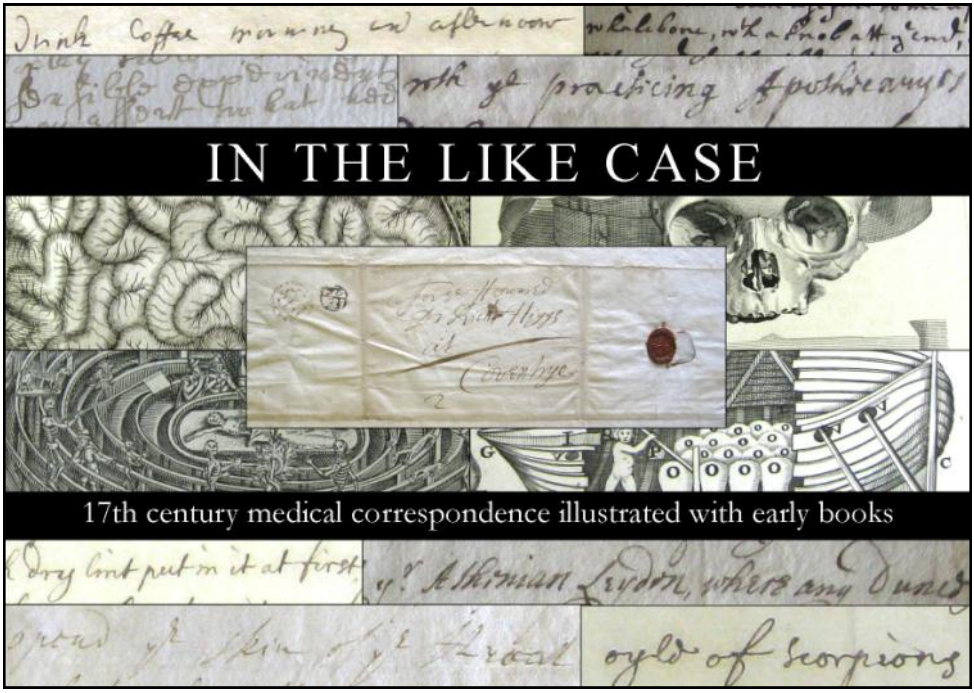
Library Exhibition



Dramatis Personae

William Cole (1635-1716): Physician in Worcester. Author of a treatise on the secretions of animals.

Sir John Floyer (1649-1734): Physician in Lichfield. Author of works on asthma, therapeutic bathing, and enthusiast for taking a patient's pulse.

Richard Higgs (ca. 1632-1690): A physician in Coventry. Supplier to the pesthouse there.

Richard Lower (1631-1691): Physician in London. Author of a major work on the heart and circulatory system, performed the first successful blood-transfusion on two dogs.

Walter Needham (1631?-1691?): Anatomical lecturer to the Company of Surgeons. Author of a work on foetal anatomy.

Henry Sampson (1629-1700): Historian of the dissenters and physician to non-conformists in London. Contributor to the *Philosophical Transactions of the Royal Society*.

John Wilkins (1614-1672): A cadaver. Once Bishop of Chester. Founder member of the Royal Society. Popularizer of Galileo. Creator of a universal language.

Thomas Willis (1621-1675): Physician in Oxford. Associate of Messrs Boyle, Wren, Locke, Hooke. Writer of pioneering work on the brain. Sedleian Professor of Natural Philosophy at Oxford.

The Medical Correspondence of Richard Higgs

Gathered together in a single album kept here in the Library are a selection of letters from numerous key figures of the late 17th century flowering of scientific and medical thought and discovery that took place in Oxford. All of these letters are addressed to Dr Richard Higgs, and yet, for an associate of such illustrious figures, Higgs himself is elusive in the historical record. Originally from Gloucestershire, he appears to have matriculated at Queen's College in Oxford in 1642 at around the age of 17, before embarking on medical training at Hart Hall, to graduate DM in 1659. The only other details of his activities are that he held land in Coventry, where he practised as a 'Doctor of physic' supplying medicines to the pesthouses there. He apparently died in 1690 at the age of 65.

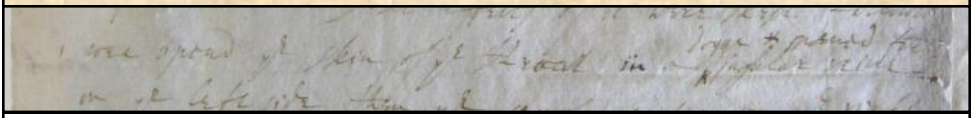
Appropriate bodies

A human skeleton from Govard Bidloo, *Anatomia corporis humani [Anatomy of the human body].* Amsterdam, 1685.

