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SURGERY OF EIGHTEENTH CENTURY ENGLAND

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During the eighteenth century, England was a country in which the nobility and other groups of society patronized numerous charlatans and mountebanks. This "Age of Enlightenment" was a period during which great rationalizing by the intelligentsia took place in Western Europe. However, the rest of society was often led astray by quacks who pretended to possess numerous natural powers and abilities. Sometimes the surgeons of this period were men who did not deserve the right to take the lives of other human beings into their own hands. During this interval in the history of medicine, however, the art of surgery developed into what could be considered a field of science. There were relatively few new principles introduced into surgery, but techniques were greatly improved in the realms of normal and pathological anatomy.

The history of surgery can be traced back to the days of the Stone Age when the aborigines roamed over the plains of Europe and performed operations with tools of chipped flint. Surgery gradually progressed through the era of the advanced civilization of the Egyptians. The Greeks added to the progress during the time of Hippocrates, the Father of Medicine, and subsequently. The Arabians developed further advances during the Middle Ages.

The social status of the surgeon was greatly enhanced during the Middle Ages in Europe as well as in England. The surgeons were organized with the barbers in business guilds that were known as Barber-Surgeon Companies. During the first part of the

medieval period, the task of operating was performed usually by the barber, although some of the work was often done by executioners, bathhouse-keepers, and strolling vagabonds.¹⁶ In time the surgeon gradually became specialized. Nevertheless, he was still associated with the barber as a layman and could only operate at the discretion of the practicing physician.³⁴

Barber-surgeons were usually divided into two distinct classes.¹⁵ The first class was the short robes who could not use Latin and had not attended a university. The long robes were educated men from universities who could apply the vernacular language of the ancient Romans. Although these men of the long robe were educated, they were held in a position subordinate to the practicing physician. The men of the long robes preferred not to come in close contact with a wounded person. They would give advice to patients but would call for the services of a short robe if any cutting was needed. The long robe would point out with his cane and explain what should be cut; the short robe would do the cutting.

Authority from legal enactments and royal edicts gave the long robes control of the surgical profession.¹⁶ They had the power to dictate how the art of surgery was to be practiced and by whom; and they did just that. They passed on codes of surgical treatment that had developed since antiquity over the centuries and which were rigidly enforced. By following the

procedure of handing down the rules for the practice of surgery, relatively few improvements were added to the skills of the practice. The chirurgeons discouraged improvements and based all of their procedures on traditional systematic processes.

At the beginning of the eighteenth century, organization of the surgeons was still the Barber-Surgeon's Company. Different towns and localities had their own special rules. In the early part of the century, the only way a surgeon could practice his skills within seven miles of London was to be associated with the barbers as a "City Company".³⁴ At Oxford a person was sometimes granted a license in surgery by proving that he had treated a certain number of poor persons, or he could become "privilegati" by showing that he possessed a license from a Barber-Surgeon's Company.³⁵

To obtain a license from a Barber-Surgeon's Company, a person attended public lectures and demonstrations given by the most prominent surgeons of the time. These teachers were often unable to obtain the specimens needed for demonstrations. The licensee had to pass an oral examination in English but was not required to do a thesis as was required of the physician.³⁵

The rank of the surgeon, in the eyes of other than those of the profession, can be seen in the tales of surgeons who were taken prisoners in 1744 by French and Spanish warships.³⁵ They complained that they were not treated as commissioned officers but mere privates because their captors claimed that they were barbers.

On May 2, 1745, a decision of the House of Commons divided the London Company of Barber-Surgeons into two companies. The newly formed Company of Surgeons took over the Gale and Arris bequests for lectures, assumed the right of choosing surgeons for the army as well as the navy, and received the old exemption from serving on juries and in parish offices.²⁹ John Ranby was the first Master and William Cheselden was a warden. Their admission fees were reduced from £100 to £25, and the company started as the licenser and educator of the London surgeons.²⁹ They left the barbers their ancient hall, and the paintings, silver, and books which had accumulated through the ages. The company was badly managed and had trouble with bankruptcy of its clerks. Their Master in 1790, John Gunning, is quoted as saying,

Your theatre is without lectures, your library without books is converted into an office for your clerk, and your committee room is become his eating parlor; and is not always used even in your own common business, and when it is thus made use of it is seldom in a fit or proper state.⁹

On March 22, 1800, the Company of Surgeons became by a Charter from the Crown, the Royal College of Surgeons in London.

