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Obituary - Professor A Hunter
An appreciation by Dr J M Horton

MEMBERSHIP OF THE SOCIETY - JUNE 1991
George Washington Crile (Fig. 1), the founder of the world renowned Cleveland Clinic in Ohio, was one of the great pioneers of modern surgery. The Mayo brothers and Harvey Cushing were his contemporaries in the United States and, in some ways, he was more famous and influential in his own country than they were.

Childhood and education

Crile was the son of an industrious and successful farmer. He was born near the small town of Chili in Ohio in 1864 and worked his way through college and medical school by doubling as a school teacher. He was awarded the MD degree by the Wooster Medical School in Cleveland. This small institution was later absorbed into the Western Reserve University.

Crile's undergraduate medical studies had consisted of an apprenticeship lasting a year, followed by a total of eight months of didactic instruction spread over two years. Medical courses as short as this were not unusual in the USA in the 1880's. The Wooster School did not possess a microscope and Crile had to assist in resurrecting cadavers for dissection from pauper graves. He seems to have been well satisfied with the tuition he had received from dedicated tutors however.

Early surgical career

Crile joined a surgical practice in Cleveland soon after qualification at what he describes as the 'horse and buggy' era of surgery. Hospitals were small and basic and many operations were carried out in the patients' beds or on the kitchen tables in their own homes. The surgery of trauma from industrial accidents formed a
larger proportion of surgical practice at the time. Severe traumatic shock, for which treatment was very elementary, was commonplace and often fatal. The nature of shock, the aetiology of which was not understood when he qualified, and its treatment became a life-long study for Crile.

Morton's seminal demonstration of ether anaesthesia in 1846 had enabled surgeons to carry out body surface and orthopaedic operations, which they had been undertaking without anaesthesia, with greater facility, but the danger of sepsis prevented further surgical development. The extension of the surgeon's territory, particularly into the abdomen, had to await the development first of Lister's antisepctic technique in the 1860's, and later of aseptic surgery. Crile had the benefit of these discoveries when he started to practice in the 1890's at a time when surgery was rapidly developing; For example, Reginald Fitz had described the surgical treatment of appendicitis the year before Crile qualified and he was an early protagonist of the technique, despite his youth and the considerable controversy surrounding the operation. Crile carried out many major procedures in the 90's, including early laryngectomies and thyroidectomies but these operations required deep and greatly prolonged etherisation and also occasioned greater blood loss than had been previously experienced; in the absence of intravenous fluid replacement, the danger of postoperative shock in elective surgery was a constant potential hazard which frequently resulted in a fatal outcome. Crile's interest in the problem was stimulated further and he began animal research in primitive surroundings.

The Spanish-American War

George Crile was an officer in the Reserve, and he was therefore called upon to serve in the Spanish-American war of 1898, when Cuba was liberated from Spanish control and Puerto Rico was ceded to the United States. The standard of US Army hygiene was low and many soldiers died of yellow fever and dysentery. Crile greatly reduced the rate of infection in the units which were his immediate responsibility by insisting on elementary preventative measures.

Comparatively few soldiers were wounded in the fighting, but Crile mentions one case of ruptured spleen in a trooper who was kicked by a horse. The only resuscitative fluid available was saline administered subcutaneously. Crile reported that the patient survived the operation, but tells us laconically that what he described as the 'inevitable change' occurred some hours after the operation, and the patient died.

The kinetic theory of shock and anoci-association

Crile returned to civilian practice and became an Associate Professor at the Lakeside Hospital in 1901 and developed what he called the kinetic theory of shock. He became convinced that shock was the result of exhaustion of the brain as a result of bombardment with nociceptive stimuli originating both from the traumatic wound or the operation site and as the result of fear.
He therefore advocated very gentle surgery in conjunction with simple local infiltration with procaine to block off the impulses coming from the part on which he was operating, and he combined this with general anaesthesia with nitrous oxide to eliminate the nociceptive effect of fear. He called this technique anoci-association. The procedure in abdominal cases was layer by layer infiltration - skin, subcutaneous fat, muscle, peritoneum, and the mesentery of the target organs.\(^3,4\)

Patients operated on under anoci-association recovered more rapidly and had less postoperative shock than those who had had surgery under deep ether. The latter did well enough during the operation under the sympathetico-mimetic stimulus of etherisation but, in the absence of fluid replacement, became shocked in the long recovery period before autonomic control of the peripheral vascular system was restored; in contrast, the patients who had had their surgery under anoci-association recovered their vascular tone rapidly and comparatively quickly compensated for their hypovolaemia. Crile did not see it this way, however; he believed that nitrous oxide had a protective effect on the brain, whereas ether did not. He was rather unfair in contrasting 'nitrous oxide' and 'ether', as he often did in his papers; in fact, the nitrous oxide was often enriched with a little ether, especially for the closure of the abdomen.\(^3,4\)

What Crile had actually done was to produce a form of what is now called 'balanced anaesthesia'. If anoci-association is considered in relation to Gray's now familiar triad of anaesthesia (unconsciousness, reflex suppression and muscular relaxation),\(^3\) it can be seen that, in Crile's anoci-association technique, reflex suppression and relaxation are largely taken care of by local anaesthesia, enabling unconsciousness to be maintained by very light anaesthesia.

John Lucky of the Mayo Clinic actually originated the term 'balanced anaesthesia' in 1926 but his technique of 'a moderate amount of preliminary hypnotic, a moderate amount of local anaesthetic, a moderate amount of nitrous oxide or ethylene and a sufficient amount of ether to obtain the desired result' apparently owes much to Crile's ideas;\(^6\) of course, if you ask the present day examination candidate 'what is meant by balanced anaesthesia?', you will be referred to the nitrous oxide, oxygen, muscle relaxant technique, which Gray originally called 'selective anaesthesia'.\(^7\)

**Animal experiments**

Crile and his associates undertook extensive animal work using traumatised dogs. They came to the conclusion that they could demonstrate actual histological changes in the brains of the animals which they believed to have been caused by nociceptive stimuli.\(^1,3,4\) But, as Cannon pointed out in the 1920's, the hyperchromatic and chromolytic changes which they observed were identical with those of extreme cellular hypoxia due to capillary stasis which is the primary lesion in shock, whatever the cause.\(^8\)
Crile's use of blood transfusion

Crile was one of the earlier users of blood transfusion in the modern era of surgery; however, he regarded it as an adjunct to the treatment of traumatic and postoperative shock rather than a first-line therapeutic method. He also tried blood transfusion as a possible treatment for a number of other conditions, including thyrotoxicosis, tuberculous in cattle, the treatment of sarcoma and, with justification, in the treatment of carbon monoxide poisoning.\(^1,3,4,9\)

In order to appreciate Crile's use of blood transfusion, it is important to realise that although Landsteiner reported the existence of blood groups in 1901,\(^10\) it was not until the work of Jansky in Bohemia (now part of Czechoslovakia)\(^11\) and of Moss at Johns Hopkins Hospital, Baltimore,\(^12\) working independently almost a decade later, that cross-matching became a practical proposition, and not until Hustin reported the use of citrate that anticoagulation was practicable.\(^13\)

Crile's earlier transfusions were made before cross matching or anticoagulation were available. He employed the direct donor to patient method, usually connecting donor radial or ulnar artery to the patient's basilic vein. He was not the first to use this technique but the technical problem had always been clotting in the connecting cannula. Crile overcame the difficulty by designing a very short cannula; this, by cuffing the vessels, allowed direct intima to intima continuity.\(^1,3,9\)

If consideration is confined to ABO group compatibility, the chances of a compatible transfusion are about 60% in a European population. Crile naturally had complications but the mortality from incompatibility was much lower than might have been expected—presumably because of the relatively small amounts of blood transfused before the transfusion was discontinued. The quantity of blood transfused was variable; some of Crile's transfusions resulted in serious exsanguination of the donor.\(^1\)

Later, when the anticoagulant properties of citrate had become known, a combined glass container and cannula was used. Positive pressure was applied with a Higginson's syringe;\(^1,4\) great care must have been necessary to avoid air embolism! Modern drip chamber intravenous infusions were not introduced until 1935 when Marriott and Kekwick published their classic paper in the 'Lancet'.\(^14\)

Crile in the Great war

Crile introduced both his anoci-association technique and blood transfusion when he served with an American civilian team in France from 1914 to 1915 soon after the start of the Great war, but it was not until he returned as an Army surgeon when the United States came into the war in 1917, that he succeeded in establishing its use in American and British military hospitals.\(^1\)
Summary

George Washington Crile (1864-1943) ranks amongst the very greatest surgeons. He had a pleasant personality and was not afraid to acknowledge his mistakes. The list of his achievements as a surgeon is lengthy, but he also certainly deserves an honoured place in the history of anaesthesia.

