

Sir Astley Paston Cooper (1768–1841): The man and his personality

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Abstract

The most acclaimed surgeon of his time, Astley Cooper, a man from Norfolk and a student of the eminent John Hunter, was an outstandingly successful surgeon. With his accomplishments in surgery and experiments in dissection he soon became a prominent figure and received recognition worldwide. At the young age of 21 he was appointed Demonstrator in Anatomy at St Thomas's Hospital in London and two years later was made Joint Lecturer in Anatomy and Surgery. With his passion for anatomy, his love for surgery and his expanding knowledge he became Surgeon to Guy's Hospital in 1800 and in the same year was elected a Fellow to the Royal Society. His attainments led him to become surgeon to three successive British monarchs as well as receiving a bestowal of Baronetcy. Through his edifying lectures, fastidious experiments and publications on anatomy and pathology he has inspired and enlightened many budding anatomists and surgeons and the principles of his teachings still prevail in practice today.

Keywords

Astley Cooper, John Hunter, William Cooper, Isaac Newton, Brooke Hall, Henry Cline, Benjamin Travers, Copley Medal, Benjamin Brodie, Serjeant Surgeon

The English county of Norfolk

Astley Cooper was born on 23 August 1768 at Brooke in Norfolk. His father Reverend Samuel Cooper (1740–1800) was a country clergyman and his mother, Maria Susanna Bransby (1737–1807), a descendant of Sir Isaac Newton, was a successful authoress. Of Astley Coopers' nine siblings, five of the girls died of tuberculosis as did one boy, Samuel Lovick (1763–1817), who was father of Bransby Cooper (1792–1853).¹

The family was wealthy. Astley spent much of his youth in the opulent Brooke Hall. During the early years of his life he was sent to live with a wet nurse, Mrs Love, an unconventional decision taken by his mother. He spent five years on the Love's farm and later referred to them as his adopted family. In the later years of his life, while writing a treatise on the breast, he heavily criticised being wet-nursed: 'All animals, even those of the most ferocious character, show affection for their young – do not forsake them, but yield them their milk, – do not neglect, but nurse and watch over them'.²

Raised in a propitious environment where both his parents flourished in prosperous careers and his brothers obtained degrees at Cambridge, Cooper's paternal grandfather was a surgeon at Norwich and his uncle William Cooper was senior surgeon to Guy's Hospital. Under these favourable conditions he was reputed to be a poor scholar who lacked aspirations

to go to University and instead he received domestic education from his parents and in the meantime was sanctioned to run wild and adopt a devious boyhood, finding himself in all sorts of escapades.¹

Astley Cooper's interest in surgery may have stemmed from a memorable incident in his youth where, under immense pressure, he demonstrated an act of boldness and ceased a haemorrhage:

A foster brother of mine, named John Love, aged about 13 years was playing and fell as a wagon was passing, and one of the wheels of the wagon went over the back of the knee, as he lay with his face to the ground. The wagon stopped and when he was drawn from under it, a stream of blood directly burst from his ham; a handkerchief was tied tightly over the wound, and was carried home in a fainting state.³

At the expense of his foster brother, Cooper began his academic journey and went on to gain experience in apothecary. He soon became apprenticed to Edward

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Digby, a local Surgeon at the Norfolk and Norwich Hospital. His interest in surgery was kindled during this time when he watched Mr Donnee operate on a bladder calculus.

Cooper decided to embark in Surgery as a career and moved to London in August 1784. He was articled to his uncle William Cooper, Senior Surgeon to Guy's Hospital.⁴

New beginning

Up until 1825, Guy's and St Thomas's were referred to as the United Hospitals, closely affiliated with each other and students of each institution attended teaching in both hospitals. Lectures in medicine were given at Guy's and combined lectures in anatomy and surgery at St Thomas's.