During the first part of the eighteenth century, George Wbife, in 1701, began a course of lectures and demonstrations in which the student could actually take part in the work. He later became Professor of Anatomy at Cambridge.³⁵ He was soon followed by Bussiere, a refugee surgeon from France, who gave lectures on anatomy.²⁴ Cheselden began a series of lectures

in 1711 which continued for twenty years.²⁴ In 1734, Edward Nourse announced in the London Evening Post of October 17th,

...designing to have no more lectures at my own house, I think it proper to advertise that I shall begin a course of Anatomy, Chirurgical operations and Bandages on Monday, 11th November at St. Bartholomew's Hospital. Edward Nourse, Asst. Surgeon and lithotomist to the said Hospital.^{1,25}

William Hunter advertised that he would start a course of anatomical lectures on October 13, 1743, to which "would be added the operations of surgery, with the application of bandages."³⁵ Hunter made the participating students dissect a body so that they could verify the statements made by the teachers or could have the structures pointed out by a demonstrator as the lecturer mentioned them as he read from a book. Another source states that he set up a small school to instruct a "Society of Naval Surgeons", and that he delivered his first course in the home of James Douglas in 1746.³⁴ In 1768, he built his famous anatomic theater and museum at Great Windmill Street where the best British anatomists and surgeons of the period were trained until it closed in 1831.

Percivall Pott began giving private lectures in his home on Watling Street in 1747 to students who followed his surgical practice in St. Bartholomew's Hospital.³⁴ He expanded the course after he gained more self-confidence and taught many surgeons to be, including John Hunter in 1751.

The latter part of the century saw the apex of the teaching

in the hospitals that had begun the previous century. Surgeons would take on pupils and would instruct them in the surgical skills. Unlike being a graduate of a university as the physician was, the surgeon was an apprentice.

Up to the eighteenth century, the surgeon had been a layman, who did operations at the physician's discretion, but now he was blossoming in a realm of his own. At last he had some say in the treatment of the patients upon whom he performed operations. As old beliefs were disregarded and as the knowledge of anatomy increased, "operative surgery such as amputations of the extremities, excision of tumours on the surface of the body, and removal of stones from the bladder"¹⁷ increased the respect for surgery, and methods were adopted which could not be improved upon until the fields of chemistry, physics, and optics had enlarged.

Operations were only undertaken as a last resort after patients had often suffered for months. A patient was psychologically prepared for the operation, as he often is done today by doctors, so that he thought he would recover or at least be relieved of pain. He was not usually drugged but was generally given a glass of brandy. Binding of the patient was not practiced, but the surgeons usually had three or four assistants to hold the patient down. In many accounts people said that the pain was great, but it was not unsupportable.³⁵ The person perspired but did not usually

faint. The operation was performed as quickly as possible, and the worst of the pain was soon over. Blood seemed to flow freely, and the methods used by the surgeons to stop the bleeding were easily contaminated by the soil and clothing. As the bacteria count rose, soon stench, fever, and even death were evident and unavoidable.

It was hard for the anatomists and surgeons to get cadavers to work upon, and many illegal means were used in obtaining subjects. Therefore, all publicity was avoided. In the larger cities, a professional class arose under "the various names of fishermen, body-snatchers, sack-em-up men, and resurrectionists."³¹ who "robbed graves, lured victims to lonely inns, strangled them, sold the remains to . . . doctors."³³ The anatomist was a victim of circumstances because he could not get along without the services of this class. When a person was caught and imprisoned, the anatomists helped him and supported his family. If an anatomist refused to do business with one of the class for various reasons, he was blackballed by the whole class and did not receive specimens. To show the importance of having specimens, John Hunter supposedly related that he had dissected thousands of cadavers over the years.³¹

Many references have been made in the literature and history of these gangs. Shenstone in his twenty-second elegy complains about the frequency that the tombs are opened, and people are removed.²⁴ Also during this era of plunder, Londoners sang the

popular ballad of Mary's Ghost, complaint of a resurrected girl to her lover:

The arm that used to take your arm
Is took to Dr. Vyse,
And both my legs are gone to walk
The Hospital at Guy's.