References

A search of the daily scientific press of Barcelona and Madrid for the year 1847 throws light on the introduction of sulphuric ether in Spain and the chronology of the first surgical operations performed with this anaesthetic.

Perusal of the Madrid press for 1847 shows that, contrary to some recent assertions, the first surgical operation carried out in Spain under sulphuric ether was performed on January 13th of that year by Professor Argumosa Obregan in the Surgical Clinic of the Faculty of Medicine in Madrid, and consisted of lancing and draining a neck abscess.

News of the discovery of this anaesthetic arrived in Spain by several routes. One, according to the 'Gaceta Medica' of February 10, 1847, originated from Dr Forbes, editor of the 'British & Foreign Medical Review', who wrote from London to one Senor Barron in Madrid, who, in turn, communicated the news to Professor Argumosa. As well as the above operation, Argumosa carried out at least two others in January, with results that were not entirely satisfactory.

The first public announcement in Spain of the discovery of ether anaesthesia was made by the Madrid newspaper 'La Opinion' on January 14, 1847, in an item on Liston's first experiments. This was followed on January 24 by a more extensive article in the same newspaper describing the operations carried out in London in December 1846 and at the beginning of January 1847. The operations performed by Professor Argumosa were mentioned by the scientific press of Madrid, specifically 'Anales de Cirugia' of January 24 and 'La Facultad' of January 28 (although without giving dates), and were immediately commented on by the Madrid dailies 'El Popular' on Friday January 29 and 'El Imparcial' on Saturday January 30.

Meanwhile news of the discovery was also sent from Boston to Oliver Machechan, a highly respected American dentist in practice in Madrid. According to the Madrid dailies 'El Tiempo', January 28 and 30, 'La Opinion', January 31, and 'El Espectador', January 31, Machechan performed a number of dental operations under ether, starting on January 20; we have recently reported this finding in a Spanish scientific magazine.

The news of ether also entered Spain via Barcelona, possibly via the English weekly 'The Illustrated London News', the January 9, 1847 issue which mentioned many of the first trials carried out in England. It appears to have been these reports that prompted Castells, Mendoza and other members of the Faculty of Medicine in Barcelona to perform experiments on dogs, the results of which they presented to the Real Academia de Medicina y Cirugia de Barcelona on February 1, 1847. Later, on February 16, Professor Mendoza made the first clinical application of ether in Barcelona during a leg amputation; this operation was described in the Barcelona medical journal 'El Telegrapho Medico' February 1847 issue and extensively commented on in the Barcelona daily 'El
The use of ether anaesthesia spread so rapidly through Spain that by the end of March 1847 it had been employed by the great majority of Spanish surgeons. The best documented series comprises 56 operations carried out in various cities on patients who were mostly aged under 40 years, the oldest being 64. Most of the operations performed constituted major surgery at that time, including a number of mastectomies and several amputations of limbs; tooth extractions and a few self experiments also figure on the list. By contrast, we have been able to unearth very little information about a group of 79 operations carried out in Madrid and Santiago de Compostela. In September 1847, the Real Academia de Medicina de Madrid awarded Dr Basilio San-Martin a prize for a paper on ether in which he described 53 cases of ether anaesthesia, 16 of them experiments he carried out on himself. While in Santiago de Compostela, Professor Gonzalez Olivarres mentioned on several occasions his dissatisfaction with the results obtained in 26 operations with ether anaesthesia that he performed in 1847.

In their first trials of ether anaesthesia, Spanish surgeons administered it either with apparatus designed by themselves, or using devices that had become popular in other European countries, such as those developed by Luer and Charriere (with or without modifications by the users). The ad hoc apparatuses designed by Mendoza and Argumosa were described in detail in the literature, but without illustrations.

In conclusion, the date of Argumosa's first operation with ether anaesthesia in Madrid, January 13 1847, makes Spain the fourth country to have employed this anaesthetic, the first three having been United States, United Kingdom and France. We now know about many of the first Spanish trials thanks partly to the surgeons who reported their findings in scientific publications, and partly due to the great interest aroused by the subject of anaesthesia among the general public, which was echoed in the daily press of the time.
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HENRY WALTER FEATHERSTONE 1894-1967

First President of the Association of Anaesthetists of Great Britain and Ireland

Dr E T Mathews (Birmingham)

Henry Featherstone was born in Erdington on 5 April 1894; Erdington became part of Birmingham in 1912. His father was general practitioner. His mother was the eldest daughter of a successful businessman from Brooklyn, USA. She opened the Erdington Laundry in 1898, unknowingly providing a generation of medical students with material for jokes about anaesthetists washing the surgeons' dirty linen.

Childhood and education

As a child he spent long summer holidays in Brittany with a French family and learnt the language. He visited this family throughout his life and described their friendship as 'one of the joys of my life'. Henry was educated at King Edward's School, Birmingham, Trinity College, Cambridge and the Birmingham Medical School. He qualified during the Great War 1914-18.

Service in the Great War 1914-18

Featherstone joined the Royal Army Medical Corps (RAMC) and saw some of the terrible aspects of the 1914-18 war. He was medical officer to the 7th Battalion King's Royal Rifle Corps who lost 500 of their original strength of 530. He later spent Christmas 1917 in the advanced dressing station at Passchendaele, a place where in 21 days his unit lost half its effective strength. Later he was gassed. He always described this incident as 'slight' but he was unable to see for a time. After 3 weeks in hospital in France, he was evacuated to England. His brother, who was in the Royal Artillery, was killed. Henry spoke and wrote of these events, and he subsequently revisited the scenes of his experience and maintained friendships with other survivors.

Medical career

Featherstone returned to Birmingham after the war and took up resident medical posts at the General Hospital. These included that of Resident Medical Officer, which was then the accepted route to the post of Consultant Physician. Such a post had been his father's ambition but, encouraged by Dr W J McCardie who was the first full-time provincial anaesthetist, Henry took up anaesthetics and was appointed Assistant Anaesthetist in 1919 and Honorary Anaesthetist in 1926. Henry Featherstone had great admiration for McCardie, whose professional status at one time was such that he was consulted before the surgeon was selected, and received fees equal to those of the surgeon.

Featherstone's contributions to the literature included some 27 items in journals and chapters in 4 books. They covered a wide range of subjects. An early paper described a combined mask and airway and the Featherstone gag for oral surgery is still used. It has jaws lined with soft gun-
metal. His paper on the pulmonary complications of anaesthesia was well received and this topic was also the subject of his MD thesis. He also had a special interest in explosive vapours, both in anaesthesia and in industry, and in this context he worked closely with the Chief of the Birmingham Fire Brigade.

He was introduced into the Section of Anaesthetics of the Royal Society of Medicine (RSM) by McCardie, who had been its President in 1907. Featherstone himself became President in 1930. He was also Vice President of the British Medical Association subgroup on anaesthesia, and played a leading role in the local medical societies of Birmingham. He was at one time President of Birmingham Medical Institute and also editor of the Birmingham Medical Review.

**Founding the Association of Anaesthetists of Great Britain and Ireland**

Featherstone made several visits to leading centres in Canada and the United States, sometimes with fellow members of the Royal Society of Medicine. He discussed with them and other colleagues his concern about the lowly status of anaesthesia, and he believed anaesthetists needed an independent organisation. Others agreed, but it was Featherstone who took action. Philip Helliwell has summarised what Featherstone did: 'Featherstone of Birmingham must be given credit for firstly conceiving and then providing impetus and organising ability, which led to the formation of the Association of Anaesthetists of Great Britain and Ireland'. He was elected its first President 1932-1935, and then held the office of Honorary Secretary 1936-1939. His description of these events was the first paper in the first number of the journal 'Anaesthesia'.