Cooper demonstrated quite a somnolent attitude towards his studies; failing to impress in his first year, his uncle had no inclination to provide for him. This left Cooper in a predicament and he switched allegiance to Mr Henry Cline (1750–1827), Surgeon to St Thomas's, a colleague of William Cooper and student of John Hunter (1728–1793). Cline, unlike William Cooper, was patient with his student and one day challenged Cooper to dissect an arm. To his amazement, with skill and precision Cooper managed to complete the task. This episode may have transformed his indolent attitude, marking the beginning of his career. Indeed, Cline imposed much influence on Cooper; the solidarity which arose between the two men was thought to be an encouraging factor in establishing the firm foundations of what Cooper was to become. Eager to study cadavers and accompany Cline on ward rounds, slowly his knowledge began to sprout as he grew confident in the field of anatomy and surgery.⁵

Astley Cooper attended a series of lectures given by John Hunter whose character and wisdom had immediate impact on him. Hunter's lectures on aneurysms and his experimental work engaged Cooper's attention and inspired him to conduct animal experiments of his own. He would ligate femoral arteries and observe the animals heal and later kill them to demonstrate collateral circulation. Cooper soon became engrossed in animal experiments that he would conduct on the blood vessels of dogs and cats.

Professional development

In October 1787, at the start of his fourth year, Cooper visited Edinburgh where he studied under Professor Alexander Monro Secundus (1733–1817), son of Alexander Monro Primus (1697–1767). After seven months in Edinburgh, Cooper returned to London

and in 1789 at the age of 21 was appointed demonstrator in anatomy at St Thomas's. He continued with his studies and became more absorbed in his private experiments on stray animals. He was becoming a distinguished figure and with his willingness to teach he proved to be a remarkable demonstrator. Furthermore, he gained much popularity as a member of the Physical Society where he spoke with courage and fortitude at meetings.⁶

In 1791, Cooper was appointed lecturer in anatomy as an assistant to Mr. Cline. Still a student and a novice in surgery, Cline saw it suitable to do business with Cooper largely because of his aspiring personality and thirst for teaching. It was at this time largely as a result of Cooper's suggestions that the traditional teaching of anatomy and surgery were separated. He believed there was more to Surgery than anatomy and that pathology, embryology and physiology all had to be integrated. This was a radical change to be instituted by such a young man.⁶

In 1791 Cooper married Ann Cock, the daughter of a wealthy merchant who left Cooper a fortune of £14,000 and bought a house for them in Jefferies Square. In the summer of 1792 the couple travelled to Paris, a City that greeted them with heightening political uneasiness. The purpose of Cooper's visit was to study the work and teachings of the great French surgeons for which he attended the lectures and operations of Dessault and Chopart (1743–1795).³

Surgeon

With seven years of hard work behind him, at the age of 23 Astley Cooper stood before a long career of achievements. He devoted himself wholly to his work and desired to sharpen and enhance his training. He was determined not to seek private practice and offered his time to see non-paying patients. In his own words

For three years after my apprenticeship expired, I did not seek business, but devoted myself to the study of my profession, and to teaching the students entirely. My industry at this time may be gathered from the following circumstances.³

The first course of lectures he gave on surgery was disappointing. His teachings were unsuitable for students and this was reflected in the poor attendance of students at his second course of lectures. Cooper resolved this by adopting a distinct fashion of teaching, one that was less vivid and far less abstract and designed to attract and retain the attention of the students. He introduced cases from the hospital wards and selected patients suffering from a disease that had a bearing on the subject of his lecture. By the winter season of 1793 Cooper had

become a reputed lecturer and this was reflected by the overwhelming attendance of his students.¹

At the age of 25 he was merited as Professor of Anatomy at Surgeon's Hall. This position entailed performing public dissections of the bodies of criminals executed at the Old Bailey. Cooper held this position for two years and preferred not to continue for a third year.⁶

The Winter of 1794 witnessed the death of the Cooper's first child, Anna Maria. Grief-stricken, they adopted a baby girl, Sarah, who was brought up as their own. Cooper threw himself wholeheartedly into his work and remained engaged in his lectures, clinical teaching and research. He became a fervent attendant at the Physical Society and in 1798 a volume called *Medical Records and Researches* was published, comprising selected essays based on papers read at its meetings. These records contained two of Cooper's essays, one a report of a case of diaphragmatic hernia and the other a report on the observation and experiments on obstruction of the thoracic duct. The two reports were his first surgical publications.¹

