History of Neurology: The Tale of Two Toms— Thomas Willis & Thomas Sydenham

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A live recording of this lecture can be viewed here: RRNMF Early, Early Neurology History The Tale of Two Toms - YouTube

This is the first in a series of short presentations where I will review some of the early historical points of neurology and neuroscience. The first story I want to tell you is the Tale of Two Toms.

The first Tom is Thomas Willis (Figure 1). He was born in the 1600s, went to school in Oxford, and while he was a medical student, the Civil War broke out. Not the U.S. Civil War. This was the British Civil War between Charles I and Oliver Cromwell, the Royalists and the Parliamentarians. Willis sided with the King. Since the Parliamentarians won the war, this delayed his education, and it took him a while to finally get his degree. While he was a student in Oxford, William Harvey was doing experiments on the heart and published *De Motu Cordis*.[1]

Figure 1

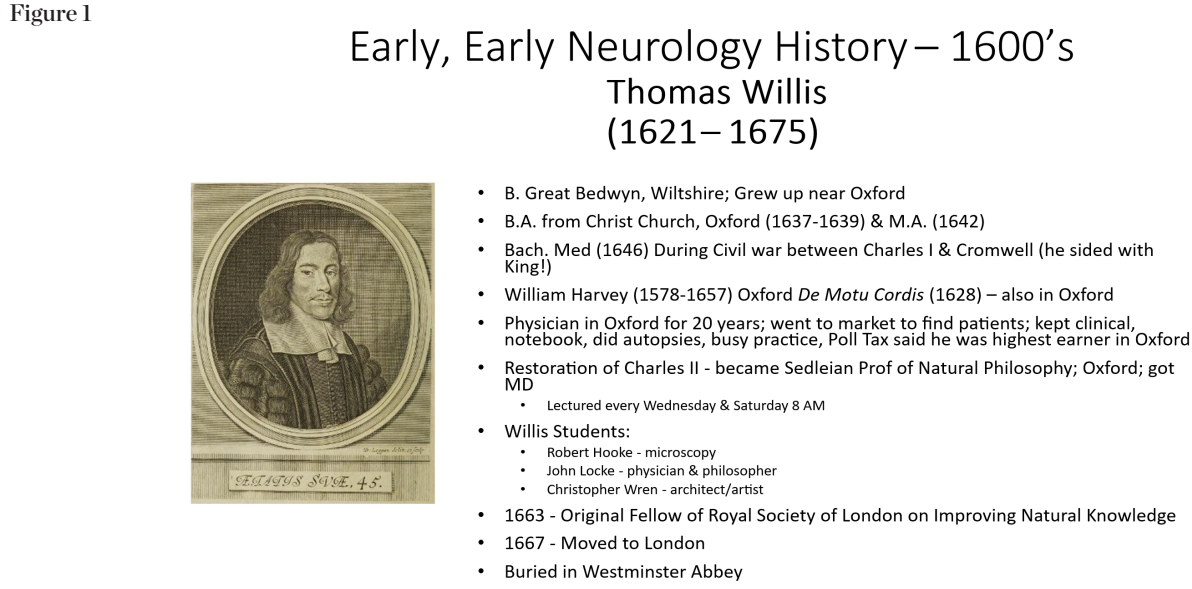
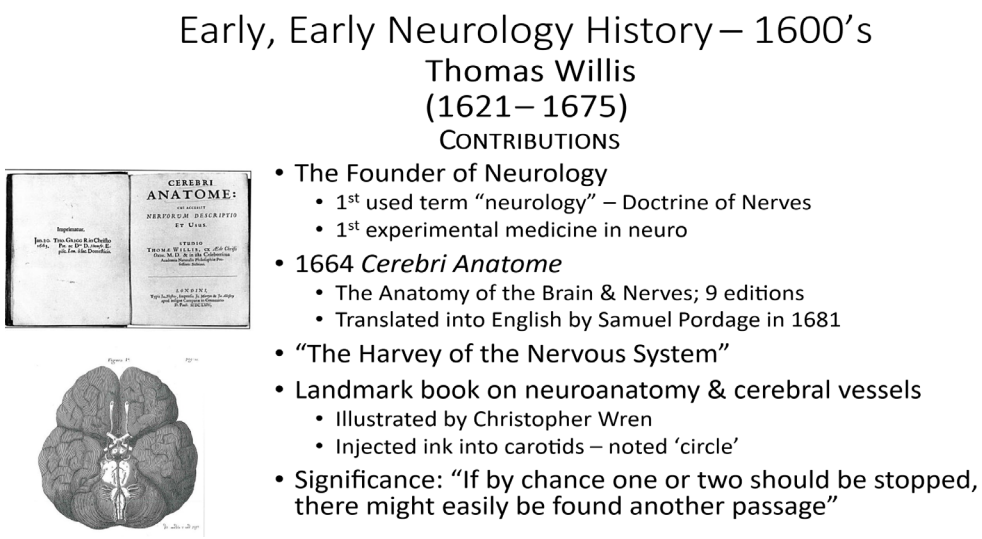