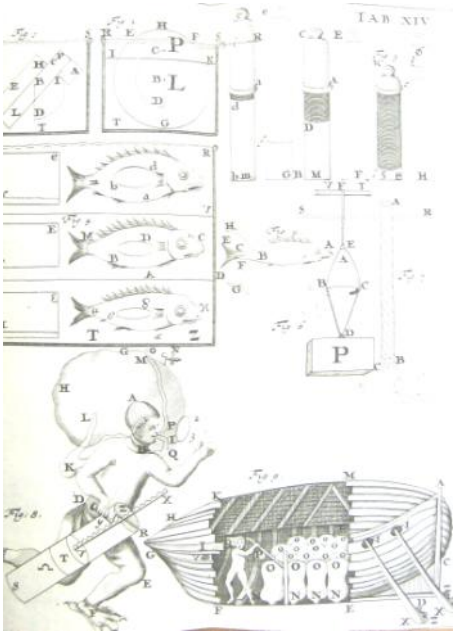
Art and science come together in the highly detailed engravings of this work, drawn by practitioner and theorist of Dutch Golden Age painting, Gerard de Lairesse. They adorn a text produced by the influential anatomist Govard Bidloo, later to become the personal physician of William III, Dutch Stadhouder and King of England. In spite of the quality of the illustration sales of the book faltered and the publisher sold off some 300 copies of the plates to an English publisher. The English physician William Cowper provided an alternative text. This was published with no credit to Bidloo or Lairesse. Bidloo was not overly pleased and several acrimonious exchanges resulted between the two, notably at the autopsy of William III. Matters were probably not helped by

the success of Cowper's text (critical of Bidloo's in several places) which became a standard work on anatomy in the 18th century.

'I am very much obliged to you ... & know not how to requite it better than by giving you an account of an experiment lately made in Whitehall by ye Kings command of wch I was an eye witnesse ... wee opend ye skin of ye throat in a dogge ...'



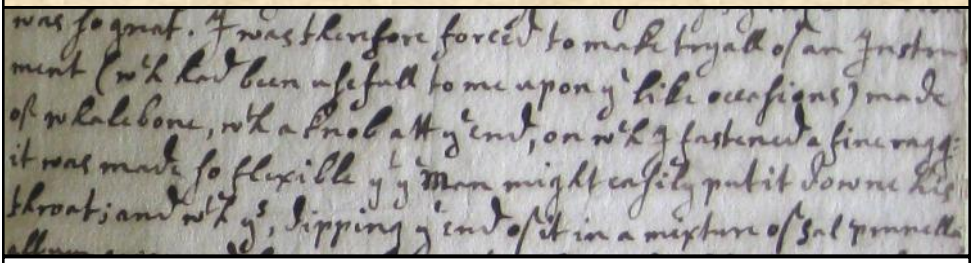
Walter Needham to Higgs describing an experiment conducted by Richard Wiseman to demonstrate the efficacy of a liquor brought from France in staunching bloodflow on a dog, an amputated breast and a woman bleeding from scrofula (June 4th, 1673).



Diagrams using the anatomy of fishes to propose a design for a submarine and diving apparatus, from Giovanni Alfonso Borelli, *De motu animalium [Of the motion of animals]*. 2nd ed. Leyden, 1685.

Whilst Galen had used pigs and other animals to draw (often erroneous) conclusions about human anatomy, the comparison of the effects of a treatment on both a dog and a human in Needham's experiments hints at a more systematic approach to anatomy which was gathering momentum at the time of the writing of these letters. This important book first was published in 1680 by the Italian scientist, Giovanni Borelli, who associated with the likes of Galileo and the exiled Queen Christina of Sweden. It develops the Cartesian notion of the body as a machine working under the constraints of physical forces, and is one of the first works to depict the human body alongside those of other animals, not as a special case distinct from the rest of the physical world. A few years later Edward Tyson in England would develop this theme into the notion of 'a great chain of being', inspired by his dissection of a chimpanzee, aided by William Cowper.

'... I was therefore forced to make tryall of an Instrument (wch had been usefull to me upon ye like occasions) made of whalebone, wth a knob att ye end, on wch I fastened a fine ragg: it was made so flexible yt ye Man might easily put it downe his throat ...'



Higgs, to an unidentified correspondent, describes the insertion of a whalebone tool into a patient's throat to effect a cure for a suffocating blockage (September 23rd, 1671).

Tools of the Trade

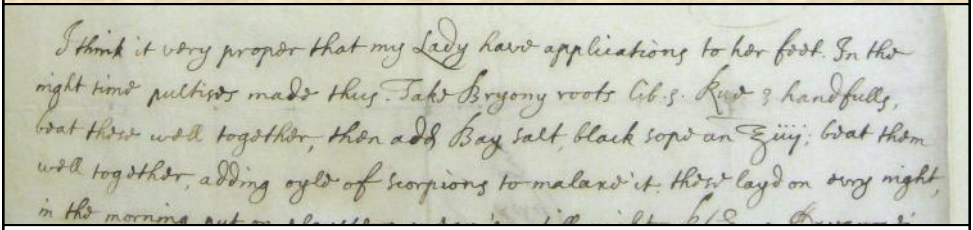
Surgical instruments from a 14th century manuscript of Guglielmo da Saliceto's *Chirurgia [Surgery].*

These depictions of surgical implements appear on leaves inserted at the beginning of a manuscript which also include medical recipes in Latin and English, and Biblical quotations and hymns. The main body of the manuscript is a 14th century copy of Guglielmo da Saliceto's *Surgery*, originally written in 1275. In this treatise Guglielmo, a Professor at the University of Bologna, advocated the use of knives, as opposed to cauterization, in order to remove tissue during surgical procedures. Early surgical implements were often adapted from tools used by other professions such as butchers, leatherworkers, etc. and can appear quite crude to modern eyes. Surgery itself was seen as a lower order occupation compared to that of physician, often conducted by barber-surgeons, who supplemented their income from shaving by undertaking operations. It was only from the later 16th century that surgery became more professional, under the guiding influence of figures such as Ambroise Paré, who made Vesalius' anatomy available to barber-surgeons by translating portions into French, and developed effective procedures from his battlefield experiences in the military.

