of Physicians had never been able to find any satisfactory treatment.

Meanwhile British enterprise was busy exploiting the rewards of trading in commodities obtained from the East Indies, China and Japan in competition with the Dutch. Trade also developed with America and the West Indies in competition with the Portuguese and the Spaniards. It soon became evident that co-operation among the English merchants was greatly needed, and in 1599 an Association of Merchant Adventurers was formed. This body was given a fifteen years' Charter by Queen Elizabeth in December 1600, and nine years later a second Charter granted by King James made their privileges permanent. The first Governor of the Company was a wealthy merchant, Sir Thomas Smith, a patron of John Woodall. The first fleet set out for the East Indies in December 1600 under the command of Captain James Lancaster; it consisted of four ships, each carrying two surgeons and a barber. Life at sea on the long voyages to the East round the Cape of Good Hope was very hard, the provision of suitable food and enough fresh water being almost impossible. It was therefore of the greatest importance to have adequate medical and surgical aid, and it became essential to have some sort of organised medical service with an individual as administrator. So, in 1613 John Woodall was chosen by the Company as their first Surgeon-General 'for all their employments as well by sea as by land'. His duties were laid down in *The Lawes and Standing Orders of the East India Company*, printed in 1621. The first two paragraphs are as follows:

'The said Chirurgion and his Deputy shall have a place of lodging in the Yard, where one of them shall 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 an Anchor at Deptford and Blackwell, and at Erith, where hee shall also keep a Deputy with his Chest furnished, to remaine there continually,

untill all the said ships be vayed down from thence to Gravesend.

They shall also cut the hayre of the Carpenters, Saylor, Caulkers, Labourers, & any other Workmen in the Companies said Yards or Ships, once every forty dayes, in a seemely manner, performing their works at Breakfast and Dinner times, or in raynie weather, & in an open place where no man may loyter or lye hidden, under pretence to attend his turne of Trimming.'

The Surgeon-General was also to detect any man who was unfit for duty, being decrepit, lame or unclean, with a view to his dismissal. As a reward he was to have twopence a month out of the wages of all the men employed. One cannot imagine Woodall cutting the hair of his labourers; probably this was done by his Deputy. Another important duty was, 'ordering and appointing fit and able Surgeons and Surgeons' Mates for their ships and services, as also the fitting and furnishing their Surgeons' Chests with medicines instruments and other appurtenances thereto'. He therefore reduced their Chests into an order and method, this, he said, never having been done before. In addition, he made it his duty to protect his employers from engaging impostors under the name of surgeons. He soon realised that 'the surgeons of the younger sort', that is, the newly trained men and the surgeons' mates, or unqualified assistants, lacked any means of learning the use of new medicines and inventions, since no one had written about them. To this end he composed his first book, *The Surgion's Mate*, published in 1617.

There can be no question but that Woodall was in this way performing a public service of great importance. For the first time the young surgeons and their assistants were provided with a practical textbook standardising their medical and surgical equipment and giving instructions for its use. He gave wise counsel also as to their keeping a journal with clinical notes, and taking care to have all equipment in good condition. Rusty instruments, needles, lancets and razors with no edge would be prejudicial to good work. Woodall also begged his youths to observe St Paul's advice to keep their tempers when serving 'froward Masters'. He knew too much 'of the great harm that hath ensued by the dissension of the Surgeon and his Mates in long voyages, the which with discretion and love might have been prevented, if but one of them both had been wise'. This seems to imply that Woodall had himself made one or more of the long voyages to the Indies and back. His appointment as Surgeon-General would have been most suitable if he had personal experience of the difficulties to be encountered, but there is no direct evidence that he had in fact done this.

It is clear from the numerous references in the Court Minutes of the

Company that Woodall had no light task in trying to give satisfaction in the quality of the men that he provided to take charge of the health of the ships' companies and of the materials provided in the surgeons' chests. Training of the men was exceedingly sketchy in the early seventeenth century, and there must have been many opportunities for the apothecaries to economise by providing drugs deficient both in quality and quantity. Consequently a system of viewing the chests before they were sealed and sent aboard ship was instituted. Sometimes this was done by Woodall himself, but already in 1615 a letter was received from an irate ship's captain who had arrived at Saldania in the Indies. He had done well to get there in 91 days despite 23 days of contrary winds, but he complained that Woodall was guilty of great abuses in the surgeons' chests. He had included a number of boxes of one drug when according to their labels there should have been several different kinds. Some drugs were rotten, others were made of 'kitchen stuff'. Woodall was also accused of thrusting boys with no skill into the position of surgeons, and so was to be accounted guilty of the death of all the men that perished by his default. It looks as if Woodall's shoulders were made to bear the blame for the shortcomings of others, and that young surgeons often learnt in the hard way by experience, their patients sometimes suffering in the process. The same thing has been known to happen even in modern times, when inexperienced surgeons have had to improvise under conditions totally different from anything they had seen at home.

It is, of course, possible that Woodall was not too scrupulous in making up the chests, since he was not paid for their cost immediately, sometimes not until months later. Thus, in August 1615 he was paid for the chests supplied to the last eight ships. On other occasions there was £40, £50, or even as much as £100 due to him for outlay on chests.