Figure 2



Willis went into practice after the Civil War in Oxford. He had a very busy practice, but he is said to have gone to the marketplace to find patients when business was slow. His practice grew, and the poll tax showed he was the highest-paid earner in Oxford. He did autopsies on his deceased patients. Interestingly, when Charles II was restored and the King was back in place, Willis was named Sedleian Professor of Natural Philosophy in Oxford, and he gave a lecture every Wednesday and Saturday morning at 8 a.m. His students became famous: Robert Hooke, John Locke, Christopher Wren. John Locke took notes on the lectures, so we know exactly what Willis was saying. Robert Hooke, who wrote *Micrographia*[2] in 1665 and pioneered the use of the microscope, was Thomas Willis' laboratory assistant. Willis recommended Hooke to Robert Boyle and these two became research partners for many years.

He was one of the original Fellows of the Royal Society and was buried in Westminster Abbey, one of the few physicians to receive such an honor.

What is Thomas Willis famous for in neurology? He's the first to use the term "neurology," calling it the doctrine of the nerves, and he's considered the first experimental medicine physician in neurology. He published his most well-known and landmark book, *Cerebri Anatome*,[3] which went through nine editions while he was alive. He is rightly known as the Harvey of the nervous system (Figure 2).

The book was illustrated by his student Christopher Wren, the legendary architect who rebuilt London after the Great Fire of 1666. In *Cerebri Anatome*, Willis describes his experiments where he would inject blood vessels with ink and showed that there was a circle of arteries around the base of the brain that we now call the Circle of Willis. He noted that if one or two vessels were blocked, another passage might easily be found. This was a monumental breakthrough in understanding brain anatomy and ultimately is the basis for what we know about stroke.

He also wrote a number of other books in his lifetime[3-13] (Figure 3). After his death, his followers had his works translated into English by Samuel Pordage. The first title "The Remaining Medical Works of That Famous and Renowned Physician Dr. Thomas Willis"[11] contained major parts of *Cerebri Anatome* with the famous brain illustrations by Christopher Wren. The most popular and frequently reprinted English translation was called *The London Practice of Physick or the whole Practical Part of Physick contained in the works of D. Willis*[12] included chapters from many of his previous books. One chapter, on "palsy", originally published in *De Anima Brutorum* (1672)[7] described what was probably the first case of myasthenia gravis—a woman who temporarily became weak and lost speech:

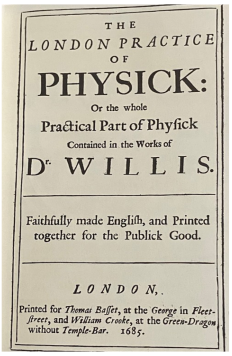
"Wherefore, in regards the Spirits residing in the Brain are conscious of the Weakness of the others plac'd in the Members, they refuse to impose local motion on their Companions, as being a task too difficult for them; for which cause the Affected are scarce led by any persuasion to try whether they are able to go or not: but those who being troubled with a scarcity of Spirits, will force them as much as they may to local Motions, are able at their first rising in the Morning to walk, move their Arms, this way and that, or to lift up a weight with strength; but before Noon, the store of Spirits which influenc'd the Muscles being almost spent, they are scarce able to move Hand or Foot. I have now a prudent and honest Woman in cure who for many years has been

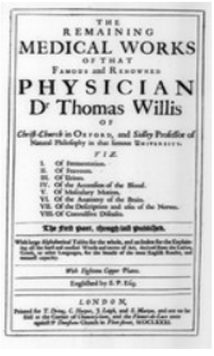
Figure 3

Early, Early Neurology History – 1600's

Thomas Willis (1621–1675)

Major Bibliography


THE
LONDON PRACTICE
OF
PHYSICK:
Or the whole
Practical Part of Phyſick
Contained in the Works of
Dr WILLIS.
Faithfully made Engliſh, and Printed together for the Publick Good.
LONDON,
Printed for Thomas Baſſet, at the George in Fleet-ſtreet, and William Crooke, at the Green-Dragon without Temple-Bar. 1685.