Pumpkins & squashes from John Gerard's *Herball, or, General history of plantes.* London, 1597.

The 1600s saw the demise of the books known as 'herbals' which had dominated pharmacological practice throughout the Middle Ages. These were listings of plants which described and detailed their uses, particularly their medical properties. They often had a derivative character, borrowing lore and knowledge from previous herbals and adding a little bit more of their own. Thus this well known English example by John Gerard, the superintendent of Lord Burghley's gardens, is a re-working of an English translation of a Dutch work, which was itself a re-working of a German original. Gerard's main contribution seems to have been his allusions to people and gardens in contemporary England. Even the illustrations are borrowed: of the 1800 woodcuts only 16 are new, the rest mainly prepared for another German book on plants, and purchased by his publisher. Amongst the new illustrations were those of the newly imported potato, the first to appear in any herbal. Each plant is described, the etymology of its name is examined, together with when it appears in the year, where it grows, and a list of its virtues.

'I think it very proper that my Lady have applications to her feet. In the night time pultises made thus. Take Bryony roots lib. 5, Rue 3 handfuls, beat these well together, then add Bay salt, black sope ... beat them well together, adding oyle of scorpions to malaxe it.'

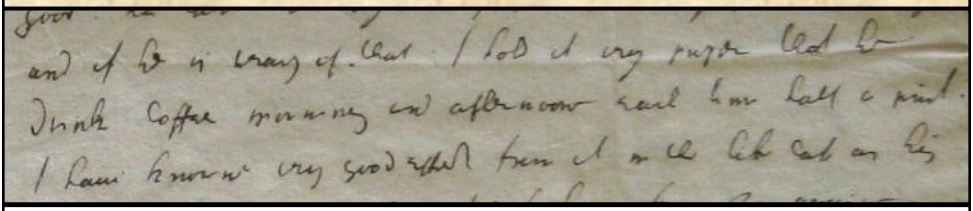


Thomas Willis describes the preparation of poultices for the feet of a lady to Higgs (March 24th 1665).

George Bate, *Pharmacopoeia Bateana.* Editio altera. 1691.

During the course of 17th century the knowledge basis that informed the herbal split into two different disciplines and two different genres: the systematic botanical description of plants gave birth to the 'flora', and the standardized preparation of medicines was expressed in the 'pharmacopoeia.' The first pharmacopoeia in England was issued by the Royal College of Physicians of London in 1618, and focussed on the accurate preparation of treatments rather than plant lore. Other pharmacopoeia's continued to appear, such as this one by George Bate, who managed to be physician to both Charles I and Oliver Cromwell (Bate was rumoured to have finished off the latter with an overdose). The use of Latin as opposed to English, and the incorporation of cryptic symbols to denote common ingredients, show that this is a technical treatise for specialist users, unlike Gerard's *Herbal*, which had a broader appeal to laypeople. References to Bate's recipes occur in several of the letters in Higgs correspondence, and indeed there is one letter from Bate himself.

'I hold it very proper that he drink coffee morning and afternoon each hour half a pint. I have known very good effect from it in the like case as his.'



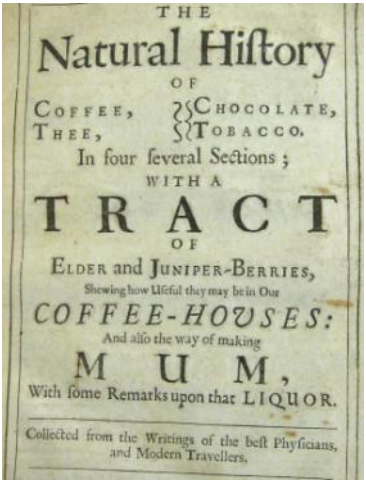
Thomas Willis advises a regimen of coffee drinking for one of Higgs' patients (September 12th 1660).

Purely Medicinal

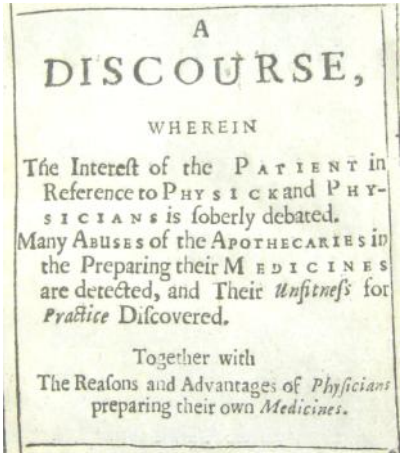
***The natural history of coffee, thee, chocolate, tobacco.* London, 1682.**

That this anonymous text was 'collected from the writings of the best Physicians' is a reminder that preparations and recipes which we would today consider culinary, were, in the 17th century, the province of the medicinal practitioner, even for popular beverages. As the author notes, coffee-drinking was being prescribed as a treatment by eminent physicians such as Thomas Willis, who:

has publish'd a very rational account, whose great reputation and authority are of no small force; he says, that in several headachs, dizziness, lethargies, and catarrhs, where there is gross habit of body, and a heavy cold constitution, there coffee may prosper ... And in these cases he sent his patients to the Coffee-House rather than to the Apothecaries shop ...