An attempt was made to deal with complaints about drugs by asking a distinguished Fellow of the College of Physicians to view the drugs supplied, or even by calling in the Master and Wardens, both of the Barber-Surgeons and of the Apothecaries to make a report. This was in 1620; yet in the later part of the same year the Company's Bantam ships were stated to be ill provided with necessaries. In addition, the surgeon in one ship, the *Bear*, and the surgeons' mates in the fleet as a whole were said to be 'good for nothing, nor understood anything belonging to surgery'. Woodall was wronging the Company by sending out imperfectly trained men, who affirmed moreover that they were bound to give him two-thirds of their wages. This last charge was quite untrue, and in 1621, Woodall asked for his accounts to be audited and said he wished to answer any complaints against him in open court.

In February 1624 some of the surgeons were being examined in order to

judge their proficiency, but Woodall regarded this as insulting, answering that the surgeons of the fleet were, certainly by this date, experienced men who had made many voyages and performed many extraordinary cures. They would scorn to be examined. He claimed that all surgeons returning from the Indies with good reputations should not be questioned, but agreed that when new unknown men were introduced, they should be examined. He was naturally affronted a few days later when an order was issued for surgeons appointed to the fleet to attend on Dr Atkins, a Fellow of the College of Physicians. He suppressed the order on the grounds that it was improper for 'a surgeon's proportions to be set down by a physician, this not being proper to their art'. Woodall was obviously finding that the demand for adequately trained men exceeded the supply. In 1624, having been again warned to meet the Court to clear doubts about employing unskilful surgeons, he agreed that any who came home without leave or that ran away should forfeit their wages and, in addition, be liable to pay for their passage and victuals homeward.

In spite of these recurrent complaints Woodall retained the confidence of the Company. It is natural that when things went well this was taken for granted, without comment. Indeed, an order, made in 1619, that he was to have two months' pay yearly of all his servants' wages in the Indies, was confirmed in 1627. He was therefore entitled to one-sixth of their pay, not the two-thirds of which he had been accused. After all, his salary as Surgeon-General was only £30 a year, and even this was reduced to £20 in 1629.

Another source of income as Surgeon-General was the fees paid for attention to individual servants injured on board ship or in the dockyards. Thus, in 1623, he was paid £4 19s. 4d. for curing John Martin, who fell from the main yards of the *Charles* and broke his leg. Usually, however, he had to ask for payment. In 1627 he presented a petition showing that formerly he had been allowed a labourer's pay in Blackwell Yard and 2d. per month out of every workman's wages there for curing and healing those hurt. But he had received nothing for three years past. The Court gave him £30 in settlement. On one occasion, in 1623, he was given £20 for treating a Scotsman wounded in the fighting at Amboyna and was also reimbursed for another £20 lent to the injured man. This he did not seem to expect, and was correspondingly gratified. Again, in 1630 he was given a gratuity of £20 for extraordinary service in treating divers of the Company's servants.

In 1635, when he was nearly 80, Woodall was discharged from his post because the Company had to economise, but he continued to provide the surgeons' chests. Even as late as 1642 he was accused 'of new boiling the salves again and so to make the Company pay for them twice'.

In 1643 he resigned, but asked for a gratuity to ease his necessities due to his old age. He was now about 86, and died in August of that year. The Court voted that he should not be given anything. Evidently they were aware that he was a bit of an 'old soldier' and was not so poor as he pretended. Indeed, one way and another he had been able to set aside considerable sums of money. Already in 1620 he was able to invest £1000 in the Company as Adventurer, and he also had large interests, described as 'chargeable and constant adventures', in the Virginia plantations.

#### SCURVY AND ITS TREATMENT

An important aspect of Woodall's thirty years' service as Surgeon-General to the East India Company was his knowledge and treatment of scurvy. It is hard to know just at what point in time the use of fruit juice in the prevention and treatment of scurvy came to be understood. The earliest use of the word scurvy, as the name of the disease recorded in the Oxford Dictionary, is in 1565, and it occurs frequently in the accounts of later voyages, such as those of Sir John and Sir Richard Hawkins to the West Indies in 1593 and of Sir James Lancaster in 1601. Sir Richard Hawkins gave a good description of the disorder with all its salient characters in 1593, with the opinion that it was caused primarily by eating meat seethed in sea water, but already in 1590 Hawkins had a clear idea of how to treat it and even to prevent it. The chief methods consisted in keeping the ships clean, avoiding as far as possible salt meat and salt fish, wet clothes and bedding, and keeping 'the company occupied in some bodily exercise of work, of agility, of pastimes, of dancing, of use of armes'. He also gave them bread with wine or beer early in the morning. He concluded, however, 'that which I have seen most fruitful for this sickness is sour oranges and lemons'. Later in the same year, 1590, he described how his men, when sickening with symptoms of scurvy, 'at the sight of the oranges and lemons seemed to recover heart'. 'This', he added, 'is a wonderful secret of the power and wisdom of God, that hath hidden so great and unknown vertue in this fruit to be a certain remedy for this infirmity.'