THE
REMAINING
MEDICAL WORKS
OF THAT
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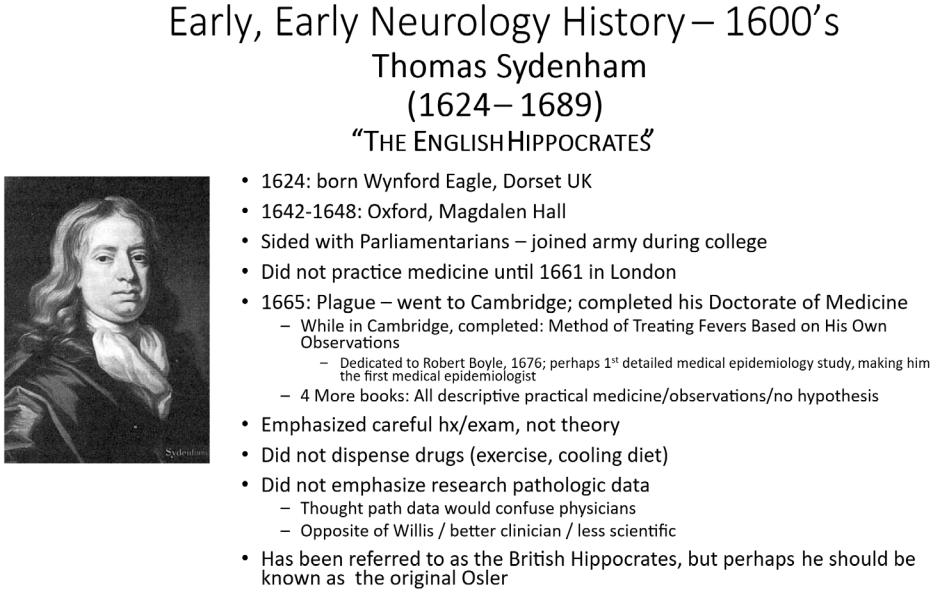
Dr Thomas Willis
LONDON,

- 1658 *Diatribae duae medico-philosophicae*
  - Wrote hysteria was caused by brain dysfunction
- 1664 *Cerebri anatome*
- 1667 *Pathologiae Cerebri et Nervosi Generis Specimen*
- 1670 *Hysteria and Hypochondria*
  - Mental retardation and hysteria are brain disorders
- 1672 *De Anima Brutorum*
  - 1st textbook of neuropsychiatry
- 1672 *De moto musculari*
- 1672 *De Sanguiniis ascensione*
- 1675 *Pharmaceutice rationalis*
- 1681 *The Remaining Medical Works of that Famous and Renowned Physician Dr. Thomas Willis, translated from Latin by Samuel Pordage*
  - English translation of major parts of *Cerebri anatome*
- 1685 *Dr. Willis' London Practice of Physick, translated from Latin by Samuel Pordage*
  - Of the Palsey – 1st description of Myasthenia Gravis: woman temporarily lost speech and became "mute as a fish". First published in Latin in *De Anima Brutorum*

Figure 4



obnoxious to this kind of bastard Palsy not only in the Limbs, but likewise in her Tongue; This Person for some time speaks freely and readily enough, but after long, hasty, or laborious speaking, presently she becomes as mute as a fish and cannot bring forth a word, neigh, and does not recover the use of her Voice 'til after an hour or two" (From the London Practice of Physick, London, 1685:page 432; Recently republished in the Classics of Neurology and Neurosurgery Library, Division of Gryphon Editions, New York, 1991).[13]

Therefore he is credited for being the first physician to recognize what we now call myasthenia gravis.