THE
Natural Hiſtory
OF
COFFEE, THEE, CHOCOLATE, TOBACCO.
In four ſeveral Sections;
WITH A
TRACT
OF
ELDER and JUNIPER-BERRIES,
Shewing how Uſeful they may be in Our
COFFEE-HOUSES:
And alſo the way of making
MUM,
With ſome Remarks upon that LIQUOR.
Collected from the Writings of the beſt Phyſicians, and Modern Travellers.

Elsewhere the remedial effects of **coffee** on hangovers is noted, as is the stimulating effects of **tea** on both the head and bladder. The tendency of **chocolate** to make people fat is already a familiar theme (it is suggested this might have something to do with its preparation using sugar), although its use in a balsam applied to the testicles for reasons of 'venery' is perhaps less well known. Whilst 'some anatomists tell us the most terrible stories of sooty brains and black lungs' in the bodies of those who use **tobacco**, it is still recommended as a pain-killer, and for making soldiers insensible of fatigue. **Mum** appears to be a brew of malt, tree extracts and herbs useful against scurvy, and popular with Germans who consider that it preserves their bodies: "indeed, if we consider the frame and complexions of the Germans in general, they may appear to be living Mummies."


A
DISCOURSE,
WHEREIN
The Intereſt of the PATIENT in Reference to PHYSICK and PHYSICIANS is ſoberly debated.
Many ABUSES of the APOTHECARIES in the Preparing their MEDICINES are detected, and Their *Unfitneſs* for *Practice* Diſcovered.
Together with
The Reaſons and Advantages of *Phyſicians* preparing their own *Medicines*.

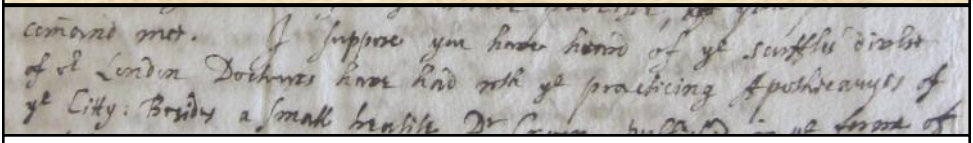
Many Abuses of the Apothecaries

Thomas Coxe, *A discourse, wherein the interest of the patient in reference to physic and physicians is soberly debated.* London, 1669.

As different health professions began to define and establish themselves in the 17th century they often trod on each others' toes and conflicts developed between them. Professional bodies emerged to ensure correct

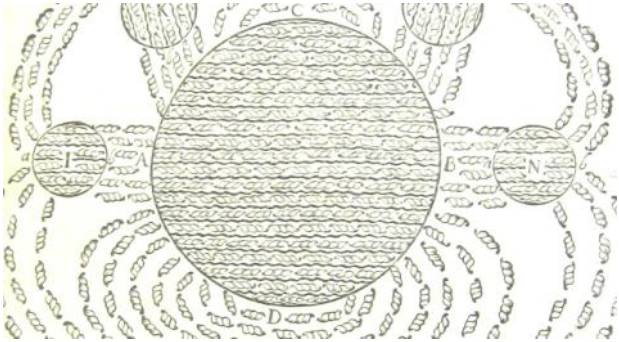
practice, license practitioners and punish those making false claims. A group of physicians established a Royal College in 1518 to exercise authority on medical matters. But physicians often catered to a wealthy elite, and the level of training required meant they were in short supply, so many people turned to others who might have medical advice. Amongst those were the practitioners who supplied spices, herbs and other materials of a medical nature, known as apothecaries. These came under the auspices of the Grocers Company (until 1617 when the Worshipful Society of Apothecaries was formed). As they were relatively cheap and accessible, apothecaries often ended up diagnosing conditions and prescribing medicines, drawing them into conflict with physicians. Physicians reserved the right to inspect apothecaries' premises and impose stringent controls on their dispensaries until 1704 when a test case ruled in favour of an apothecary's treating a patient. From this point onward apothecaries began a slow evolution to become the forerunners of today's GPs.

'I suppose you have heard of ye scuffles diverse of ye London Doctoures have had with ye practicing Apothecaryes of ye Citty'



Henry Sampson refers to the conflicts between physicians and apothecaries in London (February 10th 1669).

Physicians & Philosophers

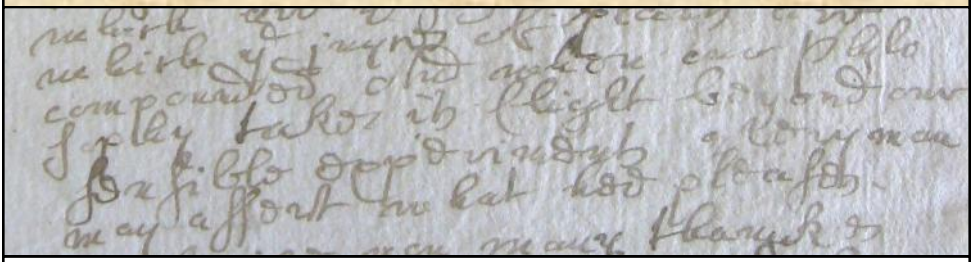


A model of magnetism caused by particles, from René Descartes, *Principia philosophiae [Principles of philosophy].* Amsterdam, 1644.