If so distinguished a leader as Sir Richard Hawkins could speak in this authoritative manner as early as 1590, the virtues of orange and lemon juice must have been common knowledge among those undertaking long sea voyages both before and after this date. The ravages of scurvy among seamen had been so frightful that it seems extraordinary that so little notice had been taken of it by medical writers. In 1617, however, within four years of his appointment to the Company, John Woodall had set himself to remedy the state of ignorance by means of his book, *The Surgion's Mate*. In his Preface to the section on scurvy Woodall justly remarked that:

‘It is strange in so many ages past, that no one Chirurghion of our countrymen hath out of his experience taken in hand sincerely to set downe to posterities the true causes, signes and cure thereof, neither left any instructions, caveats, or experiences for the prevention or cure of the same; yet it may be some may say the cure thereof is common, and we have in our owne countrey here many excellent remedies generally knowne, as namely Scurvy-grasse, Horse-reddish roots, *Nasturtia Aquatica*, Wormwood, Sorrell and many other good meanes; the truth is we have so, but marke how farre they extend, only to the cure of those which live at home, or else it may be said, they also helpe some Sea-men returned from farre.’

He concluded that it would be a waste of time to write of remedies that could not be had at sea.

Woodall’s description of the signs and symptoms of scurvy is full and he misses nothing of importance. It may be read with as much profit as in the pages of Osler’s *Principles and Practice of Medicine*—perhaps even with more profit, owing to the vivid and picturesque language he employs. His account of scurvy is, indeed, so explicit that it is difficult to believe that he had not himself attended sufferers on some long voyage. He would at any rate have seen many seamen arriving home in various stages of the disease, so that he could properly claim special experience in treating them. Also, he noted that a fever contracted at sea commonly ended in the development of scurvy, and therefore warned against too much purging or blood-letting, both of which could make the disease much worse. ‘I speake this’, he says, ‘because I have noted there is a fault in young Surgeons of forwardness in taking too much blood at sea.’ He had noticed the enlargement of liver and spleen so often seen, and therefore subscribed to the view that scurvy came by an obstruction of the spleen and accumulation of melancholy humours. Yet he admitted wisely that, ‘the causes are so infinite and unsearchable as they farre pass my capacity to search them all out’. Lack of vitamins was indeed a cause ‘infinite and unsearchable’ in 1617. Others had attributed the depression arising from cares and grief as a cause, but Woodall emphasised that scurvy is ‘a lazy foul disease’; lassitude and depression were, in fact, symptoms rather than causes. He shrewdly advised his young surgeons ‘morning and evening to seeke for weake and poore men in their cabins, or so soone as they are missing at messes to inquire for them’, so that treatment might begin forthwith. Woodall quoted earlier writers who had insisted on the general principle of providing the patients with a plentiful diet of fresh food, but pointed out the difficulty of fulfilling this condition at sea.

Once the depression and weakness had given the clue to the diagnosis of

scurvy, Woodall gave various minor remedies such as an oatmeal caudle, a little beer or wine sweetened and warmed, a comfortable broth made with currants and other fruit, spices, barley water and so forth. Finally, he recommended juice or syrup of lemons, and here is the core of the matter. His words must be quoted to give the full force of his insight:

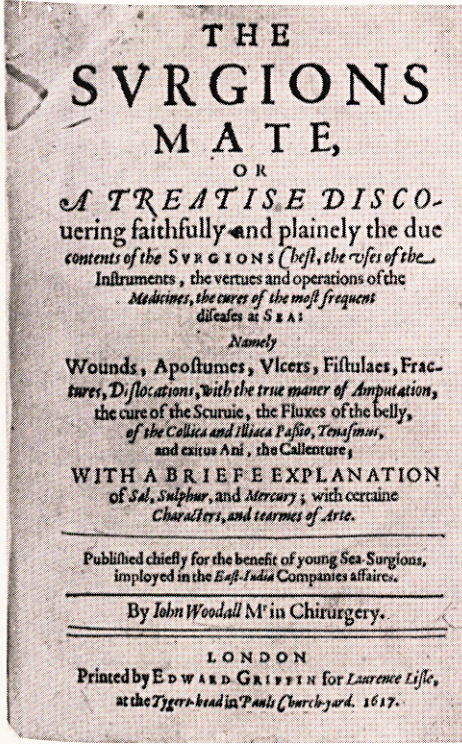
‘The Chirurgeon or his Mate must not fail to perswade the Governour or Purser in all places where they touch in the Indies and may have it, to provide themselves of juice of Oranges, limes or lemons, & at Banthame of tamarinds. . . . And further experience teacheth that where a disease mostly raigneth, even there God hath appointed the best remedies for the same grief, if it be his will they should be discovered and used: and more for substance, the Lemmons, Limes, Tamarinds, Oranges, and other choice of good helps in the Indies which you shall finde there shall farre exceede any that can be carried thither from England, and yet there is a good quantitie of Juice of Lemmons sent in each ship out of England by the great care of the Marchants . . . The use of the juyce of Lemmons is a precious medicine and well tried, being sound and good; let it have the chief place, for it will deserve it.’

After giving details of how the juice should be administered, Woodall added: ‘I dare not write how good a Sauce it is at meat, least the chiefe [cook] in the ships waste it in the great Cabins to save vinegar.’ The lemon juice sent out in the ships by the merchants probably refers to ‘lemon water’, that is an alcoholic extract of lemons, not so effective as actual lemon juice.