**Service in the Second World War**

Featherstone was in the Territorial Army reserve. He was already in uniform and away at camp as the administrative officer of the 14th General Hospital when war was declared. This unit was sent to France on 1 April 1940 with orders to set up a 1,000-bed tented hospital at Etaples across the estuary from Le Touquet. Le Touquet still had its colony of English residents; they included Mr and Mrs P G Wodehouse who gave the unit much assistance. Their gifts included a radio which became the unit's only source of information when the blitzkrieg began. The hospital made ready to evacuate immediately. The convoy was dive-bombed on the way to Boulogne and Henry and his colleagues had to take to the ditches, but the unit held together. They boarded the 'Queen of the Channel', a London-Southend ferry, which was one of the armada which came to the rescue. She took them safely to Dover, but she was sunk a few days later. The defence of the jetty at Boulogne lasted a further 48 hours.

Back in England he had a variety of postings. When the Americans arrived, he was attached to the United States Army as chief anaesthetist to a 1,000 bedded hospital. With his American background he enjoyed this posting, except that the final meal of the day was at 5.30 pm. He was used to dining much later and hunger woke him early each morning. His early rising impressed the American team. In preparation for the D-Day
landings, he was posted to teach airborne medical officers the use of chloroform, the only agent they were permitted to take with them.

His own role for the D-Day landings was in command of a hospital ship (Hospital carrier 64). In peacetime, she was the 'Amsterdam' on the Harwich to Hook of Holland route. He trained his teams thoroughly; they loaded and unloaded 300 Canadian sailors as mock casualties in simulated disasters. From D-Day onwards he worked from the Normandy landing beaches. The ship was anchored close in-shore as Casualty Clearing Station for Juno Beach, the scene of some of the heaviest fighting. Many of the casualties from Juno beach were French Canadians and, consequently, his command of the language was useful. Featherstone's son landed on the adjacent Sword beach and was badly wounded. At 7am on 7 August 1944 whilst sailing from Juno Beach to Southampton, the 'Amsterdam' was shaken by two almost simultaneous explosions. The ship broke in two, and sank in less than a quarter of an hour. The training which the unit personnel had received was such that everyone behaved as if on another exercise. Over 200 of the 260 patients were saved; what loss of life there was, was caused almost entirely by the explosions. There was no rescue ship about and no signal could be sent, but eventually a naval launch came along, and a cruiser was called up to rescue them. Henry was awarded the OBE for this exploit. His next posting was to the hospital ship 'Empire Clyde', sailing between the Mediterranean ports and the UK, but ill-health caught up with him, and he was boarded out on the day after VE Day.

The post-war years

Henry resumed his post at Birmingham General Hospital. He had been away almost six years, but he was still only 51 years of age and while he was on active service others had taken over many of the roles he had played at local, regional and national level. Much of his private practice had gone, so too had his seat on the Council of the Association, though he became a Trustee. He was still an enthusiastic teacher of medical students in his hospital practice and although he was the most senior consultant, he would regularly anaesthetise for the minor operations list done by the house surgeon. He taught the history of anaesthesia and demonstrated the use of historical apparatus, including Hewitt's nitrous oxide apparatus. He rarely used trichloroethylene. He objected to its price because he knew it was supplied, without waxoline blue, for dry cleaning at a fraction of the medical price. He spoke highly of its use in dry cleaning. He was contracted for four sessions when the National Health Service was introduced in 1948. He also continued his overseas visits and was invited to present papers at prestigious conferences in Boston and Montreal.

The Association of Anaesthetists awarded him the first John Snow Medal in 1946, and in 1947 he received the honorary degree of Doctor of Laws from Edinburgh University as part of the Simpson Chloroform Centenary Commemoration. He was elected an Honorary Fellow of the Faculty of Anaesthetists of the Royal College of Surgeons in 1962.
Commercial, social and domestic interests

Henry Featherstone took an active interest in the management of the laundry which, with its subsidiaries, had become a leading laundry and dry-cleaning business in the Midlands and he had other commercial interests. He went to live on his 700 acres (280 hectares) family estate which was some 30 miles from Birmingham. He lived first at the Knoll, in Barton-under-Needwood, and later at Yoxall Lodge, Newchurch. Barton-under-Needwood is mentioned in Dennis Smith's book 'Under the Influence' in connection with the first use of nitrous oxide anaesthesia in England; surely an appropriate place for an anaesthetist to live; and as to his interest in explosions, just to the north of his estate, the largest explosion in Britain took place in 1944. Bombs stored in a gypsum mine exploded. It was wartime secret that was well kept; 46 years later in November 1990, a memorial was erected.

The estate was in good hunting country. Henry was a brave horseman; on one occasion when he was thrown from his horse and dislocated his shoulder he devised a method of self-reduction using a 5-bar gate. The gate also enabled him to remount without assistance and continue the chase. Featherstone fought against ill-health for many years. He had several heart attacks and some serious gastrointestinal bleeds and he had to undergo several major operations. He gave the writer this valuable advice about postoperative fluids after one operation; the patient should have a case of half bottles of champagne in his room; a half bottle being a suitable size to share with a close friend in the early postoperative period and later a suitable amount to have with a meal; whereas if whole bottles are opened the wrong type of people come to the room!

Henry was proud of his membership of the Octette, a select Midlands group based on the old Lunar Society. He was a magistrate, a Commissioner of Taxes, Chairman of the YMCA and a Trustee of the William Salt Library which houses the major collection of historical material relating to Staffordshire. He loved the countryside and endeavoured to improve it by planting more trees on his estate. A few weeks before his death in 1967 he and his wife invited a hundred friends to lunch and a walk in their woods. He is buried in the churchyard at Newchurch where there is a commemorative plaque in the church. It records that he was the Founder and First President of the Association of Anaesthetists of Great Britain and Ireland. He was indeed a remarkable man, who played an important part in the development of the specialty. He lived in interesting times and places and he was - as he once described himself - a dutiful old soldier.

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One of the main problems in the early days of anaesthesia was during the induction period. The excitation phase of anaesthesia induction with inhalation agents could be very troublesome to those giving the anaesthetic. Young vigorous men particularly, could hardly be kept on the operating table during this stage. This problem was finally resolved by the advent of intravenous anaesthesia in the thirties, but several special techniques were introduced to circumvent this excitation phase. For example the rectal application of sedative agents prior to the induction of anaesthesia became common in Heidelberg.

Ritter's solution

An uncommon, but very efficient solution to the problem was described, practised and propagated in the early 1920's by C Ritter of Dusseldorf. The article describing his method in detail was published in 1923. He suggested temporary occlusion of both carotid arteries to enhance anaesthesia induction. Ritter described his manoeuvre as simply consisting of bilateral compression of the carotid arteries with the thumbs towards the cervical spine.

Ritter's occlusive device
Effect of the technique

The effect was that the breathing of the patient almost immediately became slow, quiet and snoring. Talking and movement of the limbs stopped, and deep anaesthesia was achieved rapidly. Thus, by applying this technique, patients moved rapidly from excitation to deep anaesthesia during ether administration. Ritter found that this temporary occlusion of the carotid arteries during anaesthesia also reduced the requirement for anaesthetic. Transferring this concept to modern anaesthesia, one would have to talk about the MAC-reducing effect of the anaemisation of the brain, and would have to add this phenomenon to the list of factors which modify MAC. No postoperative neurological problems were reported by Ritter. He stated that all patients woke very early after surgery without any problems.

Occlusive device

As the hands would get tired, the application of pressure with the thumb was considered unsuitable for longer anaesthetics. A device was therefore constructed which allowed occlusion of the carotid arteries without exerting digital pressure. (Figure); this was manufactured commercially by the Windler Company of Berlin. As Ritter was still experimenting with this device, he only recommended his manual manoeuvre for routine enhancement of anaesthesia induction.