As for my feet, the little feet
You used to call so pretty,
There's one I know in Bedford Row
The t'others in the City.³³

The first part of the eighteenth century also marked an era where the surgeons were gradually replacing the dirty, ignorant, unskilled midwives. During the latter period of midwifery, the practice of inducing premature birth as a means of avoiding difficult labor was revived. Surgeons tended to make child-bearing an operation and used instruments whenever possible. Sometimes, if something was not normal, they would employ cutting which often meant certain death.¹⁴ They practiced blood-letting, and the women were bled either for preventive treatment if normal or for treatment if anything seemed abnormal.

Two of the most prominent obstetrician-surgeons of the century were William Hunter and William Smellie. Hunter's most important accomplishments were in the fields of obstetrics and gynecology where "his well known atlas of the pregnant uterus . . . remains a monument to his genius."²¹ In 1757, he proposed the excision of ovarian cysts which, as early as 1701, Robert Houstoun had tapped for ovarian dropsy.¹¹ William Smellie invented many obstetric instruments, and he wrote a treatise on the theory and practice of midwifery. He studied the deformation

of the pelvis, and he was the first to show the importance of vertex and breech deliveries.²⁸ The practices that Smellie introduced were observed in France during his studies there.³⁴

In 1789, Matthew Baillie described the dermoid cyst of the ovary.¹¹ Thomas Denman demonstrated how the infection due to childbirth was easily spread²⁸ and reported an imperforate hymen through which he made an incision and later followed with several stellated incisions.¹⁹

The obstetrics forceps began to be used widespread in the eighteenth century. The Chamberlen family is credited with the invention of the forceps that resembles the type used today. By the early part of the century, doctors were using forceps with which a living child could be extracted in circumstances where formerly both the mother's life and the child's life were endangered. William Hunter did not believe in instrumental midwifery, "and was in the habit of showing his forceps, covered with rust, as evidence that he never resorted to such aids."²⁸

In 1782, Welchman performed a symphyseotomy in England for the first time.³² This was condemned by the Hunters, Osborn, and Denman, and only favored on theoretical grounds by Leake and Aitken. In 1785, Aitken proposed his "new pelviotomy" which has been described as the precursor of modern pubiotomy.³⁷

Caesarian section in the eighteenth century almost always ended in the demise of the mother. It was the first successfully performed in England in 1793 by Barlow, of Bolton; but in that

case the child did not survive.³² Ould claimed that a caesarian section was a "detestable, barbarous, illegal piece of inhumanity."³² Although Smellie, Denman, Burton, and Hamilton had accepted the operation for cases of extreme pelvic contraction, Osborn felt that neither a caesarian section nor symphyseotomy was ever a justifiable operation. In the cases of contracted pelves that could not be delivered by forceps, a craniotomy was commonly done sacrificing the child.

The surgeon was also known to indulge in the field of dentistry and dental surgery during this era. It was possible in 1749 in London to get false teeth which could be left in over night and could be taken out to be cleaned.²³ Also it was a common practice to transplant teeth as can be shown by "A Practical Essay on the Human Teeth" written in 1781 by Paul Euralius Jullion in which he quoted the following prices: "Transplanting a living tooth 5 pounds, 5 shillings; transplanting a death tooth, 2 pounds, 2 shillings."²³

John Hunter recommended the local plan of a plugging compress of lint or a piece of cork thicker than the bodies of the adjacent teeth for the treatment of an alveolar hemorrhage.¹⁹ Both Hunter and William Drake favored the pulling of a molar tooth and perforating the partition between the roots of the alveolar process and the antrum for the treatment of abscesses of the maxillary sinuses.¹⁹ In 1719, James Keill,

of Northhampton, attempted to treat an oral cancer of his own mouth by cautery but failed to get relief.¹⁹