Four years later, in 1797 the Coopers moved to 12 St Mary Axe, the former house of Henry Cline. Cooper did this for two reasons: 'It is well calculated to private practice, and has also a large warehouse attached to it, which will make a most admirable dissecting room'.³

Although his private practice was modest, it was definitely fruitful since his income rose to £610 a year. In addition, he did not abstain from seeing poor non-paying patients. The large warehouse indeed proved to be an admirable dissecting room, permitting Cooper to exercise his skills and dissection. He was not reserved about his work and accepted unusual animals to dissect, for example an elephant which he received from the Royal Menagerie.⁵

Surgeon to Guy's Hospital

In 1800 William Cooper was due to retire from Guy's after fulfilling a laborious career. Of the four candidates, Astley Cooper was the leading surgeon to fill the vacancy and Cooper was most impressive with his professional attainments and after presenting his application to the Board of Governors Astley was chosen to succeed his uncle and joined Guy's as Surgeon in October.¹

Patients were regarded as fortunate to receive his services and students lucky to have him as their mentor due to his knowledge and acclaimed teaching abilities. Benjamin Travers (1753–1858) who was apprenticed to Astley Cooper describes his work at this time: 'Guy's Hospital, to which he was newly elected surgeon, shared a large portion of his time. His interest in his profession was genuine, independent of the additional incitement of the love of reputation or of gain'.³

Furthermore, Cooper's private practice was growing and with his new position at Guy's he was earning £1000 a year. He was absorbed in his work and did not compromise his constant experimental dissections. His loft occupied up to 30 dogs at one time as well as cats, snakes and rabbits ready to be sliced, injected, dissected and preserved. Cooper performed his experiments purely out of curiosity and in one particular experiment he chose to destroy the blood supply to one of his dog's testicles and then cut the vas deferens on the other side. Later, when he killed the animal, the testicle where the blood supply had been ligated had shrunk while that on the other side was large and healthy. By slicing the vas deferens he failed to find damage to the testicle and the two ends of the vas did not join up again. This is the scientific basis of vasectomies performed in practice today but whether it was inspired by Astley Cooper remains a mystery.^{5,7}

Professional attainments

In 1800 Cooper read to the Royal Society a paper entitled *Observations on the effects which take place from the destruction of the membrane tympani of the ear*⁸ and in the following year he read a second paper in which he suggested myringotomy for obstructive deafness. His work was original and experimental and earned Cooper the honour of becoming a Fellow of the Royal Society and receiving the prestigious Copley Medal, the highest honour the Society could bestow⁸ (Figure 1).

Treatise on hernia in 1804

The year 1804 saw the publication of the first volume of *Treatise on Hernia*,⁹ one of his greatest works, centred upon inguinal hernia. The second volume that followed in 1807 was concerned with femoral, umbilical, obturator, sciatic, diaphragmatic and mesenteric herniae.¹⁰ Moreover, Cooper was the first to give an accurate description of the internal abdominal ring and the fascia transversalis. He is also commemorated by the attachment of his name to what he himself depicted as the *ligament of pubis* (Astley Cooper's Ligament). His explanation of the surgery of strangulated hernia, where he carefully delineates it, is captivating and provides an account of two personal experiments to support this.