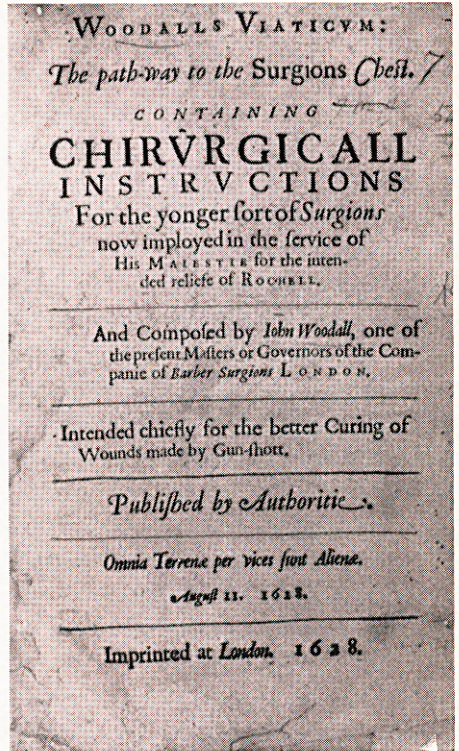
Woodall naturally did not neglect symptomatic treatment and was well aware of the troubles caused by diarrhoea or constipation. For the latter, in particular, he gives detailed instructions for the use of clysters, laxatives, suppositories and so on, but warns against strong laxatives, particularly when ‘the Intestinum rectum or Arse-gut’ is excoriated or inflamed. For extreme constipation he even invented a special instrument called by him *Spatula Mundani* for gently drawing out the excrements. For this purpose the spatula should first be warmed and oiled. He had himself seen on several occasions this extreme costiveness, which might actually cause the patient’s death through gangrene of the rectum and haemorrhage.

These remedies for scurvy Woodall thought not amiss to publish, though admonishing young men to be wise and careful to make right use of them. Yet modesty enjoined that, ‘for the elder sort of grave Artists I crave their charitable censures of my weake or undigested instructions, which I no way meane to them, but to Babes in Chirurgery, and so I conclude to the honour of the Almightye concerning the scurvy for this time’.





Title Page of *The Surgions Mate*,  
published 1617.



Title Page of *Woodall's Viaticum*,  
published 1628.

Woodall had certainly convinced the East India Company of the importance of providing plenty of lemon juice for their seamen. The Court Minutes for February 9 1627 record that a special order for lemon juice was made, the want of which might endanger the whole fleet. It seems that Woodall himself had failed on this occasion to provide enough, since he was much blamed for not speaking more timely.

Woodall's *Surgions Mate* with his account of scurvy was reprinted in his collected works of 1639 and 1658, but the original edition of 1617 is extremely scarce, only two copies existing in the United Kingdom. Another book, *Woodall's Viaticum: The Path-way to the Surgeon's Chest*, 1628, is known only in a single copy. It contains instructions for the treatment of gunshot wounds, and was written for the young surgeons attending the troops sent out in 1627 under the Duke of Buckingham in an unsuccessful attempt to effect the relief

of Rochelle. The present rarity of these books suggests that they were read and used up by the young men for whom they were intended. The quotations from Woodall's writings on scurvy were made to demonstrate beyond doubt that he was the first medical man to compose an adequate and convincing account of the problems posed by the disease, based on extensive personal experience.

The subsequent history of scurvy must be dwelt upon because it is an outstanding example of the extraordinary way in which knowledge can sometimes pass out of currency, and established facts be ignored. Even during the latter part of the seventeenth century no medical writer after Woodall gave a clear-cut description of the disease or had any idea of really effective treatment. So great a clinician as Thomas Willis betrayed a hopeless confusion as to the signs, symptoms and treatment of scurvy. In a long and learned tract devoted to scurvy, published in 1667, the clear outlines of the disorder are lost in a cloud of theory and verbiage concerning a mass of signs belonging to a variety of diseases. He even believed that scurvy could be inherited or contracted by contagion. The essentials are there if pains be taken to extricate them from the general welter of signs and symptoms quoted, but it would have puzzled any contemporary physician to arrive at a firm diagnosis of scurvy on the basis of Willis's clinical merry-go-round. His account of treatment is little better. Severe purging and phlebotomy, both explicitly condemned by Woodall, formed the basis of his method. Polypharmacy run mad was then decanted down the patient's throat, remedies from powdered crabs' eyes to conserve of damask roses being confidently recommended. The rind of oranges made into a conserve finds a mention, and orange juice is slipped into a mixture of vegetable juices, but it seems to be there almost by accident. Prominence is given to the 'Orange Tablets sold in the Apothecaries' Shops in Oxford'; the numerous ingredients of these would have made a delicious sweetmeat, but any antiscorbutic properties would have been lost in the process of boiling the mixture into a tablet. Willis mentioned many earlier authorities, but Woodall is not among them. Thomas Sydenham avoided Willis's clinical confusion by not attempting to deal specifically with scurvy in his main writings; it appears only incidentally in a small posthumous volume ascribed to him. Martin Lister regarded scurvy as closely allied to venereal disease, but was nearer the mark than most writers on the subject in strongly recommending juice of scurvy grass, lemons, oranges and other kinds of fruit for treatment.