Conceived as a syllabus to replace the Aristotelianism still taught in many universities, Descartes' *Principia* synthesized much of his previous work into the first attempt at a mechanistic account of the physical universe. Starting with a reformulation of his sceptical search for a basis for

knowledge in the awareness of the conscious self (the famous *cogito,* first described in his *Discourse on method*, and often translated as 'I think therefore I am') the book goes on to construct a metaphysical and physical system describing the orbits of the planets, the courses of comets, magnetism, the ignition of flames, and the behaviour of different states of matter, amongst other things. The basis of this system is corpuscularian, i.e. that all matter is formed from small particles, and that the properties of different substances and natural forces are caused by the arrangements and interaction of these particles. So for example in the diagram illustrated here, magnetism is portrayed as a system of striated or corkscrew shaped particles aligned around the world, and different states of matter are ascribed to the different agitations of the particles within them. The influence of Descartes' mechanistic portrayal of the world was widely felt and informed many biological and medical accounts of the body, and his corpuscularianism was also widely discussed—Sir John Floyer refers to "the round figures of particles of water" he had included in his book "which I thought more probable than the notion of Cartesius you mention" in his letter to Higgs ca. 1688.

'... And where our Phylosophy takes its flight beyond our sensible experiments every man may assert what hee pleases.'

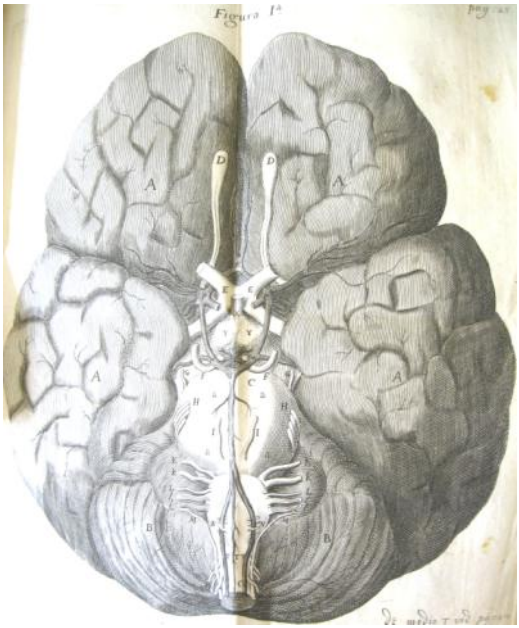


Sir John Floyer discusses Cartesianism (February 22nd 1688?).

Hardly Brain Surgery

The correspondent most frequently represented in Higgs' letters is Thomas Willis. Although Willis is mostly celebrated for his pioneering work on the brain, he had also developed a flourishing medical practice. From humble beginnings as an itinerant medical advisor at Abingdon market, often examining urine to make diagnoses for people (a suspect practice even then), he became the wealthiest physician in the country, able to purchase substantial estates in Herefordshire and Buckinghamshire. Born in Wiltshire in 1621, Willis attended St John's in the 1630s, although accounts differ as to

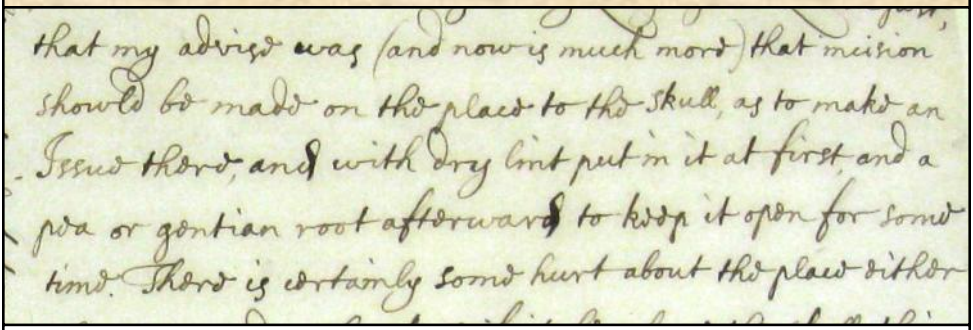
whether he took a degree here or at Christ Church. Willis was assisted by Robert Hooke in his first experiments on chemistry, and later became part of a circle that included the likes of Robert Boyle, John Wilkins, Richard Lower, Christopher Wren and John Locke.



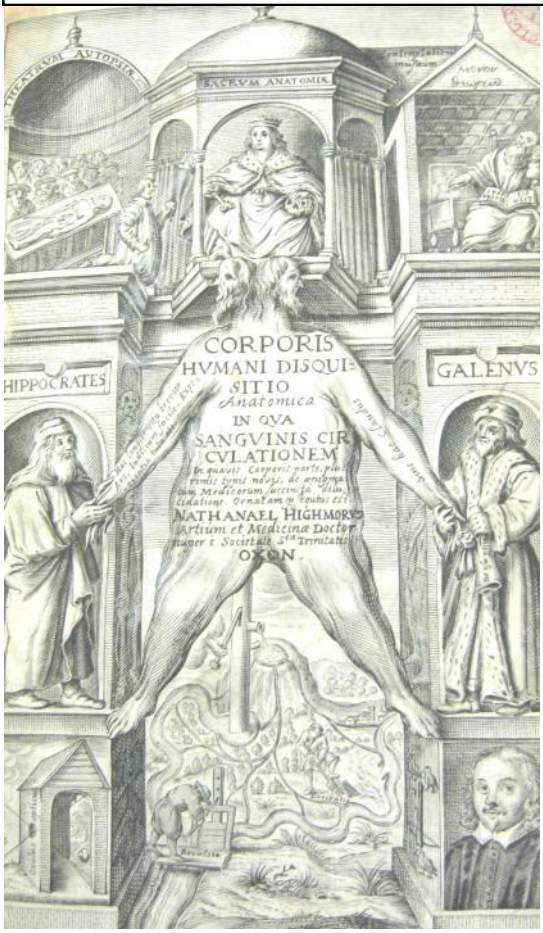
The base of the brain showing the 'Circle of Willis' from Thomas Willis, *Cerebri anatome [Anatomy of the brain]*. London, 1664.