Kussmaul's technique

Ritter had learned this technique from A Kussmaul who had used it to demonstrate that in humans - as opposed to dogs - the vertebral arteries would not deliver an adequate blood supply to the brain during bilateral carotid occlusion. The effects of bilateral carotid occlusion in young healthy patients were rapid loss of consciousness, pallor and finally, collapse. Consciousness would return each time when pressure was released. A welcome positive side-effect was that the patient or volunteer had total amnesia for the time of pressure!

Artificial bloodlessness

In his book on artificial bloodlessness published in 1922, F Momburg provides us with more details about Ritter's experiments on reduction of cerebral blood volume during neurosurgery. Evidently, Ritter had used the technique of interruption of the arterial blood supply for operations on the skull and brain in three patients. Periods of ischaemia lasted up to 30 minutes, with discontinuation of anaesthesia at the moment of carotid occlusion. The first two patients did not pose any problems and woke up early after surgery. The third, however, died on the operating table.

References

MARTIN KIRSCHNER'S 'SPINAL ZONE ANAESTHESIA'

Drs C Weisser & G Sprotte (Wurzburg)

Lumbar anaesthesia was independently developed in 1898 by August Bier in Germany, in 1899 by Theodore Tuffier in France and by Dudley Tait and Guido Caglieri in the USA. Gaining in importance, this kind of regional anaesthesia became concurrent with general anaesthesia by ether or chloroform. During the following years a number of attempts were made to perfect this technique. Some interesting investigations were made by Martin Kirschner, starting in 1925.

Martin Kirschner (1879-1942) was one of the most outstanding German surgeons of the early 20th century. He contributed to many fields of surgery as well as to anaesthesia. Even today, surgeons are familiar with the nail for fixing bone fragments associated with Kirschner's name.

Kirschner's concerns

Some peculiarities of lumbar anaesthesia were criticised by Kirschner: 1, the anaesthetic has to be applied in great quantity; 2, a great deal of the body is anaesthetised needlessly resulting in disturbance of the blood circulation; 3, Different effects occur in different individuals in spite of identical administration; 4, The level of anaesthesia is uncontrolled.

Consequently, he set out the following demands for an improved technique of lumbar anaesthesia: 1, limitation of diffusion of the anaesthetic in the dural sac; 2, prevention of cranial spread of the anaesthetic; 3, placing the anaesthetised segment at the desired height; 4, individual dosage of anaesthetic necessary for the particular case.

Kirschner started his work on the improvement of lumbar anaesthesia with theoretical considerations based on intensive experimental studies. The first problem was to find an anaesthetic drug that would not blend with cerebrospinal fluid. But the hypobaric solutions available could not be the definitive answer because the anaesthetic would move to the highest position inside the dural sac or 'swim' on the surface of the CSF. This observation, made during his experimental search for a suitable local anaesthetic, led Kirschner to the second idea: the caudal part of the dural sac could be replaced by air so that the anaesthetic could 'swim' as a 'plug' on the surface of the CSF.

Development of the technique

For the performance of his technique, Kirschner developed specific instruments. The end of the spinal needle was made oblique and closed, while the outlet was placed at the longitudinal side of the cannula. The idea of this shape was to prevent punching out of a cylinder of tissue and to be able to inject the anaesthetic in the desired direction. The syringe set consisted of two cylinders tightly connected; one (10ml) for the anaesthetic and the other (50ml) for the air. The plungers were
moved by screws for exact dosage. A rubber tube allowed limited movement of the syringe.\(^2\)

In practice, the patient was placed in a lateral position with an elevated pelvis. The spine had to form an angle of 25 degrees to the horizontal and the coccyx had to be at the highest point of the spine. Lumbar puncture was then performed approximately at the spinal segment of the upper, cranial, level of analgesia. The puncture site recommended by Kirschner was L2/L3 for analgesia of the lower extremities and D12/L1 for the abdomen and thorax. However, the puncture site had no decisive effects on the spread of analgesia.

Then the double syringe was tightly connected to the puncture cannula. Now the needle was situated approximately at the upper level of the CSF. In order to bring this level of CSF to the exact position of the desired height of analgesia, a certain volume of air had to be insufflated. Kirschner suggested 10-15ml air for analgesia below the umbilicus and 20-25ml air for analgesia below the breast. The result of this procedure was a bubble of air in the sacral part of the dural sac. The tight connection of the two cylinders of the syringe set enabled the subsequent injection of the local anaesthetic without disconnection of the syringe from the cannula.\(^3\)

Because of the lateral position of the outlet of the needle, injection of the local anaesthetic was possible in a designated direction: for analgesia of the abdomen it was injected cranially, and for the legs, caudally. Initially, Kirschner recommended the minimum dose of local anaesthetic. The hypobaric local anaesthetic now formed a 'plug' swimming on the surface of the CSF just below the sacral bubble of air. The segmental spread of spinal anaesthesia was determined by the cranial extension of the bubble and the volume of the local anaesthetic 'plug'. After some minutes the spread of local analgesia had to be tested. If it was insufficient or wrongly placed, an increase in the dose or correction of the position of the 'plug' was possible by insufflating or removing air. In this way dosage and spread of analgesia could be adapted to individual circumstances. After attaining suitable anaesthesia, the needle was removed and the patient laid on his back.\(^4\)

During and after the operation, the patient had to remain in a head-down position for as long as the analgesia took to completely wear off. Not till then could the patient be brought to the horizontal position, and some hours later to the head-up position.\(^2\)

The results of this technique in the hands of Kirschner were very good. Only one patient died in 1000 cases of the new spinal anaesthesia and significant changes in blood pressure did not occur. Each case was exactly reported and documented for later evaluation. An important innovation was also a 'psychic narcotist' who had always to be present with a patient. Kirschner and his team gained a great deal of experience from this method (some 1000 cases were reported after 1932 with excellent results) but it seems that other authors had only limited practical knowledge, probably because of the exacting technique.
Kirschner's clinical observations remain valuable for the recent discussion of the site of action of local anaesthetics in spinal anaesthesia. Because all segments within the bubble of air were spared from anaesthesia it is unlikely that spinal anaesthesia acts on the spinal cord itself but directly or mainly on the spinal roots. This fact was already detected and described by Martin Kirschner. In his diagram of 1934 he exactly illustrated the clinical observations of the spread of analgesia dependent on the localisation of the anaesthetic 'plug'.

References

Hypnotism goes back to antiquity. Mankind has always been fascinated by hypnotic phenomena. Since human nature rejects what it cannot understand, many different explanations have been offered to try to illustrate what hypnosis is and means, and thus we have philosophical, religious, anthropological and medical hypotheses depending on the background and provenance of the authors.

Analgesia and anaesthesia have played an important role in medical hypnosis; we know of a paleolithic carving on bone which shows a woman, obviously pregnant, lying unconcernedly while a reindeer tramps over her body. The theoretical meaning has been suggested that she was absorbing the strength of the animal to aid labour and delivery through hypnosis which was considered to be a form of magic.

**Modern understanding**

We know today that hypnosis is a special state of vigilance characterised by specific physiologic changes:

1. **Heaviness or sometimes lightness in the feeling of the arms and legs caused by reduction of alpha motoneurone activity.**

2. **The feeling of warmth in the extremities caused by reduction of peripheral resistance and higher blood flow due to neurogenic influence.**

3. **Change of vigilance in the EEG with a shift of activity to the right hemisphere in brain mapping with REM phases and sometimes hallucinatory phenomena with selectivity of perception.**

These specific physiological changes can be obtained through Suggestions Under Hypnosis (SUH) and are important in understanding the many types of hypnosis performed by our ancestors.

**The prehistoric era of hypnosis**

In almost all primitive peoples there were natural doctors and sometimes priests, trained in the art of healing and using hypnosuggestive techniques to treat different illnesses. Monotonous singing and monotonous repetition of words, then considered as prayers to naturalistic gods, dancing and music were the basic tools to induce trance.