No improvement in medical knowledge is to be found during the first half of the eighteenth century. Meanwhile seamen and soldiers were dying in thousands from true scurvy in all parts of the world. Lord Anson's circum-

navigation of the globe in 1744 resulted in the death of 620 out of 921 sailors. At times it was difficult to find any men on one of his ships with the strength to rig the sails. The wisdom of our Ancient Artist was sunk without trace and an incalculable amount of suffering had been the inevitable result.

At length, in the very middle of the eighteenth century, it fell to the lot of James Lind to redress the balance. He was a Scottish naval surgeon and, later, Fellow of the Edinburgh College of Physicians. Born in 1716 he entered the navy as surgeon's mate in 1739 and served for nine years on board ship, being promoted Surgeon to H.M. 4th-rate ship *Salisbury* in 1747. He retired in 1748 and devoted himself to medical studies and writing until 1758, when he became physician to the new Naval Hospital at Haslar. It was his personal experience of the ravages caused by scurvy that caused him to write his celebrated monograph on this disease, having made a special study of it during his eight month's cruise in the *Salisbury* in the English Channel. His book, first published in 1753, is rightly regarded as a classic in its own right and the bicentenary of its publication was celebrated in this country only fourteen years ago. Lind's book is indeed a splendid factual study of a subject that had long needed the light of day. The first edition was dedicated most suitably to Lord Anson, who had lost 75 per cent of his men in 1744 through ignorance of the elementary facts about scurvy. Lind provided an account of those who preceded him in writing on scurvy, and he has been praised by his recent editors for his 'meticulous care in checking his references and giving credit to other workers'. So, even in 1953, Lind's most glaring error remained undetected. He had quoted many unimportant authors, but had totally ignored John Woodall, who had written the first and most illuminating account of scurvy nearly 150 years earlier. In the third edition of Lind's book in 1772 there is evidence that Woodall's name had become known to him, but it was only as author of a passage quoted by another writer in 1764, 'from a book published about 1639'. This he had certainly never read. Lind was undoubtedly a modest man, and only once complained of neglect because his name was not mentioned in a tract of 1767 as having invented a method of freshening sea water by simple distillation. In fact, this had been done by Sir Richard Hawkins in 1590, recorded in his *Observations* published in 1622.

Lind has been praised also for conducting a 'controlled experiment' of a primitive kind. On May 20 1747 he chose twelve comparable patients with scurvy while on board the *Salisbury* at sea. They all had the same diet in the sick bay. In addition, two were given a quart of cider a day. Two took 25 drops of *elixir vitriol* three times a day on an empty stomach, and used an acidulated gargle. Two took two spoonfuls of vinegar three times a day on an empty stomach. Two of the worst-affected patients drank half a pint,

more or less, of sea water a day. Two ate two oranges and one lemon each day upon an empty stomach for six days, by which time they had been given all that could be spared. The two remaining patients took an electuary made of garlic, mustard seed, radish root, balsam of Peru and gum myrrh, with barley water acidulated by tamarinds and cream of tartar as a laxative. The not unexpected result was that the two men who had eaten oranges and lemons quickly recovered, and one of them was set to nurse the other ten, none of whom had shown any appreciable improvement. The numbers of patients in this controlled experiment are not impressive. Woodall would have smiled. His controlled experiment consisted in personal knowledge of hundreds of patients who had died for lack of oranges and lemons, and of others who had avoided or been cured of scurvy by taking the fruit or its juice.

Nevertheless, Lind had written a fine book and demonstrated to a larger public than ever before the inescapable truth regarding scurvy and its proper treatment. It might have been thought that his work would have quickly revolutionised the prophylaxis of scurvy by wholesale provision of fresh fruit juices in the navy, but it was not so. Administrative torpor saw to it that a regular allowance of lemon juice to men remaining at sea for more than six weeks was not established until 1795, a time lag of 178 years after Woodall's first demonstration of the facts. Even Lind's principles tended to be diluted by administrative convenience or parsimony. Both Woodall and Lind knew that limes and lime juice were not as good as oranges and lemons, yet limes became the official standard, so much so that to this day Englishmen are known to Americans as 'limeys'.

#### WOODALL THE SURGEON

Before his appointment as Surgeon-General to the East India Company Woodall had been looking round for a surgical post in London, and at the beginning of 1610 had applied for the appointment in reversion as surgeon to St Bartholomew's Hospital. He had the support of the Lord Mayor and was duly given the place. Appointment in reversion meant that it was to be available when the position next fell vacant, the holder designate being expected to take over when the actual holder was unable to do his duties. It was six years before Woodall's opportunity arrived. In April 1616, Richard Mapes, the senior surgeon, resigned his office through ill health, and on June 19 Woodall was duly elected. His duties as laid down in 1626, were to attend every Monday and Thursday at least to dress his patients and to oversee his servants. Some of the governors were asked to attend on Thursdays to see this done. At the end of 1619 Woodall took up residence in Little Wood Street as a tenant of the Governors of the Hospital, moving from Broad Street