There was no such subspecialty of surgery as otorhino-laryngology in the eighteenth century but several surgeons contributed to the history of this field as well as that of ophthalmology. Cheselden observed several times that hearing was but little affected, or not at all, by the perforation of the tympanic membrane.³⁰ John Douglas and other surgeons very highly recommended injections through the Eustachian tube for cure of deafness arising in the internal ear.³⁰ In 1755, Johnathon Wathen condemned Guyot's method of Eustachian catheterization and suggested a method of relieving catarrhal deafness by means of injections into the Eustachian tube through a catheter passed into the nose.¹² Near the end of the century, Sir Astley Cooper performed an operation on the ear in which he perforated the eardrum to relieve deafness accompanied by "classe of the Eustachian tube."⁷ He performed this operation successfully three times.³⁰

In 1728, according to Garrison, Cheselden introduced a new operation for an artificial pupil which consisted of a simple iridotomy with a needle. Renouard gives Cheselden credit for publishing in 1732 the history of an operation for synechia which he had successfully performed. This also consisted of making an opening or artificial pupil in the center of the iris. This rarely succeeded and therefore the procedure

of Cheselden was later judged defective. His professional status is shown in Pope's couplet:

"I'll do what Mead and Cheselden advise,
To keep those limbs and to preserve those eyes."¹¹

Samuel Sharp in 1753 was the first to cut the cornea with a knife in operating for cataract.¹² Pott discussed the subject of depression of cataracts in his Chirurgical Observations, written in 1775:

When the opaque crystalline is in a state of dissolution, or the cataract is what is called perfectly soft, if the capsula of it be freely wounded by the couching-needle, the contents will immediately issue forth, and mixing with the aqueous humour will render it more or less turbid; sometimes so much as to conceal the point of the needle and the iris of the eye from the operator. . . . The aqueous humor, however turbid it may become, will in a very short space of time be again perfectly clear; and if no disorder of the capsula of the crystalline, previous or consequential, prevents, the rays of light will pass without obstruction through the pupil, and the patient will be restored to perfect vision as could have followed the most successful operation of either, or of any kind, in the same subject under the same circumstances.¹⁹

Pott described a "puffy tumor" in his Injuries of the Head, 1768, which actually was a pericranial abscess.¹⁸ He thought that the bone was affected only secondarily to that of its membrane and believed in free blood-letting at the onset of symptoms. He also thought that trephining for matter between the bone and dura mater was a successful operation for this condition, and he indeed was successful in five out of eight cases in which he tried trephining. The majority of these were limited to inflammation of the outer surface of the dura mater. Samuel Gross related

that Pott did not procrastinate in acting, but with a slight blow on the head, followed by the formation of pus between the pericranium and bone, pain, restlessness, languor, febrile action, slight rigors, cephalalgia, and a quick pulse, were sufficient indications that the dura mater was seriously involved.¹⁸

John Abernethy reported in his Injuries of the Head, 1797, that he had successfully used trephination for the compression of the brain from blood that had extravasated between the skull and the dura mater.¹⁸ Pott felt that intracranial inflammation would, in all probability, follow a fissure of the skull and stated "that perforation is absolutely necessary in seven cases out of ten of simple undepressed fracture of the skull."¹⁸

Samuel Sharp also devised the cylindrical or rounded form of the crown of the modern trephine used for craniotomy in brain surgery.¹⁹

William Cruikshank communicated to the Royal Society in 1795 an account of the regeneration of nerves.¹⁹ In 1793 Abernethy introduced neurectomy and was able to show successful reunion after removal of one-half inch of the nerve and the return of normal sensibility of the patient's finger.²⁵

In 1733, Cheselden published his famous Osteographia, which he dedicated to Queen Caroline, the wife of King George II.¹⁹ In 1768, Pott published his treatise "On Fractures and Dislocations" which was added to his work On Injuries of the Head.^{3,19} John Hunter explored the treatment of club foot⁵ and studied how the

union of ruptured or severed tendons occurs, having ruptured his own Achille's tendon while dancing.¹³ William Cheselden treated club foot for almost forty years by manipulative correction, using adhesive tape to preserve the improved position, and evidently achieved considerable success because cases came to him from all over Great Britain.³