Zilboorg and Henry showed that shamans in different regions in Siberia used hypnosis in this way. Muthu showed that hypnosis can be traced

back to old Hinduism. Pakirs and yogis used autohypnotic anaesthesia and trance for their meditations. Between 2350 and 1350 B.C. we find hypnosuggestive techniques in Persia and Greece, with rituals similar to group hypnosis today. Eber's papyrus describes the use of hypnosis for analgesia. Specific hypnotherapy was carried out in the Egyptian sleep hospitals of Isis and Osiris. During the sleep (incubation) the goddess of Isis was imagined to relieve patients of their complaints. Sleep temples of Egypt had a great influence later on similar constructions in Greece.

The pre-Hellenistic era of hypnosis

In Homer's Odyssey XIX 457, Odysseus stops the bleeding of a wound through suggestion. Asklepios learned hypnosis from the Centaurus Cheiron (Cheir - Gr. = hand).

Achilles knew the method too (the Iliad IV 219, XI 829). The Delphi Oracle used direct suggestive methods as well as herbs and drugs for induction.

The Hellenistic era of hypnosis

The Asklepieion influence was of the greatest importance for hypnosis in the Hellenistic era. Patients came to the Asklepieionan temples seeking relief from their maladies. The most famous of these temples were at Epidaurus, Kos, Knidos, Crotana and Cyrene. Patients had first to perform washing rituals at natural wells. After these rituals the patients had to sleep outside the temples for 3-5 nights. After this, they were admitted to the anteroom of the temple where they had to stay several days while praying and listening to the speeches of the priests. Later the patients could go into the holy part of the temple (Abaton) which was attributed with a magic force. The basis of this kind of hypnosis was the incubation = lying in a relaxed way. Suggestions were given before and during the trance period, either directly or by prescription of remedies.

The Byzantine-Roman era of hypnosis

The Aesculapian form of therapy continued for many years, but was changed by Galen of Pergamon (129-199 A.D.). The temple sleep method was changed by Galen to pre-sleep-suggestion-induction. The patient received suggestions in the pre-sleep phase with the instruction to imagine a specific dream. This form of hypnosis therapy was used well into the 6th century.

The Middle Ages era of hypnosis

While in Byzantine and Islamic states, medicine reached a high level, the situation in Europe was quite different. In the middle ages hypnotherapeutic techniques were used predominantly by monastic orders who performed many so-called 'wonder healings' with hypnosis. This monastic practice supplanted Galenic medicine. One of the advances at this time was the use of an associative technique of suggestions to be able to distinguish between 'demons' and real illnesses.
The word 'magnet' was introduced by Pliny the Elder (23-79 A.D.) who knew, so the story goes, a shepherd by the name of Magnes who told him of the phenomena of magnetism. Other tales say that Lucrez described the magnetic phenomena of siderite which came from Magnesia, a city in Asia. Thales of Milet discussed the possibilities of siderite having a soul (525-545 B.C.). Netius of Amida used siderite for algiesiologic treatment. Paracelsus (1493-1541) used siderite in an attempt to cure wounds, pain and other kinds of disease. Paracelsus's doctrines lasted for over two centuries.

A Scottish physician, William Maxwell (1679) was one of the first to write about empirical knowledge of 'medical magnetism' in his book 'De Medicina Magnetica'. He was one of the first to mention suggestion and imagination in this context.

All this earlier work influenced one of the most outstanding figures in hypnosis: Franz Anton Mesmer (1734-1759). He started by using magnets in therapy. In 1776 he put forward his hypothesis of animal magnetism in which he described artificial somnambulism and a magnetic report. Medical science discussed Mesmer's theoretical approach to hypnosis and rejected it, at that time, since no magnetic field could be measured by the many commissions who tried. Nevertheless, the impact of Mesmer caused persistent discussion over the phenomena of hypnosis and his induction method is still in use today; it is especially useful in the induction of deaf patients.

It was Benjamin Rush in the USA, the father of American psychiatric research, who taught in his 'Duties of a Physician' the Mesmeric approach as a stimulus to motivation of the patient to get a better therapeutic result.

Pioneers of scientific research in hypnosis

Armand Marie Jacques de Chastenet, Marquis de Puysegur (1751-1825), used the mesmeric approach and worked with magnets. After being able to free his patient, Victor Race, from respiratory problems, pain in the chest, and low back pain, he became famous and reported about 5,000 cases treated by him. He described somnambulism as a reproducible phenomenon in hypnosis.

Abbe Paria (1755-1819) described both the nature of the 'sommeil lucide' which he interpreted as a variation of normal sleep, and also took an opposite viewpoint on hypnosis to Mesmer, describing this as the result of concentration and suggestion of the hypnotised person. Furthermore, he considered the subject to be the active party in hypnosis. These theories could be considered as coming as closely as possible to the findings of modern psychophysiological research.

John Elliotson (1791-1868) was the leader of the mesmeric movement in England. As Professor of Medicine at the University of London, he made one of the first stethoscopes. He published a widely used textbook of physiology. From 1837 he took an extensive interest in mesmerism and
published many articles on this approach to hypnosis, mainly in a journal 'The Zoist'. In these writings he described many operations with mesmerism as the only anaesthetic, and stressed the success achieved. The first such operation, he stated, was performed in the USA. Dr Sydney Doane of New York, removed a neck tumour during a mesmeric state of hypnosis. Professor Ackley at the Cleveland Medical College also used the method. At the Medical College of Georgia, Dr Louis Dugas successfully removed a breast during the mesmeric state. In 1842 in England, Dr Ward amputated a leg at the thigh while the patient was mesmerised.

Despite the apparently successful results, the reaction of the Royal Medical and Surgical Colleges was hostile. However, mesmeric hypnoanaesthesia was practised by Ward and Elliotson and their results were published in further volumes of 'The Zoist' which gave detailed accounts of mesmerism having been used in cases of childbirth, venesection, excision of tumours, amputations and dental extractions.

James Esdaile (1808-1859) performed about 1,000 minor and about 300 major operations in India with patients in the mesmeric state of hypnoanaesthesia. The introduction of chemical anaesthesia with chloroform and ether was a serious drawback for hypnoanaesthesia, since surgeons felt more comfortable using the new method.

James Braid (1795-1860) was a Scottish surgeon who practised in Manchester. He observed that a mesmerised patient could not open his eyes during a session. After performing experiments himself, he came to the conclusion that hypnotic phenomena were entirely subjective. In 1843 he published his findings in a work entitled 'Neurypnology, or The Rationale of Nervous Sleep'.

Development of hypnoanaesthesia in the last 50 years

Even though chemical anaesthesia took over in various forms, and with a wide spectrum of drugs, hypnoanaesthesia has remained, and has been the subject of intensive research. The following researchers and clinicians have paid special attention to the subject:

Carl A Coppolipp who wrote the book 'Practice of Hypnosis in Anesthesiology'.

Jean Lasagner, Professor and Chairman of the Department of Anaesthesiology at the University of Paris who performed many psychophysiological EEG studies during hypnornarcosis.

Basil Finer, Professor of Anaesthesiology at the University of Upsala. He studied premedication in autohypnosis and had good results in premedication, intra- and postoperative drug consumption.

Rudolph Fry, Professor and Chairman of the Department of Anaesthesiology. He did extensive research on the question of combined chemical and hypnoanaesthesia. He suggested this combination would save up to 70% of the drugs used. He contributed to the German literature
and wrote a chapter on hypnoanæsthesia in his 'Textbook of Anaesthesiology' with O. Mayrhofer and W. Hugin. 

**Development of hypnoanæsthesia research in the last 10 years**

Rudolf Frey's work has greatly influenced recent research in hypnology. His former co-workers Wilhelm Erdmann and Juan Berlin, have continued that work. For this purpose, a European joint research venture was started between the Institute of Anaesthesiology of the University of Rotterdam and the Institute of Normal and Pathological Physiology of the University of Witten/Herdecke.

The results of the experimental work have been published and are continuing.

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Inhalation and intravenous administration of drugs are the main pillars of general anaesthesia. Often, a combination of both techniques is used, minimising side effects and augmenting beneficial properties of the agents.