where he had written *The Surgion's Mate*. He therefore joined the staff of the Hospital six and a half years after Harvey, and some months after Harvey's appointment to the office of Lumleian Lecturer at the College. Woodall was twenty-two years older than Harvey, but as a Barber-Surgeon was of inferior status and, even in his own environment, did not enjoy a comparable prestige. He did not become a Warden of the Company till 1627, or Master till 1633. He was, however, a man of great experience in his own branch of medical practice and claimed for himself the title of Artist. Yet he knew his place, and in the Preface to his first book of 1617 discussed by what name the Artist should properly be called. 'The more learned', he wrote, 'are justly stiled by the title of Physicians, and the more experienced sort are called Chirurgions or Surgeons; by means whereof sometimes there hath growne difference and offence, which I do advise each discreet Surgeon to avoid, and that they give the Physician his due honour and precedence, comparisons being odious and unmannerly amongst good men.' Woodall was not, therefore, going to cause trouble in the Hospital. Yet he put in a strong plea for allowing the surgeon to practise the whole of medicine and surgery combined, pointing out that the surgeon was responsible for the health of soldiers and sailors in camps and ships, where physicians and apothecaries were not allowed by King or merchants to set foot. It was surely illogical to attempt to limit the surgeon's activities and yet to put him in a position where he had to carry the whole responsibility, 'wherefore', he said, 'it were a very ungodly thing, and in reason most unjust, to forbid a surgeon to learn all or anything that concerneth his calling: and all those that are of opinion to hinder a surgeon from using outward and inward medicines, have quite misconstrued Hippocrates and Galen, shewing themselves enemies to art, reason and true experience.'

Woodall, as a reasonable man, admitted later in the argument that, 'it is expedient and just, where learned counsel may be had, to make use of it, for that by much counsel there is safety: nevertheless know, that it is uncharitable to forbid an expert surgeon at any time or in any place, the use of the instruments and medicines which are necessary to his art for the curing of his patients'.

Woodall had given expression to an old grievance in a moderate and dignified way. Four years later, in 1621, he joined with his colleagues at St Bartholomew's, including William Clowes, and eight other surgeons in presenting to the House of Commons a petition protesting against the monopoly of medical practice in London possessed by the College of Physicians and of their power over the surgeons. This move by the surgeons caused considerable anxiety to the Fellows of the College, for it threatened their

prestige and touched their pockets. Harvey was very active in the conflict but it was not until 1627 that the College obtained a verdict in favour of their monopoly with a new Royal Charter to confirm it. In 1633, Harvey, about to go on travels with the King, enforced the authority of the physician in his



John Woodall, from *The Surgeon's Mate*, 1639.

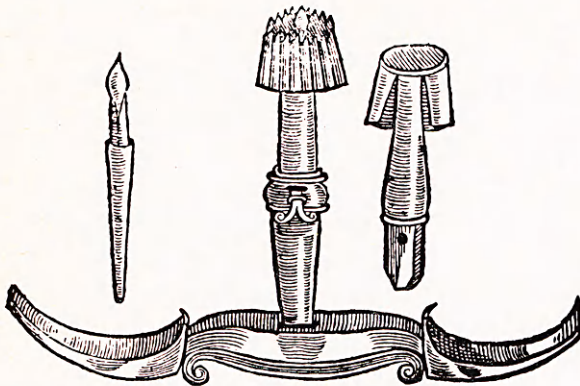
own hospital by a set of very severe regulations for holding the surgeons in subservience. These were approved by the Governors, and it is to Woodall's credit that we do not hear of any quarrels in the hospital during the rest of his term of office. On more than one occasion the surgeons were given special bonuses for their care of the patients, and in 1637 Woodall asked that his son, Thomas, should have the reversion of a place on the staff. John Woodall held his place until he died in 1643, but it was not his son who succeeded him, though he had been admitted to the Company of Barber-Surgeons and was conducting a private anatomy in 1648.

It is probable that Woodall and Harvey respected one another. Ignorance of Latin was the common ground for despising the Barber-Surgeon, but this could not apply to Woodall. He was a cultivated man with his knowledge of European languages, and could quote the classics with the best of them.

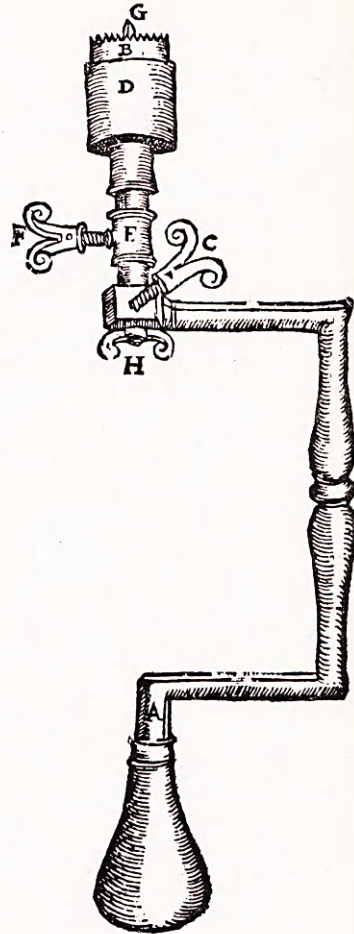
Woodall's writings show him to have been a very practical surgeon with an inventive turn of mind. To his collected works of 1639 he added a section on gangrene and the amputation of the resulting dead tissue, or *sphacelus*, as he called it. Of the cause and prevention of gangrene he had little to contribute, but criticised the conventional method of treatment because it was done either by cutting through the healthy tissue beyond the mortified area, resulting in much loss of blood, or by cauterising the dead tissue with a red-hot iron until the patient felt the pain of it. He condemned both methods. By the first, many patients died from loss of blood, the second was terrible and cruel. About the year 1617, soon after his appointment to the staff of St Bartholomew's, it occurred to him that to remove the dead tissue close to its margin would be both bloodless and painless, and accordingly he practised this method for the rest of his time at the hospital. He had, he said, taken off or helped to take off many more than a hundred legs and arms besides many hands and fingers without causing the death of any patients. He admitted that the best Artists, while dressing the patients, did have ready as a safeguard a small cautery in case there were an unexpected flux of blood. Yet this styptic cautery would seldom be needed.