Percivall Pott fell off his horse in 1756 and sustained a compound fracture of his lower leg. He described this fracture which has since been known as Pott's fracture:

The support of the body, and the due and proper use and execution of the office of the joint of the ankle depend almost entirely on the perpendicular bearing of the tibia upon the astragalus, and on its firm connection with the fibula. If either of these be perverted or prevented, so that the former bone is forced from its just and perpendicular position on the astragalus, or if it be separated by violence from its connection with the latter, the joint of the ankle will suffer a partial dislocation internally, which partial dislocation cannot happen without not only a considerable extension, or perhaps laceration of the bursal ligament of the joint, which is lax and weak, but a laceration of those strong tendinous ligaments which connect the lower end of the tibia with the astragalus and os calcis, and which constitute in great measure the ligamentous strength of the joint of the ankle. This is the case, when, by leaping or jumping, the fibula breaks in the weak part already mentioned, that is, within two or three inches of its lower extremity. When this happens, the inferior fractured end of the fibula falls inward toward the tibia, that extremity of the bone which forms the outer ankle is turned somewhat outward and upward, and the tibia having lost its proper support, and not being of itself capable of steadily preserving its true perpendicular bearing, is forced off from the astragalus inwards by which means the bursal, or common ligament of the joint, is violently stretched, if

not torn, and the strong ones, which fasten the tibia to the astragalus and os calcis are always lacerated, thus producing at the same time a perfect fracture and a partial dislocation.¹⁸

In his classical work on fractures and dislocations, Pott stressed the necessity for the immediate setting of a fracture and the need for relaxation of the muscle in order that the setting could be carried out successfully.⁶ In dealing with fractures of the femur, Pott advised that the limb, flexed at the hip and knees, should be laid on its side supported only by loose lateral splints.⁴ His contention was that, by thus relaxing the muscles, the fragments fell into position. Desault, on the other side of the English Channel, placed the limb in an extended position and applied an external splint from the crest of the ilium to a point below the foot and attempted extension and counter-extension as the governing principle in the treatment of femoral fractures.⁴

The elbow joint was first excised by Wainman in 1758.²⁸ The first knee joint excision was done by Filkin of Northwick in 1762 on a knee joint partially destroyed by tuberculous infection.³ Henry Park brought attention to the operations of these men in 1782, but they were forgotten until they were revived by Liston and Syme in the past century.²⁸ Park was performing many excisions of the larger joints towards the end of the century and described the operation of excision and arthrodesis as a treatment for destructive joint disease.³ Charles White of Manchester, whom

DeQuincy described as "the most eminent surgeon by much in the North of England,"¹¹ is usually given credit of performing in 1768 the first subperiosteal resection of the head of the humerus,^{3,11,28} but it actually was not done until 1774 by Bent of Newcastle.²⁸ White also introduced the method of reducing dislocations of the shoulder by means of the heel in the axilla.^{11,12,28} In 1762 Thompson was one of the first to describe subcoracoid dislocation of the humerus.¹⁹ Charles White performed the resection of the hip joint on a cadaver, but a man with the same last name, Anthony White, had performed the operation on a living subject in 1721.²⁸

Charles White recommended for treatment of non-union of bone fractures that the lower limb be enveloped in a firm apparatus and directing the patient to walk on it. In White's case a large abscess formed in the thigh.¹⁸ Bromfield described, in his work on surgery written in 1773, the symptoms that would lead the surgeon to suspect the existence of a bone abscess and taught that the operation of trephining in such cases should be substituted for amputation.¹⁸ In 1775 Benjamin Gooch described "amputation above the knee by the single circular incision"⁶ which since has been referred to as the "guillotine" amputation.

In 1779 Pott published the epoch making pamphlet on palsy from spinal deformity, which was contemporaneous with the more complete account contained in the prize essay of Jean-Pierre David which was written during the same year.¹¹ Although spinal

caries is now termed "Pott's disease," Pott did not describe the disease or its tuberculous nature, but only the deformity and its sequelae.