This pioneering work, in which the term 'neurology' was coined, was written after Willis' appointment as Sedleian Professor of Natural Philosophy in 1660. It was the first comprehensive account of the brain and nervous system and includes a description of the arrangement of arteries at the base of the brain, which is now commonly referred to as the 'Circle of Willis.' Willis was free in acknowledgement of the support he received in producing the work from his friends and colleagues in Oxford. Richard Lower often undertook much of the anatomical work as Willis was fairly new to the procedures. Christopher Wren produced the illustrations (including the one here) and was on hand with Thomas Millington to discuss and consider Willis' findings. Although much of the method, and the detailed recording, seem very modern, the underlying intent behind the book is more conservative. Informed by the various mechanistic philosophies that were influential at the time, such as those of Descartes, Willis intended to locate and examine the operations of the soul and its interaction with the body, whilst also refuting the sceptical and atheistical tendencies that often featured as part of these intellectual systems. Although he made comparison with animal anatomy this was mainly intended to show that there was a higher faculty in humans. Willis' political conservatism also showed through in his depiction of the brain as the king of a well-ordered body politic, and such Royalism eased the book's passage through the tight censorship imposed after the Restoration.

'My advice was (and now is much more) that incision should be made on the place to the skull, as to make an issue there, and with dry lint put in it at first, and pea or gentian root afterward to keep it open for some time'


that my advice was (and now is much more) that incision
should be made on the place to the skull, as to make an
Issue there, and with dry lint put in it at first, and a
pea or gentian root afterward to keep it open for some
time. There is certainly some hurt about the place either

Willis advises making an incision on a patient's head (March 24th 1665).



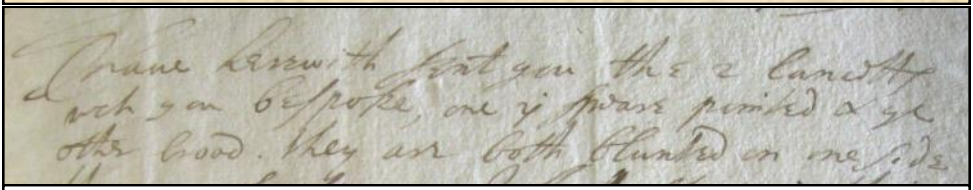
Streams of Blood

Engraved title page to Nathaniel Highmore, *Corporis humani disquisitio anatomica [Anatomical disquisition on the human body]*. The Hague, 1651.

William Harvey's account of the circulatory system, *De motu cordis [On the motion of the heart]* published in 1628 was to have a profound influence on the next generation of physicians, particularly once it was adapted and adopted by Descartes as an example of a mechanistic process driving the body. Nathaniel Highmore, was one of Harvey's key disciples and was instrumental in broadcasting his mentor's views in this work, the first to try to re-construct physiology and anatomy using circulation as a

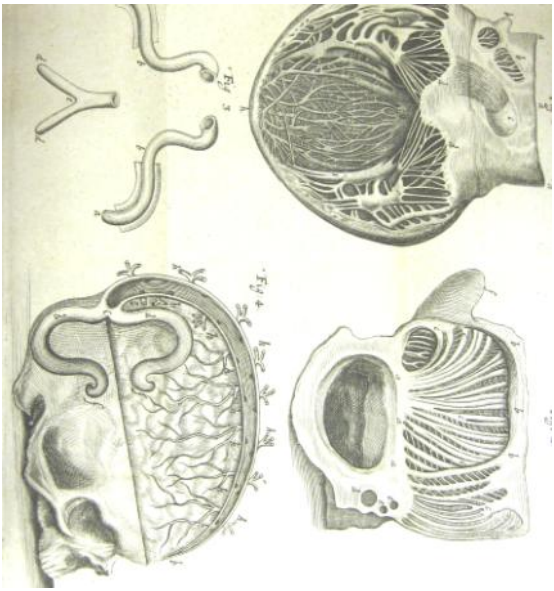
foundation, adding Highmore's own insights by suggesting that blood consisted of particles transporting nutrition. Note the flayed human skin on which the title is printed, and below it the operation of a pump to irrigate a set of fields. The body appears as a well ordered kingdom watered by the circulatory system. As with Harvey and Willis, Highmore was a Royalist, having served the king at Edge Hill, and the tropes used to describe the organization of the body often have an associated political cast. His staunch advocacy of the primacy of circulation led him into dispute with Thomas Willis over the causes of hysteria, Highmore maintaining that these lay in disturbances of the blood, against Willis' view that the causes lay in the nervous system.

'I have herewith sent you the 2 lancetts wch you bespoke, one is speare pointed & ye other broad ... The broad pointed lancett is for great veines & ye speare pointed for lesser'



Richard Lower advises on the use of two lancets for his own design for blood-letting (May 28th 1671).