The rules for amputation, Woodall said, were: first, never to perform it without getting a second opinion; second, never to wait too long; third, to obtain the patient's agreement; fourth, not to operate without having had adequate experience as an assistant; fifth, to take care to have ready everything that could be needed; sixth, to call upon God for a blessing on the surgeon's endeavours. His whole description is full of good sense and advice based on experience with acute observation. It proves him to have been a careful and competent surgeon.

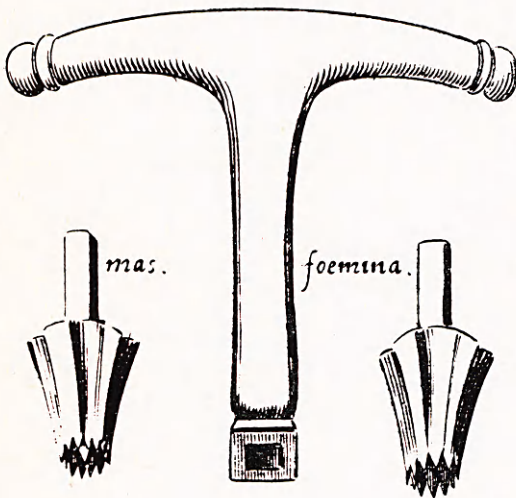
On the instrumental side there are but two inventions to be put to his credit. The first is the *Enema Fumosum*, or fumous glistler. This preposterous instrument he introduced into his collected works in a semi-humorous fashion, describing it by means of a dialogue between the author and his brother, a military surgeon. They discourse rather in the manner of Izaak Walton, Piscator, and his friend, Venator, and take some time to arrive at the core of the riddle, namely the introduction into the intestine of the smoke or vapours of various substances, such as tobacco, nutmeg, aniseed, myrrh, aloes and so on. The parts of the instrument are illustrated by an engraved plate, though no very clear idea is conveyed of how the vapour is to be



The trepan as illustrated by Helkiah Crooke, 1631.



Paré's trepan, 1582.



Fabricius's trepan, 1647.

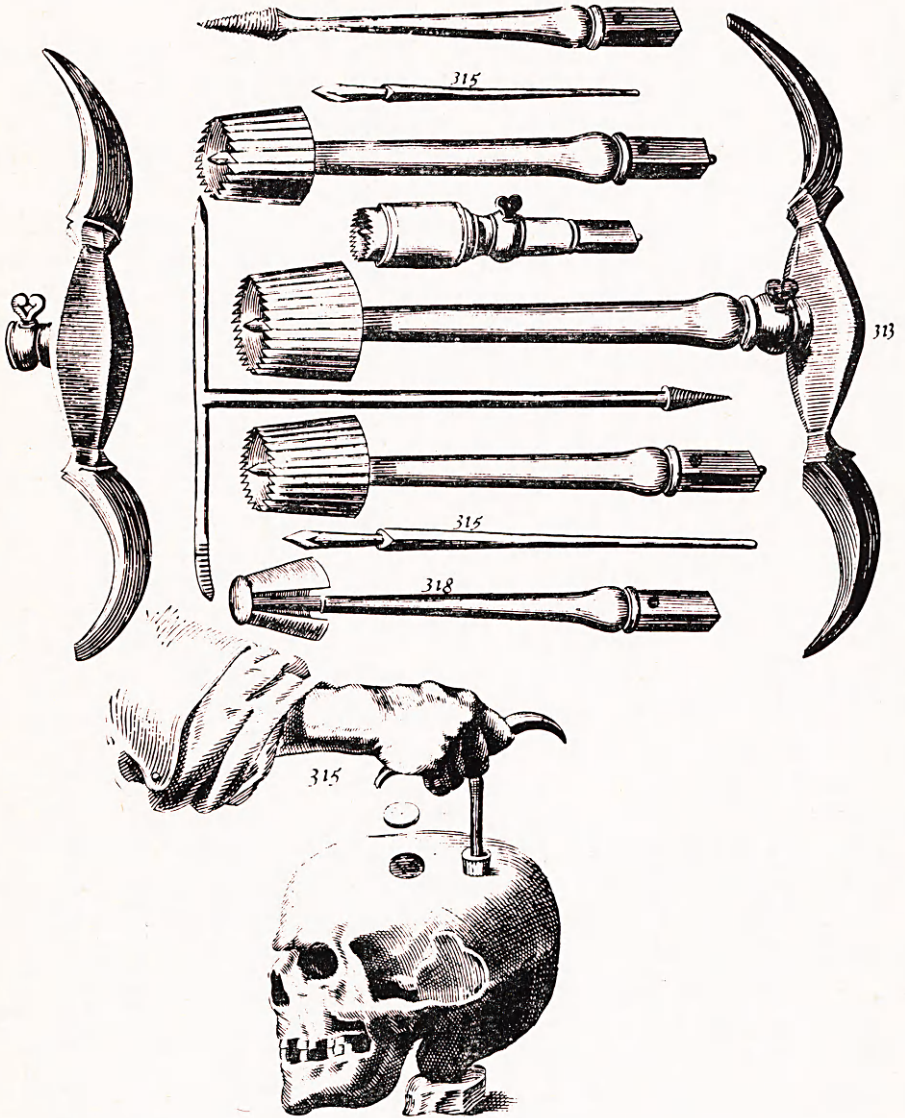
inflated into the patient's gut or of what results may be expected therefrom. He asserted in a Latin sentence at the end of the dialogue that the purpose and results of the fumous glistler would beyond doubt become manifest in the future, so this curious product of Woodall's brain need not be taken too seriously.