John Freke, who was surgeon to St. Bartholomew's Hospital, read before the Royal Society in 1736 one of the earliest accounts of myositis ossificans²⁶ although Bick says that Freke, in 1740, and Copping, in 1741, reported cases of myositis ossificans progressiva in the Transactions of the Philosophical Society of London.

A large number of surgeons during the period wrote about hernias, the most famous probably being that by Pott in 1756 when he was recovering from his broken lower leg. Pott later observed:

Recent hernias are in general more liable to stricture than old ones, for reasons obvious . . . but when old ones get into the same circumstances, the symptoms are much the same; though I think in general they are not altogether so pressing, and the latter generally admit of more time to attempt reduction in.¹⁸

John Hunter went on to say that there is a period, then:

When the symptoms of the rupture have gone very far, that it is imprudent to reduce it even if possible; but as it is impossible, perhaps, to tell when the mortification of the gut is gone too far for reduction, it will, in general, be attempted while life exists, with the hopes of a cure. Upon the other hand, it may be asserted, or supposed, that if it is not reduced, the person must also die; but this is not so certain as the other; for the mortification of a gut simply does not kill - it only kills from its consequences; and there is a material difference between a gut out of the belly, and one within. The consequences of one within is absolute death; but

the one without in general endeavors at a cure, by producing inflammation and suppuration of the parts, which is producing a fistulous orifice, or artificial anus.¹⁸

In 1730 James Douglas wrote a very detailed description of the peritoneum and has since been remembered eponymically by the pouch of Douglas and the semilunar fold of Douglas.¹⁹ Abernethy in 1793 described an anomaly of the viscera which is quite similar to what is now called an Eck fistula.¹¹ In 1765 Pott wrote his treatise "On Fistula in Ano" in which he described a much improved method of treatment by bistoury.^{8,19} Winslow had previously described fistula in ano as forming "little bags, or semilunar lacunae."¹⁸

Percivall Pott published "Practical Remarks on the Hydrocele" in 1762¹¹ and also described the diffused hydrocele of the spermatic cord.¹⁸ Hunter describes treatment to hydroceles by operations with the tent of the seton, which is a conical and expansible plug of linen or some other fabric drawn through a wound in the skin to make an issue, and with caustic.²⁰ He also describes an operation by making an incision into the sac about three inches long allowing the fluid to escape.²⁰

William Cheselden published in 1723 his "Treatise on a High Operation for Stone" but was assailed with violent abuse by John Douglas, on the score of alleged plagiarism from the latter's "Lithotomia Douglassiana," written in 1720.¹¹ Cheselden accordingly dropped the procedure he had described, and went on to modify the method of Frere Jacques, and modified by Ran,²⁵ into a lateral

lithotomy which he first performed on March 27, 1727.¹¹ He reportedly could perform a lithotomy in fifty-four seconds^{11,21} and reported six deaths in eighty cases.⁸ Sir Caesar Hawkins invented the cutting gorget for lithotomy in 1753.

John Hunter used silver nitrate as a caustic⁸ agent to destroy the obstructions, in earlier times supposed to be "callus" or "caruncle," which oppose the passage of urine.¹⁸ Hunter described and used forceps as a means of extracting a calculus that becomes lodged in the urethra.¹⁸ In 1783 he performed the operation known as the perineal section type of external urethrotomy.¹⁸

There were relatively few advancements in the field of thoracic surgery during the eighteenth century. In 1773, William Bromfield made important observations on subcutaneous emphysema explaining that it occurred following fractures of the ribs when rib fragments penetrate the lung.²⁷ He suggested as treatment opening the chest wall large enough to allow air to escape from it. John Hunter wrote about the various signs and symptoms of a hemothorax in his treatise "Gunshot Wounds."¹⁸ In 1770 William Hewson diagnosed a case of spontaneous pneumothorax.²⁷

In dealing with pulmonary tuberculosis, Samuel Sharp, in 1769, thought that it was not necessary to free the pleural cavity of adhesions but to directly incise the cavity.²⁷ Sharp also reported a case of empyema necessitatis which had been

presented by M. Fourlet at the Academy of Surgery meeting in Paris in which an operation had been deferred and the patient died.²⁷ He urged in such cases that drainage should be insured by an intercostal incision in the mid-axilla between the sixth and seventh ribs, although he felt that it made little difference where the incision was placed because the expanding lung would force the fluid out.

