

### **9.30 – 9.55: Clubs and societies for improving knowledge**

Michael Hunter, Department of History, Classics and Archaeology, Birkbeck, University of London

This paper will argue for the key role played by the Oxford Experimental Philosophy Club in the 1650s in transforming the career of Thomas Willis from that of jobbing medical practitioner to speculative natural philosopher. Though the evidence is unfortunately fragmentary, the Oxford group apparently offered a lively forum for discussion, in which Willis was able to develop his ideas and thus to acquire the authoritative voice on medical matters represented by his various books.

After 1660, however, Willis's links with the body which was effectively the successor to the Oxford group, the Royal Society, were surprisingly perfunctory; indeed, there are almost hints of tension in his relations with that body. In spite of this, however, he was consciously promoted as a leading exemplar of the Royal Society's programme, his writings being publicised by its secretary, Henry Oldenburg, in his correspondence and through reviews in *Philosophical Transactions*. Willis's case is thus significant in providing an illustration of the Society's desire to be seen to embody national achievement in its chosen areas of study.

### **9.55 – 10.20: Religious and political contingency in advancing knowledge**

Louis Caron, independent scholar

In this paper I will outline some of the ways in which religious beliefs and medical experience interact in Thomas Willis's mature thought. I do so by considering the content of his final publication, the *Pharmaceutice Rationalis*, which first appeared in two volumes from 1674-5. Both volumes give us real insight into Willis's mature medical views, which combine chemical, anatomical, and clinical observations with his own sense of how reason and experience aid each other in the pursuit of truth.

Willis dedicated most of his publications on neurology to the Archbishop of Canterbury, Gilbert Sheldon, a choice that aligned his views of the body and soul squarely with the Establishment Church of England. Conversely Willis dedicated the *Pharmaceutice Rationalis* to George Ent and to the Royal College of Physicians, a move that suggests the work was intended to be exclusively concerned with medical topics. Even so, his final publication reflects not just a 'purely' medical view of the body, for Willis continued to insist that the soul and its immediate instruments in the brain and nerves were essential to a rational account of health and illness.

### **10.20 – 10.45: Thomas Willis's imaginative empiricism**

Alexander Wragge-Morley, University of Lancaster

Thomas Willis's present-day reputation rests on his empiricism. He based his ideas about the workings of the brain and nervous system on a remarkable series of anatomical dissections, undertaken at his own home in Oxford. In the seventeenth and eighteenth centuries, however, some dismissed Willis as a fantasist – a brilliant writer who foisted ideas onto readers through ingenious, pleasurable figures of speech. What are we to make of the tension between two such contrasting reputations?

In this talk, I will show that the imagination was central to Willis's brand of empiricism. Far from simply recording the world as he found it, Willis mobilized a remarkable array of metaphors and other literary devices to make sense of what he had seen. Willis was, moreover, no outlier. Among his contemporaries in the world of seventeenth-century science, many deployed similar strategies to explain phenomena that might otherwise have resisted their grasp.

Does this reliance on the imagination mean that we need to revise Willis's place as one of the 'founders' of the modern neurosciences? To conclude, I will offer some remarks on Willis's present-day legacy, relating his imaginative empiricism to both pre-modern and modern theories of cognition.

### **11.30 – 11.55: Willis's chemical corpuscularianism and his study of fevers**

Antonio Clericuzio, Department of Humanities, Roma Tre University

In *Diatribae duae medico-philosophicae* (1659) Willis explained fevers as the outcome of an irregular fermentation of the blood. The cause of fevers was a controversial topic in early modern medicine. Jean Baptiste van Helmont rejected the traditional view that preternatural heat was the cause of fevers and maintained that heat was not the cause of fever, but a sign of the disease. Willis followed a *via media* between the Avicennian and the Helmontian doctrines. He argued that, in the case of contagious diseases, fevers derived from an extraneous substance modifying the composition of blood – the result being the irregular fermentation of blood.

Besides considering the action of an external substance, Willis maintained that fevers might derive from the imbalance of the chemical principles. He stated that the exceeding motion and the overabundance of the sulphurous particles in the blood bring about an anomalous fermentation, which in turn produces feverish heat. Willis gave a detailed chemical and corpuscular account of the normal and pathological processes of fermentation by resorting to the chemical theory of the five principles (spirit, sulphur, salt, earth and water), which he reinterpreted in corpuscular terms.