Willis also wrote about hysterical fits. While earlier writers believed the source or cause of hysterical fits was from the uterus and therefore restricted to women, Willis believed the source was the brain and could affect both sexes. The following quote is also from the London Practice of Physick page 297 in 1685 edition:

"A motion in the lower part of the Belly... and an Ascent, a Suffocation in the Throat, ... a Giddiness, an Inversion or rotation of the Eyes, often Laughing or Weeping, a talking

Figure 5

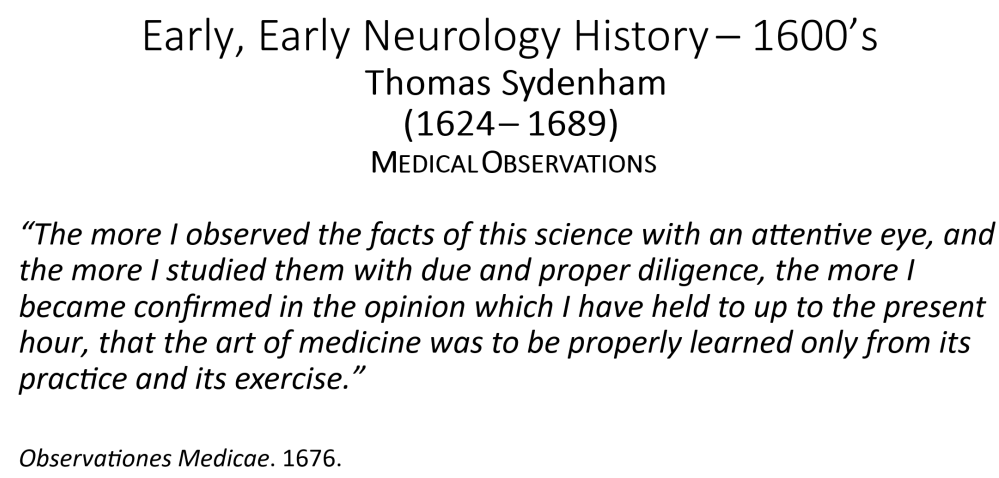
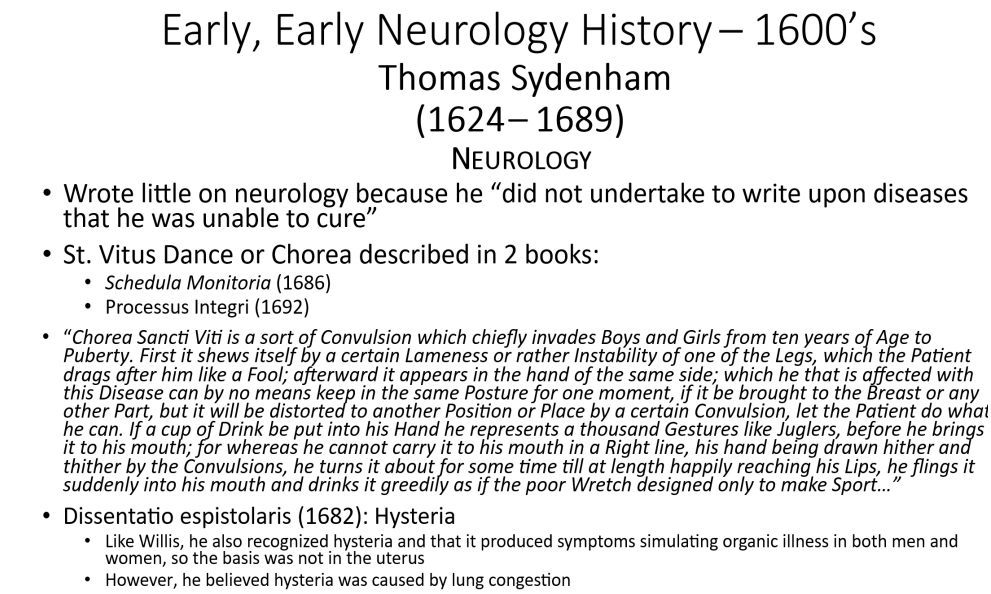