Some people believe that John Hunter described in 1757 the condition that is now known as idiopathic mediastinal fibrosis although others prefer the description of Hallet, of Edinburgh, in 1848, of the obstruction of the superior vena cava caused by fibrous tissue.²⁷ Ludlow of Bristol made the first apparent description of an esophageal diverticulum in a letter to William Hunter in 1764.²⁷ Meade tells of D. Bayford, of a small town outside London, who in 1794 made the first record of an aberrant artery causing pressure on the esophagus. He described an aberrant right subclavian artery indenting the esophagus at autopsy following the death of a woman from starvation with a long history of dysphagia. Mead feels that this was the only reference to this condition until the article in 1933 by Sprague, Ernlund, and Albright.

John Hunter made many valuable contributions on surgical shock, pyemia, intussusception, gunshot wounds, inflammatory processes, and artificial feeding. He acquired his knowledge on gunshot wounds from observations while he was staff surgeon to

Hodgson and Keppel's futile expedition to Bellisle in 1761 - the same expedition which Thackeray has rendered forever comic in his account of Harry Warrington chased by the dragons²² and the two following years while serving in Portugal,¹ although he did not publish his works until 1794^{1,11} following John Ranby's, The Method of Treating Gunshot Wounds in 1781.⁶ Hunter did not believe that the presence of a bullet in the tissues was harmful in itself, thus coinciding in opinion with his predecessor Ambrose Pare.²² Hunter also described phlebitis which he believed to be the cause of thrombosis, a doctrine which Virchow demolished in 1852.²⁵ In 1790 Hunter introduced artificial feeding by means of a flexible tube passed into the stomach.¹¹

During his studies of animal physiology Hunter found that digestion does not go on in snakes and lizards during hibernation, and that these reptiles will die in that season if they are put through vigorous movements.⁴ From this he was led to an interesting conclusion which he applied to his human patients. Namely, that if the powers of a part are diminished through gangrene or local necrosis, stimulents are dangerous, since they "increase action without giving real strength." Previously John Douglas and others described the efficacy of using bark in treating gangrene.^{6,19}

Ligatures for the control of hemorrhage were used by Celsus in the first century, A.D., and later by Galen and others.⁴ Hemorrhage was usually controlled by cautery and oil until 1564,

when Ambrose Pare earnestly advocated and practiced the use of the ligature. This was not generally accepted until Samuel Sharp brought it into general use.

In 1757 William Hunter made the first description of arterio-venous aneurysm, or arterial varix, and made many observations on aneurysms before the historic work of his brother.¹²

Classically the method used for aneurysms was that of Antyllus (third century, A.D.), as described by Oribasius of the next century, which advocated applying a ligature on each side of the sac and opening the tumor in order to evacuate its contents, but he distinctly opposed extirpation because of its danger.^{10,22}

Extirpation of the sac, after using the method of Antyllus, or aneurysmectomy, was originally practiced by Philagrius and re-introduced by Purmann. Keen gives credit to Purmann for doing this in 1680 while DaCosta says the date was 1699. Proximal ligation of the aneurysm was done by the Frenchman, Dominique Anel, who operated upon a friar at Rome during the year 1710,² and done empirically earlier by his countryman Guillemeau.^{5,11}

These procedures frequently were followed by gangrene of the leg and a high mortality from secondary hemorrhage. The leading surgeons of the time, Sharp, Bromfield, and Pott, were discouraged because of the poor results of the operation, and Pott wrote, "Nor have I ever seen any other operation than that of amputation, which has preserved the life of the patient."²

In July, 1785, while experimenting on deer at Richmond Park of Windsor,³¹ John Hunter ligated the external carotid artery of a young buck, and the half-grown antler soon became cold to the touch. Upon examination of a couple weeks later, he was surprised to find that the antler was warm and still growing. Thinking that perhaps the ligation had slipped, Hunter had the deer slain and found the artery still ligated with enlargement of the collateral arteries which were carrying the blood supply. He said, "Oho, I see that under the stimulus of necessity the smaller arterial channels quickly increase in size to do the work of the larger. I must remember that."²⁵