Cyprian Ore

The modern era of intravenous anaesthesia began in 1871 when the French surgeon Ore, in Bordeaux, reported the successful administration of chloral hydrate in animal studies. A few years later he employed the drug in human beings. A monograph about this new technique was published by him in 1875 but despite encouraging results, the method fell into disrepute. The complicated technique, coupled with the observation that the therapeutic dosage was close to toxic levels, was the explanation for this. Nevertheless, with the first attempt made, it was only a question of time before other researchers in this field would administer less toxic drugs intravenously.

Bürkhardt's biographical details

In search of practical alternatives, Ludwig Bürkhardt, a surgeon from Würzburg, (Figure 1) published his first experience of a new technique. He favoured the infusion of chloroform or ether intravenously.

Bürkhardt was born in 1872 and graduated in medicine from Munich in 1905. At the Department of Pathology he became involved in basic research and on the basis of these experiments, was able to perform intravenous ether anaesthesia research by himself. At the beginning of this century he entered surgical training at the University of Würzburg, where he continued his experiments. He recommended the method enthusiastically and spread its clinical use. In 1913 he was appointed chairman of the Section of Intravenous.
Anaesthesia Techniques during the International Medical Congress in London, being regarded as the father of this kind of anaesthesia. He died aged 52, in Nurmburg, where he had become a surgeon of repute.

Burkhardt's intravenous method

His aim was to develop dosage dependent anaesthesia by the intravenous route. He was convinced that this could be achieved by the intravenous administration of volatile agents rather than by the inhalation of narcotic drugs using the currently available anaesthetic apparatus. He suggested the suspension of a volatile agent in a concentration of about 4-5% in warmed Ringer's solution. By this means, he sought to minimise the unwanted side-effects of long acting drugs like chloral hydrate, ethyl-urethane or Midonal. As a consequence of his experience, he stated that the infused vapours were eliminated through the lungs. In this pharmacological model the accumulation of narcotics was minimised and the prospects of controllable anaesthesia became a reality. Another advantage was seen in the fluid replacement perioperatively, thus guaranteeing stable haemodynamics. At that time, the importance of fluid replacements had become more accepted by surgeons and even recommended in German textbooks of surgery.

As a logical consequence of the theoretical and practical aspects of the intravenous vapour technique, Burkhardt started its use in daily surgical practice. The inhalation agent was administered in warm saline solution to patients who were usually premedicated with a combination of Scopolamine and morphine subcutaneously. The infusion was then started and continued until anaesthesia was achieved. Often, the total amount of fluid given was more than three litres. This fluid replacement led to much greater stability of the circulation than had previously been seen and therefore the method of anaesthesia was deemed appropriate in hypovolaemic and cachectic patients. The method was recommended for all patients being surgically treated in the face or neck regions, where otherwise the anaesthetic became a hindrance as the mask could only be applied intermittently, and the quality of anaesthesia was often poor.

Burkhardt did not hesitate to point out complications, such as haemolysis with the danger of renal failure, or thrombus formation with the consequent risk of embolism. To prevent thrombus formation, Burkhardt discussed the use of Hirudin for anticoagulation. As outlined by him, the method was contraindicated in generalised arteriosclerosis, myocarditis, renal failure and in patients with general plethora. From the beginning, Burkhardt had excellent results, and in the following years he published several articles on this kind of general anaesthesia.

When writing about this infusion method, reference has to be made to an article published in 1911 by the pharmacist Straub in Freiburg. He suggested the use of an electrically powered roller-pump apparatus for the infusion of fluids under variable or constant flow conditions and recommended its use for anaesthetic purposes. Whether this was ever utilised is unknown.
One of the most prominent and reputable German surgeons during this period was Hermann Kummell, Chairman of the New Hospital, Eppendorf in Hamburg, (Figure 2)

Born in 1852, he started his medical career in Berlin before he decided to go to Hamburg, where he succeeded Scheide as the surgical chairman of the newly constructed Eppendorf Hospital. He was an all-round surgeon, but realised the need for specialisation within the surgical field. Thus, he became the protagonist of German anaesthesia, and his pupils Sudek and Schmidt became two most outstanding specialists. As a founder of the Medical School of Hamburg University after World War I in 1919, he is still remembered as the 'gentleman' amongst surgeons in Hamburg, where he died in 1937.
From the start of his medical career, he emphasised the use of perioperative fluid replacement and it is not surprising that he became an enthusiast of the new i.v. ether anaesthesia method. Kummell's interest in this field, together with his excellent results, gave a new impetus to the method. Like Burkhardt, Kummell discussed in detail the pro's and con's of the technique in Germany and abroad.

To minimise possible embolic complications, he suggested the use of a constant flow infusion. The apparatus and technique for this were first described by Schmitz-Peiffer, an assistant in the surgical department at Eppendorf. Due to its evident advantages, the continuous infusion technique became widely accepted and was never abandoned. Over the next years only a few articles were published about the method. Most authors praised the excellent results of the technique which had become accepted clinical practice.

**Later developments**

Among those who recommended this new kind of anaesthesia were the American surgeons Honon and Hasseler. In a review article, both described the technique and reported their results. Like Burkhardt and Kummell, they suggested the concomitant injection of an hypnotic like Iso primal or Hedonal to reduce the volume of ether infusion and to decrease the period of induction, especially in very robust individuals. "Mono-i.v.-anaesthesia" with Hedonal had become very popular in Russia and was for some time called 'The Russian Method'. Burkhardt as well as Kummell tried this form of infusion anaesthesia but both disliked the severe complications, such as long-lasting respiratory depression or unstable haemodynamics that were commonplace.

A new indication for the method was first mentioned by the thoracic surgeon, Wendel, of Magdeburg. He discussed aspects of its use in thoracic surgery, especially in situations where no Sauerbruch Chamber unit or Brauer apparatus was available. Due to technical progress, the indication was mentioned during the meeting of the German Surgical Society in 1911. It was a logical step to use the method for wounded soldiers during World War I. Wepfer and Districh discussed this indication in their reviews and both were impressed by the results. An advantage was seen in the rapid induction and recovery as well as the lack of pulmonary infections in these high risk patients.

In the UK, Rood had become an enthusiast for the method. As an anaesthetist at the London Throat Hospital he discussed a long list of indications for this kind of anaesthesia. In a detailed article, he considered its principal aspects in comparison with other general methods. Rood introduced an innovation, a specially designed infusion system with integrated drip-chamber and heat exchange device. This was to prevent cooling of the patient through the infusion of large volumes of fluids. Like others, he praised the infusion anaesthetic technique and was most impressed by the stable peri-operative haemodynamics and lack of post-operative vomiting and pulmonary irritation.
A few years later, a comparable indication was discussed by the obstetrician Dyroff in USA. In hypovolaemic pregnant patients, he preferred this technique. In contrast to others, he had dissolved ether 'Normosal' in a solution with volume expanding properties. The circulation thus became very stable. He recommended ether infusion as the method of choice in selected cases in obstetric surgery.

In the late twenties, several articles about ether anaesthesia were published. Members of the surgical department of the Nuremberg Hospital were enthusiastic about the results of more than 1000 consecutive ether infusion anaesthetics without fatal complication. They called for further intensive research into this technique and discussed potential aspects for the future.

Introduction of barbiturates

During the time these articles appeared, new short-acting anaesthetic drugs became available - the barbiturates. Rudolf Bumm, a member of the Surgical Department of the Charité introduced Permocon into surgical practice. His first report during the annual meeting of the German Surgical Society received little attention however. During the thirties, the enthusiasm for ether infusion for anaesthetic purposes decreased. The tremendous success of the barbiturates and their derivatives made this technique superfluous. Nevertheless, it was still described in reputable German surgical textbooks.

The use of intravenous anaesthetic ether anaesthesia was an important step forward for several reasons: a great impetus began for the production of short acting drugs and, at the same time, exact documentation of the pharmacodynamics as well as the side effects of intravenously administered drugs was initiated. It enabled experience with a new technique of phlebotomy to be gained and initiated the development of the equipment needed for its daily use in practice. Last but not least, this strange method of anaesthesia markedly influenced our knowledge of perioperative fluid replacement.