Work on aneurysms

Cooper, like John Hunter, was fascinated by the distinct behaviour of arteries and the body's capacity to develop collateral circulation. As a medical student, Cooper performed a series of investigations on the

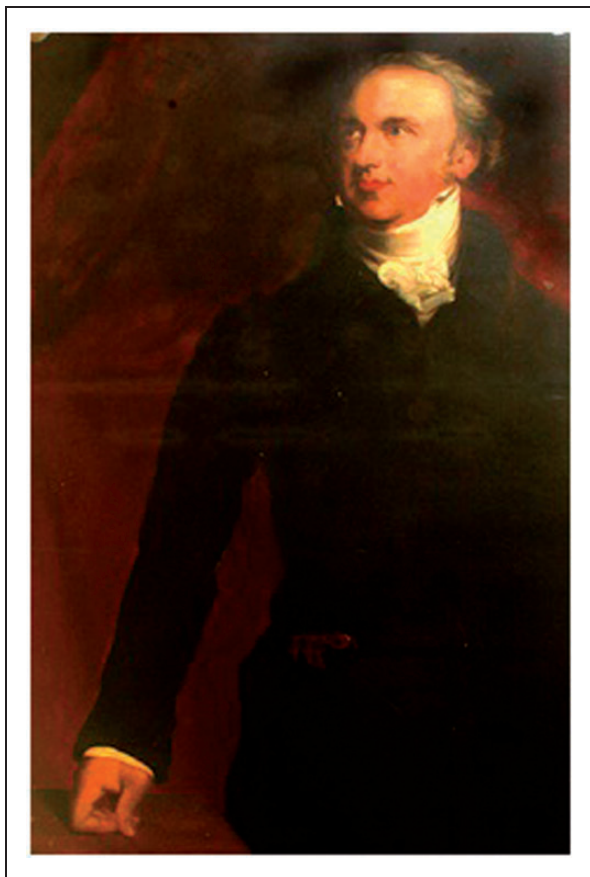


Figure 1. Sir Thomas Lawrence's portrait of Astley Cooper. Royal College of Surgeons England.

cerebral circulation in dogs and showed that both carotid arteries could be ligated without harm to the dog. He demonstrated that the vertebral arteries prevent hypoxia of the cerebrum but that ligation of both vertebrals was usually fatal. One dog was fortunate to survive and lived for nine months after ligation of both the carotids and vertebrals, before being killed to demonstrate the collateral circulation that developed¹¹(Figure 2).

Diseases of the carotids, including aneurysms, were deemed untreatable until Cooper met Mary Edwards on 1 November 1805. He took particular interest in her case and performed the first common carotid artery ligation to repair her aneurysm. A two-inch incision was made along the sternomastoid, the common carotid was exposed, the vagus separated and two thread ligatures were passed around the vessel and tied firmly. All pulsation ceased and progress was good but on 21 November 1805 Mary Edwards died and autopsy revealed 'inflammation of aneurismal sac'. Nonetheless, his ligation of the carotid artery was a bold surgical operation and one based on his numerous animal experiments and observations.^{1,11,12}

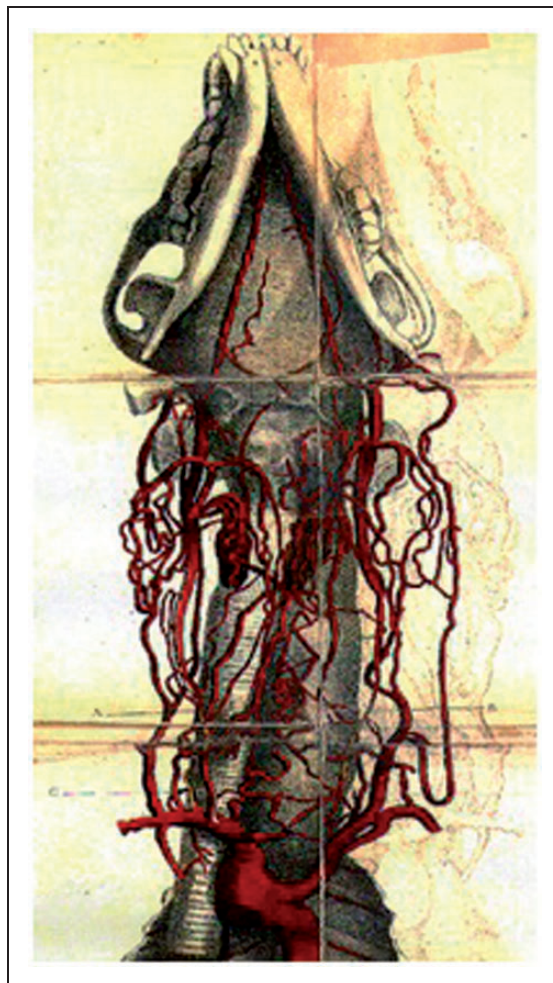


Figure 2. Illustrations of the neck, chest and heart of a dog dissected by Astley Cooper. The Gordon Museum, Guy's Hospital.