On December 12, 1785, Hunter "performed the operation at St. George's Hospital in a case of popliteal aneurysm, in a manner different from that ordinarily practised, and with success."²⁰ In the lower part of the course of the femoral artery in the thigh, in the fibrous sheath since known as Hunter's Canal, he ligated the artery. The patient left the hospital in six weeks on his own two legs. Desault had previously ligated the femoral artery for popliteal aneurysm immediately below the opening of the abductor magnus on June 22, 1785.²²

John Hunter's operation for aneurysm was considered the treatment of choice until Dr. Rudolph Matas introduced his procedure of endaneurysmectomy around the turn of this century. It was not immediately accepted by his peers, however, as can

be seen in Hunter's writings.

Mr. Bromfield objects to every operation, either amputation, or for the aneurysm; this would be just if what he asserts was true, viz., that the whole of the arterial system is in general diseased, which however is certainly not the case. He says, too, "that the injecting of parts of dead bodies having shown that in particular subjects the branches sent off now and then formed anastomoses with other branches given off lower down, has led to very extravagant notions of the smaller branches being always able to carry on the circulation; and an extravagant proposition has been suggested by some people to tie up the principal trunk of an artery in the extremities. I once saw an attempt of this kind in a true aneurysm of the ham, in which I shall only remark that the patient died; and I do believe that the embarrassments which occurred, as well as the event of the operation, will deter the gentleman" (meaning me) "who performed it from making a second attempt in a similar case." Now, unfortunately for Mr. Bromfield or myself, this is the very case from which I have formed favourable ideas of the success of future operations of a similar nature. Mr. Pott, after describing the disease in its last and most violent stage, just preceding dissolution, and when it has done all the mischief it can do without destroying the life of the patient, says, "If a man was to be asked how the disease was to be treated, he would answer, from theory, that the artery should be tied above and below the tumour, and the coagulated blood be extravasated; but that the artery is generally diseased some way above the dilatation, especially the popliteal." He also observes, "that the want of collateral branches of sufficient size to carry on the circulation is another powerful impediment to the operation."

When the aneurysm has arrived at the stage which Mr. Pott describes, perhaps the only thing is to amputate above the dilated part of the artery; but Mr. Pott should have considered, that before these threatening symptoms there is a stage when all the surrounding parts are sound. If this be true would any man allow a disease in a part to go on till the surrounding parts are diseased and past cure?²⁰

Other operations for aneurysm brought forth after Hunter's operation were ligation at a still higher point on the same principle in Scarpa's triangle, as it was done by A. Scarpa in 1819; ligation applied at the distal side very close to the tumor, which is then Brosdor's operation (1798); and ligation of one or two of the main branches, Wardrop's operation (1825).²²

In 1773 William Bromfield wrote about the compression of the subclavian artery above the clavicle on the first rib and described his own special technique for ligation of this artery after separating it from the brachial plexus.²⁵ However, credit is also given to Sir William Blizard, who in 1785 founded the London Hospital Medical School, for being one of the first to ligate the subclavian artery.²⁵ Blizard was the first person to ligate the superior thyroid artery.²⁵ Joseph Warner, a pupil of Sharp, first ligated the common carotid having done this in 1775.²⁵ John Abernethy, a pupil of John Hunter, ligated the common carotid artery for hemorrhage in 1798.¹¹ Abernethy, who rarely undertook an operation of a serious nature without vomiting,³⁵ ligated the external iliac artery for aneurysm in 1796,¹² an operation he performed four times with two successes.¹¹

It can be said of John Hunter that he introduced scientific method to the art of surgery and thus helped free the surgeon from the subservient position he held to the physician and from the binding of his practice to the ancient authorities. Hunter

taught Edward Jenner, John Abernethy, Henry Cline, Sir William Blizard, Sir Astley Cooper, Philip Syng Physick, Sir Charles Bell, James Parkinson, and many others who were eventually going to be leaders in their fields. It is of no doubt then that some people consider John Hunter as being the father of modern surgery.

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