His second invention is a very different matter, for his claim is to have fashioned for the first time the modern trepan. Up to the end of the sixteenth century and well into the seventeenth the standard instrument for cutting a hole in the skull was the trepan in the form devised by Ambroise



Paré. It resembled a carpenter's brace with a toothed cylinder as the bit. The cylinder was provided with a removable central pin to fix the bit while it was starting its circular groove, and with a cuff to limit the depth to which the bit would cut. When Paré's textbook of surgery was translated into English and published in 1634, the translator inserted a short account of the trephine, saying: 'I have thought fit to give you the figure of that Trepan [meaning trafine] that is here most in use, and the fittest therefore as it is set forth by Mr Dr Crooke'. The reference is to Helkiah Crooke's *Microcosmographia, A Description of the Body of Man*, second edition, 1631. Here in a section on surgical instruments derived from Paré is a description of 'another of Trepan or Trefine now generally in use amongst our London surgeons'. Crooke does not claim the invention, or attribute it to anyone else. He merely says it was in general use in London. So in 1639 Woodall published for the first time his description of the *Trafine*, claiming in the clearest terms that it was his invention and first used by himself. He gives no date for this, but presumably it was during the 1620s, since Crooke described it as well known in 1631. Woodall's claim is so positive that there can be no reason for doubting its truth. No one has ever cast doubt on it or made a counter-claim. Woodall states not only that he invented the instrument, but that he also gave it the name of *Trafine*, deriving the word from *a tribus finibus* in reference to the three ends that it possesses. He provided an excellent engraving of his trafine, from which it may be seen to have a principle totally different from Paré's trepan. It was worked by a to-and-fro movement of the hand, the teeth cutting both ways as the instrument was rotated. The other essential change was to make the cutting part tapered instead of cylindrical; this modification ensured that the instrument jammed as soon as the inner table of bone was penetrated, so safeguarding the dura mater from injury and making a limiting cuff unnecessary. The central pin was still needed, but could be removed when the outer table had been cut through. The operator could tell precisely when the cut was complete, and the circle of bone came away in the head of the instrument when it was raised. The other two ends of the Trafine were to be used as bone elevators, one smooth, the other rough, since the common use of the trafine was for making holes close to depressed fractures of the skull. Paré's trepan with its brace pressed on the skull by the operator's chest was a clumsy and dangerous instrument compared with Woodall's trafine.

Possibly the germ of Woodall's idea is to be seen in an instrument first obscurely described by Fabricius ab Aquapendente in 1619, though not illustrated until 1647. Woodall might have heard of it, but probably not. In any case this form of trepan, as Fabricius still called it, was very different from Woodall's much more advanced pattern. The handle was made of wood,



Woodall's trafine, from *The Surgeon's Mate*, 1639.

and the crown tapered in a hollow curve. Its shape suggests that it could be a very dangerous instrument.

Examination of later works on surgical instruments shows that the credit due to Woodall for his innovation was quickly forgotten, together with the meaning of the name he gave it. Even Lambert Rogers, writing on the history

of craniotomy in 1930, had obviously never heard of Woodall or appreciated that there was any essential difference between a trepan and a trafine, or trephine, as it came to be called. The author can recall being instructed in the proper use of Woodall's trafine more than fifty years ago, but without reference to the originator, who had described it so carefully nearly 300 years earlier.

This account of Woodall's career and writings has, it is hoped, demonstrated that his place in medical history is of great importance. He was one of the earliest medical administrators as organiser of a rudimentary medical service for ships at sea. He was the first medical writer to provide a good textbook designed for the instruction of the younger men in the service. He was an innovator in the safe and humane treatment of gangrenous limbs. He was the inventor of the trephine, used by generations of surgeons until quite recent times. Above all he was the first medical man to write a clear account of scurvy, the scourge of the early voyagers, and to insist on the effectiveness of lemon juice in its prevention and treatment. The lines of the portrait engraved in 1639 suggest that he had a keen and practical intelligence, making him fully worthy to associate with William Harvey as a colleague at their hospital. He was not just a medical carpenter. He was an innovator in both the major branches of his calling.

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