Three years later, on 22 June 1808, came Cooper's second opportunity. Humphrey Humphries, fifty years of age, presented with an aneurism about the size of a walnut on the left side of his neck. The carotid artery was tied and divided between the ligatures; the patient's recovery was unremarkable and he survived for fourteen years and died from cerebral haemorrhage. On the same afternoon of 22 June 1808 Cooper ligated the external iliac artery for a femoral aneurysm. His patient, 39 years of age, recovered well and died 18 years later.^{11,13}

In 1817 came Cooper's pinnacle achievement in arterial surgery; ligation of the abdominal aorta, the most impressive and phenomenal operation of his career. Charles Hutson, aged 39, was admitted to Guy's on 9 April 1817 for an aneurysm in the left groin. On the third day the swelling above Poupart's ligament increased from three to four inches, carrying the peritoneum far from the lower part of the abdomen

and reaching the common iliac artery. Ligation of the aorta was indicated: before Cooper operated he studied its surgical anatomy carefully and rehearsed a transperitoneal exposure. With the confidence of success in his dog experiments, where he ligated the abdominal aorta and observed sufficient collateral channels to maintain the blood supply to the lower limb, he performed the surgery. The operation went well; a thread was passed successfully around the aorta about three-quarters of an inch above its bifurcation. Although the right limb recovered its warmth and sensation, the left limb, on the side of the aneurysm, became progressively pale and cold and the patient died forty hours after the operation. In hindsight, Cooper knew he neglected the operation until it was too late and that gangrene of the affected limb was inevitable. However, the fact that the opposite leg remained viable inspired hope in Cooper that survival could follow aortic ligation^{1,11,14} (Figures 3 and 4).

Daily work

In 1806, Cooper moved to Broad Street. The years he spent at Broad Street were his most successful and industrious years. Cooper began his day at six in the morning. He would visit his private dissecting suite and work there until half-past seven. Satisfied with his morning efforts he dressed for the day and saw non-paying patients. A hasty breakfast followed since by now his private, wealthy patients were arriving and he would attend to them in his consulting room until one o'clock. At this time his carriage would take him to Guy's where a large crowd of medical students greeted him. Cooper would waltz up the ward staircases causing mayhem as pupils would push and tumble so as to get near to him and secure a front place during ward rounds. He would pass from bed to bed inspecting his patients and as two o'clock drew closer pupils would leave the wards and go across to St Thomas's Hospital in anticipation of Cooper's lecture. After an hour of lecturing, generally he would visit the dissecting room to comment on dissections and at half-past three would leave Guy's to attend to his private operations. He was occupied till six or seven in the evening and when he arrived home he would engage in conversation until dinner was ready. If it were the evening for his surgical lectures, he would get into his carriage and drive to the hospital. If it were not a lecture night, he would sit and talk to the family and to his apprentices about their daily work.³

In May 1813 the Council of the Royal College of Surgeons appointed Cooper Hunterian Professor in Comparative Anatomy. The post entailed delivering a course of 12 lectures. He began preparing his lectures and his specimens, limiting his sleep to three or four hours a night and seldom reaching home from hospital



Figure 3. Astley Cooper's successful ligation of the aorta in a dog. The specimen is injected to show collateral circulation. The Gordon Museum, Guy's Hospital

before midnight. He began dissecting furiously and sought to procure animals of all types, foreign and domestic. The popularity of his lectures was reflected in the consistent attendance of over 300 people although this was to be relatively short lived. In 1814, with the death of his adopted daughter and the hardship that came with the great labours of his practice, he decided to abandon his lectures.^{5,6}