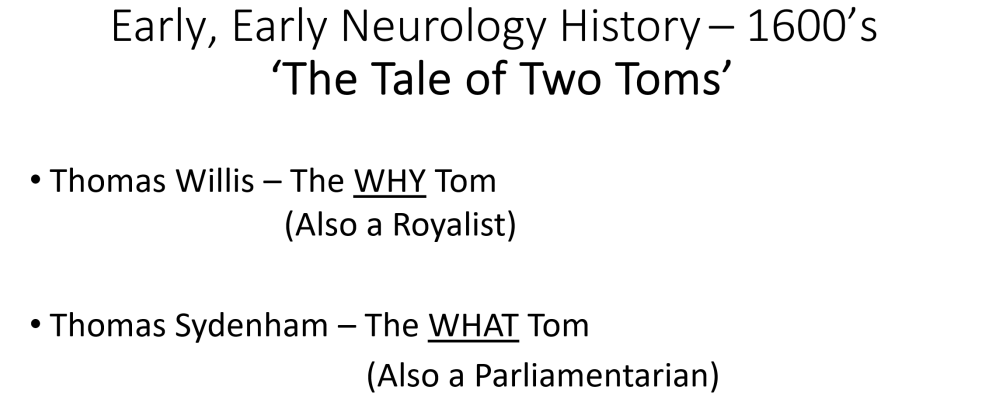
Figure 6



Idly, sometimes a Speechlessness and Immobility, with obscure or no Pulse, and a Cadaverous aspect, sometimes Convulsive Motions rais'd in the face or limb, and sometimes in the whole body.... I have observed those symptoms in Girls before the time in puberty and in old Women, and men are sometimes troubled with such kind of Passions, instances of which are not wanting. The cause of these Symptoms must not be imputed to the Ascent of the Womb, and to Vapors of the Blood into the Lungs, as the Learn'd Hughmore has Judg'd: But we say that the affect call'd Hysterical, chiefly primarily Convulsive, and depends primarily on the Brain".

The other Tom is Thomas Sydenham, sometimes called the English Hippocrates (Figure 4). He also went to Oxford around the same time as Willis, but he sided with the Parliamentarians when the civil war broke out in 1642. He joined the army during college. His whereabouts were unknown for some time during the War and under the Protectorate of Oliver Cromwell who ruled England until his death in 1658. The monarchy was restored under Charles II in 1661. Thomas Sydenham began practicing medicine in London but when the plague struck in 1665, he moved to Cambridge to complete his Doctorate in Medicine. While in Cambridge, he wrote the first book on the method of treating fevers,[14] dedicating it to Robert Boyle, another founder of the Royal Society of London, who with Robert Hooke, invented the air pump/vacuum. Boyle is probably

Figure 7



most famous for describing the inverse relationship between gas and volume, Boyle's Law. By 1676 he had written four more descriptive, practical medicine books which were observational, without scientific hypotheses. Sydenham emphasized careful history and examination rather than theory. He did not dispense drugs. His therapies usually involved exercise, cooling, and diet. He did not focus on research involving pathologic data, as he believed pathology could confuse physicians. Therefore, he was the opposite of Thomas Willis. Most considered him a better clinician than Willis but less scientific. I think of him as the original William Osler.

In his book *Medical Observations,*[15] Sydenham observed that the art of medicine was properly learned only from practice and exercise (Figure 5).

He did not publish much in neurology, avoiding topics he could not cure. He is however well known for describing chorea in two of his books,[16,17] with long descriptions of men and women suffering from what we now call "Sydenham's chorea", and he compared it to the movements in St Vitus' dance (Figure 6).

Thomas Sydenham, like Thomas Willis wrote about hysteria,[18] and also observed that it occurred in men and woman and thus did not believe the older concept that the source of hysteria was the uterus. However, he believed the cause was lung congestion while Willis believed hysteria originated in the brain and was thus a neurologic disorder.

So we have the tale of two Toms. Thomas Willis was the "why" Tom and a Royalist, while Thomas Sydenham was the "what" Tom and a Parliamentarian (Figure 7). I don't think their politics had anything to do with their "why" or "what" mentality, but we see scientists and physicians over time split into these two categories: the "why" explorers and the "what" explorers. I have always considered myself more of a "what" explorer; maybe the "why" explorers are a little smarter. I do wish I could be more of a Tom Willis rather than a Tom Sydenham.

This is the end of this brief history of neurology lecture on the "Tale of Two Toms".

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18 Thomas Sydenham. *Dissertatio epistolaris.* 1682.