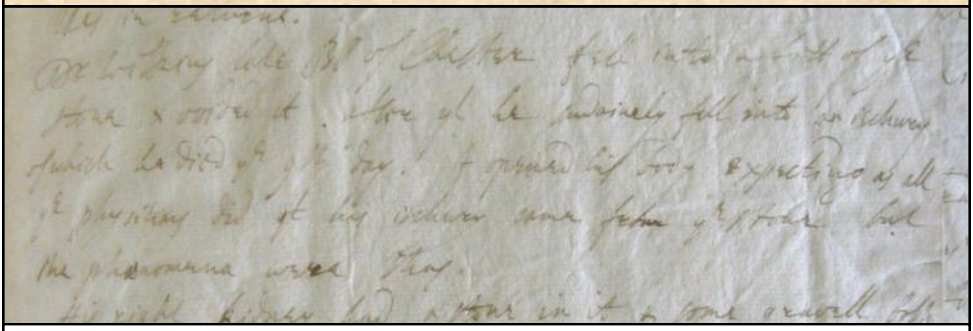
Diagram from Richard Lower, *Tractatus de corde [Tract concerning the heart].* London, 1669.



The status of Harvey's discovery was maintained by another Oxford physician, Richard Lower, whose key work in this area was self-consciously planned as an extension of *De motu cordis*. It built on Lower's own experimental work, which included the first successful work in blood transfusion, be-

tween two dogs. Included in the text are a description of the heart as a muscular pump, and Lower's ideas that the reason for the differences in colour between arterial and veinous blood was due to its interaction with air supplied by the lungs. In spite of his connections with the Royal Society, Lower discontinued his membership and concentrated instead on his thriving medical practice, which was augmented when he inherited that of his friend and mentor Thomas Willis on the latter's death. His interest in practical matters is shown in his precise instructions to Higgs regarding the use of his design for lancets for blood-letting. This single-bladed design was an attempt to reduce the number of botched attempts, but didn't catch on.

'Dr Wilkins late Bp of Chester fell into a fit of ye stone & voided it. After yt he sudainely fell into an ischury of which he died ye 9th day. I opened his body expecting as all ye physitians did yt his ischury came from ye stone but the phaenomena were thus ...'

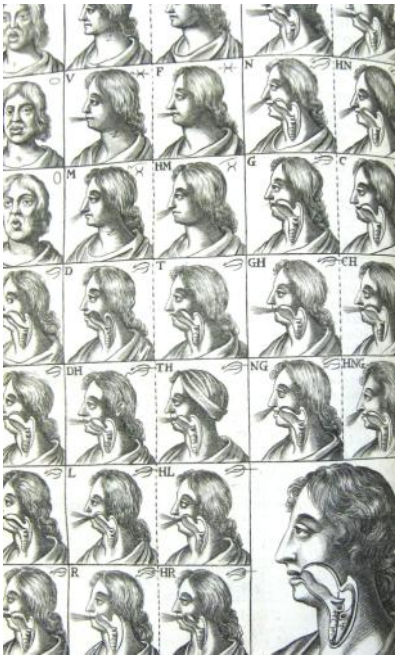


Walter Needham describes events at the autopsy of John Wilkins in a letter to Higgs (May 28th 1671).

A Celebrity Autopsy

John Wilkins. *An essay towards a real character, and a philosophical language.* London, 1668, and *A discourse concerning a new world & another planet.* London, 1640.

Although social and religious qualms about dismembering corpses seem to have remained strong during the 17th century, these seem to have been essentially popular prejudices. Most religious institutions placed no interdictions on human dissections—Pope Sixtus passed a bull in the 15th century permitting them—and autopsies were increasingly performed on royal, noble and other elite subjects throughout the 16th and 17th centuries. Walter

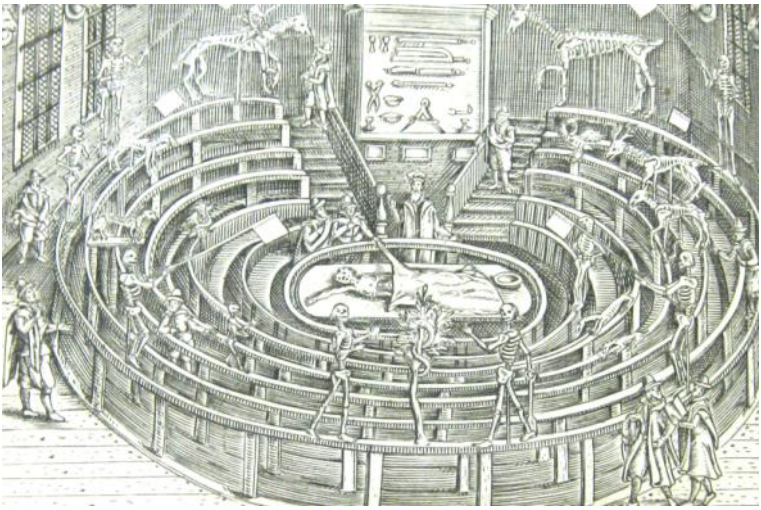


Needham describes an autopsy conducted on the body of John Wilkins, the Bishop of Chester. One suspects that Wilkins wouldn't have disapproved: as well as being a puritan theologian, he was an active populariser of scientific discoveries, and, whilst president of Wadham College, attracted such luminaries as Robert Boyle and Thomas Willis to Oxford so that they could participate in the scientific meetings he organized. From this group the Royal Society coalesced and Wilkins was a founder member, and helped to formulate the experimental method that formed its early ethos. He is reported to have declared himself ready for 'the great experiment' as he lay dying. *A discourse concerning a new world* was Wilkins' attempt to popularize the new astronomy and gain wide acceptance for the discoveries of Galileo and Kepler. He also indulged in speculation as to what inhabitants of other worlds might be like and how it might be possible to have commerce with them. *An essay towards a real character* is Wilkins' major contribution, in which he proposes a universal language based on philosophical principles to fill the void left by the decline of Latin as an international scholarly lingua franca.