Cooper's health began to show signs of giving way. The immense labour that went into preparing his lectures on comparative anatomy, his private practice and his hospital work had threatened his wellbeing. On one particular occasion, when the Duke of Manchester summoned him for a consultation, he was seized by an attack of vertigo. He realised he must do less and in 1815 decided to leave his City practice and move to New Street in the West End in the hope of restoring his health.^{3,5}



Figure 4. Specimen from Astley Cooper's case of ligation of the aorta in man. The Gordon Museum, Guy's Hospital.

Sir Astley Cooper was indubitably the most successful Surgeon in London at the time and as a consequence wealthy merchants paid very large fees for his services. His consultations rarely cost less than five guineas and he was paid generously for long-distance visits. In the year 1815, when at the summit of his career, he was earning the huge sum of £21,000 a year.⁵ Cooper practised Surgery not for gluttony but for the love of it and his perseverance, ability and knowledge brought him remarkable success. Sir Benjamin Brodie (1783–1862), one of his earliest apprentices and Surgeon to St Thomas's, said

Although he received from his practice a larger income than was ever obtained, either in the medical profession or in any other, he never exhibited anything approaching the vice of avarice. He was in the greatest degree liberal.^{1,3}

Achievements

The year 1818 saw the first volume of *Surgical Essays*¹⁵ written in conjunction with Benjamin Travers.

This book contained an invaluable account of his operation of ligation of the abdominal aorta for a leaking ilio-femoral aneurysm. Two years later he was appointed to the Court of Examiners at the College of Surgeons and later that year was summoned to remove an infected sebaceous cyst from the head of King George IV (1762–1830) who made Cooper a Baronet for his valour and aptitude, despite the risk of erysipelas. For his service he was also rewarded with a costly epergne, a table centrepiece designed by the King himself. He continued to attend to the King from there on and in 1828 was appointed Sergeant-Surgeon, a post he held for two years. Astley Cooper also served as Sergeant-Surgeon to William IV (1765–1837) and Queen Victoria (1819–1901) and later was given the honour of embalming the body of William IV.^{1,4}

Treatise on fractures and dislocations

In 1822 Cooper completed a monograph on Fractures and Dislocations and this treatise, though not based on as much original work as the *Treatise on Hernia*, was probably the most practical of his books and had the widest appeal. The monograph includes much of his original research and here almost all the common fractures and dislocations are shown dissected and displayed.¹⁶

Avoidance of amputation for compound fractures

The norm for treating compound fractures was often immediate amputation of the limb but Cooper recommended this was not always necessary. In his opinion

If loose fragments of bone can be felt, the wound should be enlarged for their removal and instead of fomentations and poultices, a piece of lint, dipped in the patient's own blood, be applied to the wound and bound in place. The whole limb should then be immobilised on a splint. In the instance of suppurative process, a small opening should be made in the bandage to allow the escape of pus.¹⁶

Astley Cooper's method of reduction of dislocated shoulder

Astley Cooper's concise description on how to use the *Heel-in-the-axilla* method of reduction for a dislocated shoulder was original. In this procedure the arm is placed in an abducted position while direct pressure is applied on the head of the humerus with the sole of the foot.¹⁶

Intracapsular fracture of the neck of the femur

Astley Cooper performed copious investigations and experiments to understand the factors responsible for the non-union that follows an intracapsular fracture of the neck of the femur. By observation and dissection in man and by many experiments on animals, he concluded that in first circumstance non-union was the result of faulty apposition of fragments due to their separation by muscular pull. Furthermore, a larger contributing factor is the imperfect blood supply to the proximal fragment, purely as a result of the fracture. The importance of such factors remains unchallenged today.¹⁶