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Criminal Confessions under the Influence of Anaesthetic Agents

Drs H Bohrer & A Bach (Heidelberg)

In modern anaesthesia, the benzodiazepine midazolam has been found to have potent amnesic effects. Patients under the influence of this drug may tell you many details about their lives and later do not remember anything about this occurrence. Years ago, alkaloids or alkaloid mixtures of certain plants, for example, peyotl, ololiuhqui, anhalonium lewinii were known to have similar properties.

The experience of Lorenz

Anaesthetic agents were used in the past to obtain criminal confessions. In the hands of William F Lorenz, this method was found to be of definite value in the cases of innocent people charged with crime. Lorenz had been experimenting with substances such as hyoscine, morphine and sodium amytal. He finally presented his findings at the Regular Meeting of the Chicago Neurological Society on March 17, 1932.

Lorenz had found the best results were obtained when sodium amytal was injected intravenously at a slow rate of 50mg/min. The injection was continued until anaesthesia was induced which was judged by the disappearance of the corneal reflex. Administration was then stopped and after ten or fifteen minutes the subject was aroused by talking or by the application of cold wet towels to the face. For a variable period of time the subject could then be interrogated, and usually there was spontaneous talkativeness. This meant that the interrogation could continue for two to three hours during the recovery period. During this state, which Lorenz called 'narcosis', it was possible to make direct suggestions. Thus, it was possible to break down barriers, with the patients providing vast amounts of information.

In persons charged with crime this technique was used with varying degrees of success. In several cases where innocent persons had been charged with murder the use of narcosis thoroughly satisfied prosecutors. The method was considered unsatisfactory in the case of guilty persons. Evidently, Dr Lorenz also received newspaper publicity about his injections of the 'truth serum'.

Questions

In the discussion of his presentation of this work at one meeting, it was stated that at a certain stage of narcosis the patient was unable to lie. Another problem suggested was that comparisons should probably not be made between actually guilty persons and subjects who volunteered for experimental purposes. The question, whether those who are actually guilty would make confessions that would incriminate them, remained unanswered; as was the question whether there was increased suggestibility in such a situation. A subject would possibly confess things he had not done, if the examiner used an aggressive technique and elicited a fear reaction.
The question of whether the technique was ethical at all—even with the consent of the patient—also remained unanswered. It was clearly stated that, without consent, this would be an abuse of the physician-patient relationship. Ethical problems were circumvented with the physician acting only in a stand-by position, concerning himself purely with the physical and mental condition of the patient and leaving the questioning in the hands of the prosecuting attorney. The presence of a friend or relative was always considered necessary.

The experience of Heinrich

Adolf Heinrich of Hamburg and Leipzig reported his experience six years later in 1938. He found confessions under ether anaesthesia very inconsistent so that they were of no value. On the contrary, excellent results were obtained with intravenous hexobarbitone (Evipan) administration.

Examination of seventeen patients was carried out under Evipan anaesthesia. Heinrich questioned patients during induction as well as in the recovery phase after hexobarbitone had been given. In agreement with Lorenz, he found that the best interrogation could be done in the recovery phase. With hexobarbitone, the optimal time period was about five to ten minutes. This time interval would allow for six to ten simple questions. These had to be clear and precise. One should begin with simple details such as date of birth etc. He was surprised that patients gave adequate answers and were amnesic on postoperative questioning.

Heinrich concluded that this was a reasonable technique to find out about things patients would never have told during their normal state of consciousness. For criminal confessions, Heinrich also recommended repeat anaesthesia with hexobarbitone as needed. In contrast to the American article of 1932, the German paper of 1938 did not contain any consideration of ethical problems involved.

Conclusion

The old understanding of anaesthesia was that it is an all-or-none phenomenon. Possible criminal confessions under the influence of anaesthetic agents support the new view of anaesthesia as a continuous spectrum in which increasing depth of anaesthesia passes through several broad areas of awareness. And there are even hints in the literature that under adequate general anaesthesia the brain might be capable of limited processing of information and implicit memory function.

References

CARDIAC RESUSCITATION - STATE OF THE ART IN POLAND 1990

Dr M Kus (Cracow)

An unwanted side-effect of early ether and chloroform anaesthesia was sudden circulatory arrest. These unhappy deaths caused concern among physicians and patients and were the impetus for taking an interest in the possibility of circulatory resuscitation in the second half of the nineteenth century.

Early animal studies

Schiff, physiologist at the University of Florence, was the first to perform thoracotomy and direct cardiac massage in experimental animals in 1874. He found that it was possible for the heart to resume spontaneous action even after eleven and a half minutes of circulatory arrest. At the same time, Boehm with co-workers at the Institute of Pharmacology of the University of Dorpat, Tartu, showed the effectiveness of closed chest cardiac compression in cats.

Jan Prus

In 1899, Jan Prus, Professor of Pathology at the University of Lvov performed his own experiments with cardiac resuscitation. Jan Prus was born in Wadowice near Cracow in 1853. In the years between 1877 and 1882 he studied medicine at the Jagiellonian University in Cracow. From 1882 to 1887 he was an assistant in the Departments of Pathological Anatomy and Physiology. In 1887, after winning a scholarship, he went to Berlin University and then subsequently to Paris University where he attended Professor Charcot's clinic. In 1896 he became Head of the Department of Pathology, Faculty of Medicine, University of Lvov. In 1900 he was elected Dean of the Faculty of Medicine.

Prus's animal experiments

Prus carried out his experiments on dogs. The results of these experiments were recorded on a Marey's cylinder and on a Herig kymograph. After tracheotomy, artificial ventilation was performed by a bellows apparatus driven by an electric motor.

In the first experimental group of forty-four dogs circulatory arrest was caused by clamping the tracheotomy tube. After a variable arrest time, which varied between one and sixty minutes, Prus opened the thorax and performed internal cardiac massage. In thirty-one cases (70%) spontaneous heart beat was restored. Prus noticed that the longer the duration of the cardiac arrest, the longer cardiac massage was necessary. In nineteen cases he failed to resuscitate the animals. Twelve dogs were fully resuscitated and one of them was presented during a scientific meeting a year later! In the second experimental group of twenty-one dogs the heart was stopped by an overdose of chloroform. It was possible to restore the heart action in seventeen dogs (76%). One dog survived for eight months.
In a third group of thirty-five dogs circulation was stopped by an electric current. Only five dogs (14%) were resuscitated. Prus found that it was most difficult to restore spontaneous action in the dogs with ventricular fibrillation. It is interesting to note that during the experiments the dogs were given a retrograde infusion of saline via the femoral artery. Prus wrote that: '...the degree of heart filling is an indication for saline injection because...the most powerful compression of the heart filled with too little blood cannot support blood circulation.'

Prus observed the following order of recovery of function:
1. the myocardium turns pink and firm
2. appearance of spontaneous atrial contractions
3. spontaneous weak ventricular contractions
4. strong ventricular contractions: arterial pressure can be measured
5. the heart beat becomes regular
6. spontaneous respiration appears
7. eye reflexes recover
8. appearance of active movement
9. recovery of consciousness

**Human studies**

Prus concluded that his technique could be applied in humans and on the 19th January 1900 he used his open chest technique in a man who committed suicide by hanging. Prus was able to restore the heart action only. He compared his technique with closed chest compression and concluded that closed chest heart massage could not be effective in individuals with a rigid chest. On 18th November 1899 Prus presented the results of his experiments at the scientific meeting of the Lvov medical Society. The results were then published in the Polish medical weekly 'Prezeglad Lekarski', and then in 'Wiener Klinische Wochenschrift' and subsequently in 'Archives de Medicine Experimentale et d'Anatomie Pathologique'. Prus's technique was popularised in the 'Lancet' where it was called 'Prus Plan.' It consisted of artificial ventilation by a tracheotomy tube, open chest cardiac massage and intra-arterial saline infusion.

Prus's technique of cardiac resuscitation was generally accepted in Europe and was used with varying success until the 1960's.

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Reports in American medical journals of 1900 enthusiastically acclaimed the latest European advancement, surgical analgesia accomplished by subarachnoid injection of cocaine. Fifteen years previously the report by an American neurologist, Dr James Leonard Corning, describing the extent of neural blockade resulting from the identical technique and suggesting that such medication would be useful for surgical procedures, was totally ignored.