### **11.55 – 12.20: The anatomy of the brain and nerves**

Zoltán Molnár, Department of Physiology Anatomy and Genetics, University of Oxford

Willis's name is usually associated with 'the circle' and the word 'neurologia', but his work, which comprised insightful descriptions of clinical cases and clear, well-illustrated and articulated scientific publications and case histories, also formed the foundation of modern translational research and clinical medicine. Willis's anatomical observations were based largely on his personal, clinical, and autopsy experience from the dissection of his own patients when they died. This allowed him to correlate his clinical observations with pathological changes. He associated these alterations of the cortical morphology with the neurological conditions and developed original hypotheses about the mechanisms of nervous system function. All this was completely unheard of before his time.

Willis is credited with naming several structures in the brain: corpus striatum, internal capsule, cerebellar peduncles, anterior commissure, claustrum, inferior olives, pyramids, optic thalamus, spinal accessory nerve, stria terminalis, vagus nerve,

intercostal nerve (sympathetic ganglionic chain), and ophthalmic nerve. It is clear from Willis's illustrations of the cut cranial nerves that he identified all of them, although his numbering distinguished only nine pairs. Willis's work formed the foundation of basic neuroanatomical description and comparative neuroanatomy, and his system of nomenclature is still used to this day.

### **12.20 – 12.45: Anatomising the corporeal soul: Thomas Willis's medical-philosophical discourse on Man**

Claire Crignon, Department of Philosophy, Sorbonne Université

In the critical literature, much attention has been paid to Willis's discussion of Cartesian dualism. The central role of compared anatomy and the observation of animal behaviour has often been central to the debate and used to show the influence of the French philosopher Pierre Gassendi in discussions about the materiality of the soul within the English medical-philosophical tradition of the seventeenth century. However, less attention has been devoted to the rich clinical descriptions of mind's disorders in Willis's work.

As George Canguilhem (1904-1995) has stressed (*La formation du concept de réflexe*, Paris, 1977) Willis's physiology is 'clinically driven and clearly pathogenesis-oriented'. Later on, the French historian of medicine and specialist of the "diseases of the soul" Jackie Pigeaud (1937-2016) also stressed the importance of Willis's clinical observation of mental disorders, and especially of *melancholia*, in the effort to access what remains invisible to the most skilled anatomist: the metamorphosis of the '*animus sensitivus*' or of the 'aethereal' and 'interior man'. In this lecture, we will try to show how the anatomy of the 'corporeal soul' provides a kind of experimental procedure for observing the proximity between man and animal and for providing a richer and more accurate comprehension of the emotional life of man, in order to lay the physiological foundations of a new psychology of the soul.

### **13.45 – 14.10: The book trade in seventeenth century England**

James Raven, Magdalene College, Cambridge

The work of John Martyn and James Allestry of St Paul's Churchyard as first official booksellers to the Royal Society (from 1663) and their relationship with the printers employed, notably Thomas Roycroft, is well known. At his Bartholomew Close printing house, Roycroft printed diverse texts ranging from language guides to books on demonology, as well as the London Polyglot Bible, one of the first books to be sold by subscription.

From at least 1659 Thomas Willis was also published by the work of Martin, Allestry, their partner Thomas Dicas, and Roycroft. This presentation considers the wider context of the printing and bookselling trade in which those producing Willis's medical and scientific publications worked. In particular, I shall examine trading networks including those between London and Oxford, local bookselling communities, and the broader working of the book trade emanating from London and to and from overseas.

#### **14.10 – 14.35: The printed works of Thomas Willis**

Alastair Compston, Department of Clinical Neurosciences, University of Cambridge

Between 1659 and 1675 Thomas Willis wrote fourteen medical treatises. Thirteen were included in six separate titles, one in two parts, printed in Latin; the last was published posthumously and in English. Four of the books contain engraved plates depicting anatomical structures. The illustrators included Christopher Wren, Richard Lower, and Edmund King. Soon after Willis's death, the treatises appeared as collected works, also in Latin, published between 1676 and 1720. These books are conspicuous for the inclusion of many printers' ornaments in addition to the engraved images illustrating Willis's work. Starting in 1679, twelve treatises were translated into English and published as *Dr Willis's practice of physick*, a project that was eventually completed in 1684.