Amputation at the hip joint in 1824

On 15 January 1824 Cooper performed an amputation through the hip joint on a soldier from the Battle of Waterloo, an event that ignited vast interest throughout Great Britain. Before the introduction of antiseptics and anaesthesia, with courage and boldness Astley Cooper successfully performed the operation and his patient made a good recovery although retarded by infection and suppuration in the stump.^{8,11}

The retired teacher

Winter of 1824 was troublesome for Astley Cooper as his sudden giddiness began to become increasingly frequent and disabling. By January of 1825, at the age of fifty-six and with increasing poor health, Cooper retired from hospital work as a full-time Surgeon. With his resignation accepted, Cooper now had the right to nominate his successors and chose two men, his old student John South and his nephew Bransby Cooper. However, these were rejected by the Governors and John South was appointed Lecturer in both Anatomy and Surgery. Angered by this rebuttal, with the help of Benjamin Travers Astley managed to persuade Guy's to split from St Thomas's and found an entirely separate medical school and thereby, splitting Guy's and St Thomas's, Cooper created a new post for his nephew.^{1,5,6}

Cooper was not inactive during retirement. Soon after the separation of the schools he was appointed Consulting Surgeon. Rather than withdrawing himself from 30 years of practice, he used his retirement to seek new knowledge. He was occupied in his private practice, now busier than before, but the year 1827 proved to be bitter as he witnessed the deaths of his great Master Cline and his beloved wife, Lady Cooper. Such events exacerbated Cooper's already ill health and on the impulse of his miserable state he retired from his practice altogether. Cooper appreciated his freedom from practice but in six months, complaining of boredom, he returned to London

to practise once again. He regarded his short-lived retirement as an opportunity to write further monographs and in 1829 published *Illustrations of the Diseases of the Breast*¹⁷ and in 1830 *Observations on the Structure and Diseases of the Testis*¹⁸ a monograph also ranked among his best works.

In 1832 came an unexpected contribution, *The Anatomy of the Thymus Gland*¹⁹ and in 1840 was his last publication *The Anatomy of the Breast*.² This monograph includes an account of the normal anatomy of the breast, a short section on comparative anatomy and notes on the physiology of lactation. His most exceptional contribution to the anatomy of the breast is his description of the Ligamenta Suspensoria, known more commonly as Cooper's Ligament of the Breast.²

The final chapter

In 1827, when Cooper returned to London his leadership and domination of English Surgery was acknowledged by his election as President of the Royal College of Surgeons. Three years later he received another great honour when elected as one of the Vice-Presidents of the Royal Society and, in 1836 was elected President of the College for the second time. In addition, he had honours from almost every country where medicine and surgery were practised. This included his election to the National Institute of France, his election as an Honorary Fellow to the Scottish Royal College of Surgeons and a Doctorate awarded by the University of Oxford. Moreover, he became a Fellow of the Royal Society of Gottingen and the Russian Imperial University of Vilna awarded him a Diploma. He was made a Corresponding Member of the First Class of the Royal Institute of the Netherlands, a member of the Society of Natural Philosophy of Heidelberg, of the Physico-Medico Society of New Orleans, of the Academy of Medical Sciences of Palermo and of the Mexican Medical Society of Guadalajara.^{5,6}

By 1835 Cooper had reached the age of 67 and his health was failing. Until his last breath he was determined to do what he loved most. He continued to see patients and began preparing a book on Malignant Diseases of the Breast that unfortunately was never to be finished. At the end of 1840 he began to have grave difficulty in breathing and in December of that year he retired to an armchair. His decline became progressive from there on and on 12 February 1841, at the age of 72, Sir Astley Cooper died. He was buried under the Chapel at Guy's Hospital.

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Sir John Struthers (1823–1899), Professor of Anatomy in the University of Aberdeen (1863–1889), President of the Royal College of Surgeons of Edinburgh (1895–1897)

MH Kaufman

Abstract

Between 1841 and 1845 John Struthers attended both the University of Edinburgh and some of the various Extra-mural Schools of Medicine associated with Surgeons' Hall. While a medical student he became a Member of the Hunterian

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