Dutch Athena

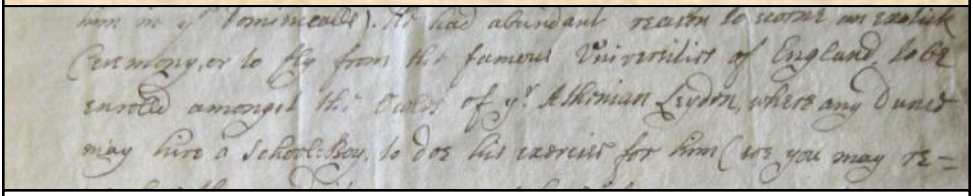
The anatomy theatre at Leiden University from Johannes van Meurs, *Athenae Batavae.* Leiden, 1675.

With cultural venues such as theatres, a wealth of pubs and other convivial social venues, ample provision for sporting activities such as horse-riding and boating, and a degree of religious tolerance which was rare at the time, Leiden was a highly attractive destination for study. Its university, founded by William the Silent, in 1575, was quick to capitalize on its many advantages, building state of the art facilities such as the anatomical theatre, illustrated here, and its associated library, so that by the beginning of the 17th century it had become one of the main centres of European medicine. In a nation of merchants, the University's administrators weren't shy in promot-



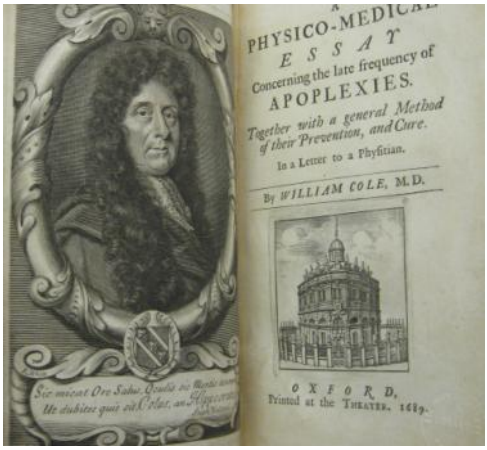
ing themselves and numerous publications of the kind shown here, dedicated to advertising its advantages and lavishly decorated with illustrations, were produced. The anatomical theatre developed from its original purpose to become itself an advertisement for the University, adorned with a myriad of specimens, for which catalogues were printed in several languages, and opened to visitors when dissections were not taking place. Clinical education was innovative, particularly that of Franciscus Sylvius, who developed the practice of bedside teaching, taking students on his daily rounds of the hospital, and advocated the frequent use of dissection. It was also relatively short compared to other institutions such as Oxford, meaning that its students could progress their career in a more timely fashion. At the time of the publication of this particular prospectus, however, Leiden's teaching was beginning to go into decline, particularly under the direction of Hermann Boerhaave, whose own preference was to be able to diagnose via letter, as opposed to the hands-on approach of Sylvius.

'... to fly from the famous Universities of England, to be enrolled amongst the owles of y[ou]r Athenian Leyden, where any dunce may hire a schoolboy to doe his exercises for him ... '



An attack on Dr William Johnson, a Leiden doctor practicing in Worcester, penned by Jos. Malden on behalf of William Cole, ca. 1682, and a copy later sent to Higgs by Cole.

The Famous Universities of England



Author portrait from William Cole, *A physico-medical essay concerning the late frequency of apoplexies.* Oxford, 1689.

It is difficult not to see a level of envy in this copy of a letter. Written on behalf of William Cole, a prominent Oxford-educated physician residing in Worcester, by his friend 'Jos.' Malden, it abuses a local rival, William Johnson, who was educated at Leiden. For the first half of the 17th century Oxford had a single, Regius, professorship in medicine, as opposed to Leiden's four professorships. It had no facilities for anatomy and the university library was severely lacking in up to date medical textbooks. To add insult to injury, the process of qualifying as a physician at Oxford required one to graduate as BA and MA before proceeding to BM and DM, and then membership of the Royal College of Physicians, a course that could take a minimum of 14 years. Only a minority spent time hurdling all these obstacles. If one went abroad to study, often it was possible to gain a recognized qualification after a much shorter programme of study, knocking as much as 5 years off the time taken. The chief venue for this way of circumventing the process of qualification was Leiden. No wonder, then, that those who undertook studies at Leiden would be mocked for their lack of education by those who had worked through the system at Oxford, particularly after Leiden's reputation went into decline in the last quarter of the century.

Oxford medicine may have started the 17th century in bad shape, but in the middle of the century, following Harvey's successes, it flourished brightly for several decades, overtaking Leiden as the pre-eminent European medical centre. Luminaries such as those discussed in this exhibition flocked to the town and made major advances in understanding numerous anatomical systems. Unfortunately this constellation of thinkers and scientists didn't leave an imprint on the institutional structure of the university, and as they dispersed over time, medicine at Oxford once again declined in importance, losing ground to London, Edinburgh, and a revived Leiden, to lie largely dormant until the 19th century.