Apart from their contributions to anatomy and physiology, and clinical medicine, Willis's printed works are instructive with respect to the book trade in London, Oxford and continental Europe during the seventeenth century; and the processes involved in letterpress and book illustration. A prodigious amount of skilled labour went into their production. Without undermining that achievement, this lecture uses one hundred and three editions, issues or variant states in copies published from 1659 to 1721 to identify errors and inconsistencies that serve to illustrate the processes involved in assembling and distributing medical books in early modern England.

#### **14.35 – 15.00: Original and copy in intaglio book illustration**

Roger Gaskell, Ffawyddog, Crickhowell

The success of Willis's works in Great Britain and on the continent, make them an unusually rich, if not unique, resource for studying the use of intaglio plates in scientific illustration across multiple editions. The engravings have recently been analysed to uncover examples of re-use, re-working, copying and the deterioration of plates in successive editions.

This paper will discuss the implications of the technology of copperplate engraving and printing for medical publishing, setting the illustration of Willis's writings in the context of other medical and natural philosophy texts in the ambit of the Royal Society. The use of intaglio illustration in itself will be described as it relates to intellectual and structural image-text relations in scientific publishing. The re-use and copying of copper plates will be discussed in terms of the authority of images and concepts of original and copy. The variations inherent in the printing of copperplates separately from the letterpress text, implies a concept of the constancy of printed images different from what is understood by the 'fixity of print' as it refers to verbal texts and thereby the stability of the work as a whole.

#### **15.45 – 16.10: The reflex and integrated activity of the nervous system: contributions and legacy of Thomas Willis**

Miloš Judaš, Croatian Institute for Brain Research, University of Zagreb School of Medicine

Thomas Willis was one of early and important contributors to concepts of reflex and integrated activity of the nervous system. He was probably the first to explicitly use

the term 'reflex motion'; he made a significant contribution to the anatomy of the 'great intercostal nerve (i.e. the sympathetic nervous system) as well as the 'wandering' nerve. He also proposed some, for his time, original and influential concepts concerning the functions of what we today describe as an autonomic nervous system.

In this paper, I describe how Willis conceived of a mechanical process involving the reflexion of sensory impressions to create mental as well as motor responses (as just one aspect of his important work on the ancient concept of sympathy). With respect to the sympathetic trunk and nearby cranial nerves, Willis advocated a return to Galenic principles, and popularised a mechanical explanation for sympathy that was influential until the beginning of the nineteenth century. I will discuss how well his concepts fared with later researchers (from Winslow, Johnstone, Bichat and Reil to Gaskell and Langley) and what, if anything, remains as Willis's permanent legacy.

### **16.10 – 16.35: Thomas Willis and the origins of clinical neuroscience**

Alasdair Coles, Department of Clinical Neurosciences, University of Cambridge

Thomas Willis's research group correlated close observation of patients' signs and symptoms with their pathological, as well as normal, brain anatomy, most comprehensively in *De Anima Brutorum*. This 'clinico-pathological' method not only led to a better description of disease, but became the principal method to understand normal and pathological brain function, until the era of brain imaging.

The temptation for the modern neurologist is to sift through Willis's case histories for recognisable descriptions of today's diseases. This tendency leads to the claim that he was the first to describe myasthenia gravis and the attribution of the eponyms 'paracismus Willisii' for paradoxical deafness and 'Willis-Ekbom' disease for restless legs syndrome.

More important is Willis's project to give a thoroughly materialist account of the clinical and pathological changes he observes, without overtly challenging Scholastic or religious authority. This is best seen in his accounts of epilepsy and apoplexy. So he gifted to the next generation of clinical neuroscientists the freedom to study the material causes of brain disease. This legacy was thwarted by Michael Foster's unsympathetic treatment of Willis's ideas, perhaps due to a misunderstanding of Willis's use of metaphor.

Willis was not the first or only scientist to explain disorders such as depression and mania by dysfunction of the brain. But he was one of the most respected physicians of his day to do so, and therefore contributed to the emergence of the naturalistic movement of English psychiatry.

### **16.35 – 17.00: Was Thomas Willis his brain?**

Ray Tallis, School of Medical Sciences, University of Manchester

The notion that persons are identical with their brains and that consciousness at every level is identical with activity in certain parts of the brain commands increasing acceptance among philosophers and neuroscientists. The talk will set out the reasons why this view cannot be accepted.