Immediately following the introduction of topical cocaine in 1884, the demonstration of conduction block of peripheral nerves by injection (Halsted) signalled to the dental profession a therapeutic choice free from the problem of general anaesthesia. Surgeons, though openly expressing dissatisfaction with anaesthetic complications, neglected to investigate in suitable cases, the solution proffered by Corning. That this might have been the act of a self-conscious chauvinistic specialty isolating itself from anything the group itself did not initiate, is suggested by the life-long Halsted antipathy and hatred towards Corning. However, the relative reticence and absence of proselytising by Corning concerning his subsequent clinical studies, and by other American investigators concerning their clinical studies involving lumbar puncture during these years prior to 1900, points to a more encompassing fundamental determinant of medical practice: conformity dictated to avoid society’s scrutiny and stricture.

Corning’s early life

The American Civil war unsettled the faith and bonds of religious traditionalism of Corning’s father, a Unitarian preacher and sporadic fundamentalist, and in 1869 this sixth generation Yankee transported his entire family to Europe. Thus, unlike many of his American medical colleagues who in the late nineteenth century felt obliged to add a continental cachet with a year of touring European medical clinics and surgical theatres, Corning, from the age of fourteen had been schooled in Germany. He received his medical degree from Wurzburg in 1878. His dissertation was directed by the anatomist Rindfleisch in the Department of Pathology. In this milieu, exposure to knowledge of the spinal cord and cerebrospinal fluid was unavoidable. Throughout the 1870’s Retzius and Axel Key extensively investigated and described, in German, the membranes and cavities of the brain and spinal cord. In 1872 Quincke published his first study on the subarachnoid space wherein he adverts to the performance of lumbar puncture.

In 1879 Corning returned to the United States, to New York City, to pursue his special interests in diseases of the nervous system. The first step in introducing himself into the closed-rank medical establishment was to obtain one of the few, jealously guarded, highly competitive appointments as Assistant Physician at an institution where there would be clinical material for investigative studies. He began the period of required experience in the service of the renowned surgeon (and Vice President of the New York Neurological Society) Dr J Marion
Sims, where he became intimately acquainted with general anaesthesia and the problem of pain, both topics which would continue to fascinate and involve him for the remainder of his life. The following year was spent with Dr Edward Seguin, the first Professor of Neurology at the College of Physicians and Surgeons, the President of the New York Neurological Society and a founding member of the American Neurological Society. Thus Corning became embroiled in the turbulent strife of the enlarging, embattled specialty of neurology, the politics of which formed a background to his work on medication of the central nervous system.

Resistance to specialism

General practitioners of the 1870's and 1880's resisted specialism as a challenge both to their conception of medicine as a unitary field and to their relative social and economic status. 'Most threatening to the general practitioners were the specialists who claimed as their domain not the most difficult cases of a particular type, but all cases pertaining to a class of people'. Professional animosity was not confined to those outside the specialty. Extending its field of interest far beyond organic disease of the nervous system by asserting that 'the mind itself was to be understood as a physical phenomenon, a function or product of the brain, and perhaps even of the spinal cord, neurology had precipitated a schism within its own ranks'. The eminent neurologist, George Beard, asserted that insanity was as much a physical ailment as smallpox or a broken leg. The clinical neurologist, with his scientific knowledge of physiology and pathology, therefore considered himself the most competent person to treat the insane patient. In 1878 an active group of neurologists attacked the Superintendents of the Asylum Association, who had the monopoly on the professional care and treatment of the insane, accusing them of being essentially committed only to the custodial care of the insane; combining the tradition of 'moral treatment' with a 'medical response' to a social problem (the hospitalisation of the destitute, aged or the 'difficult'). The acrimonious controversy broke into the public sphere including, as reported in the 'New York Times', the Superintendents' stark rebuttal on treatment by the upstart neurologists, 'Direct medicament of the brain and nervous system is malpractice...'.

Trial of Guiteau

Further unwelcome public observance of the profession's disarray soon occurred as the nation's press focussed on the legal proceedings following the 'God-inspired' assassination of President Garfield in 1881. Criminal responsibility was the trial issue. There was public fear that vengeance might be cheated if the assassin were declared legally insane. Expert testimony reflected with clarity the personal, social and professional antagonisms that split the institutional structure of Medicine. The Superintendents, whose institutional and public role made them conscious of the expressed will of common men and the mundane stratagems of politicians, were solidly behind the prosecution, 'Insanity developed as a result of processes, often flawed religious education, taking place during life.' For the defence, the scientific nucleus of Neurology, with the European trained Spitzka as spokesman, proposed an intellectual argument emphasising the hereditary
causation of mental illness and criminality. Such advanced medical views were considered with general suspicion as being tainted with European sensualism and materialism, atheistic, and inimical to the welfare and stability of society. The will of the people prevailed: for Guiteau, death; for Medicine, a persistent suspicion of irresponsibility. Many Americans in the 1889's already considered physicians a generally impious, mercenary and cynical lot. The materialism of Spitzka dramatised the profession's dereliction of moral duty. The bitterness and near unanimity of respectable opposition to the defence experts' arguments imputed a somewhat defensive tone to medical writings generally. The striking discordance in the testimony of the opposing sides publicly proclaimed that medical science was clearly unable to settle disagreements within its own camp.

**Corning and spinal anaesthesia**

Beset by a pervasive flawed public image, clearly it behoved all of medicine, and in particular those involved in neurology, to keep a low profile and avoid the limelight. Accordingly, when there was no response to his 1885 paper, Corning's approach was low-key, non-aggressive and non-fault-finding. 'I even tried to enlist the cooperation of a prominent surgeon in the matter, but without success... Nor ought we to judge him harshly for this; for at that time penetration of the meninges of the cord seemed as adventurous an undertaking as did mutilation of the peritoneum at a more remote epoch.' He quietly continued his studies on direct medication of the central nervous system. In addition to several journal articles pertinent to spinal anaesthesia, he followed up his early book on local anaesthesia, with an 1894 book, 'Pain in its neuro-pathological, diagnostic, medico-legal and neuro-therapeutic relations.' In this book, referring to studies conducted prior to 1888, his descriptions are the very model of explicitness. 'When a needle is thrust down between the spinous processes of the third and fourth lumbar vertebrae, the point of such a needle, after penetrating the dura mater, will find itself directly in contact with the filaments of the cauda equina, which from this point downward occupies the space of the spinal canal. If such a needle be hollow and attached to a hypodermic syringe charged with medicinal fluid, it is evident that the solution may be readily deposited upon the filaments of the cauda...[and] the functions of the lower segments of the cord may be powerfully affected in this manner. We have only to conceive of the cerebrospinal fluid being, at this point, thoroughly impregnated with the medicinal fluid and lying in direct contact with the pla...' He then showed an illustration of a trocar and needle (reinvented in 1928 by Sise) used in treating a 'consenting' patient, describing the procedure thoroughly: 'A small trocar, half an inch long, and of the diameter of a wax match, was first thrust through the skin between the second and third lumbar vertebrae. A long, fine, hollow needle, screwed to an ordinary hypodermic syringe, was then passed through the opening in the trocar and down through the tissues adjoining the ligamentum interspinosum till the spinal canal was entered. The entire contents of the syringe [cocaine mixture] were then emptied upon the fibres of the cauda equina. In from five to eight minutes the subject described a
tingling sensation in both lower limbs... On examination there proved to be a decided impairment of tactile sensibility, amounting, in certain localities, particularly in the lower third of the thigh and ankle, to a positive anaesthesia.

He then described irrigation of the cauda equina with medicinal fluids. His first case of instillation of cocaine into the spinal canal relieved the complaints of spinal irritation following an operation on the urethra. The second case, an injection to relieve severe vesical and abdominal pains of caisson disease, was equally amenable to medication. This case, with its novel treatment, is not mentioned in Corning's, later published, 1890 discussion of caisson disease; observations he made on patients stricken during construction of the Hudson River Tunnel. Enquiry into the circumstances of such omission provides a further illustration of the 'screen' society interposes between the individual and reality; in this case, between the individual and his health. The counterpart to certain diseases which were convenient social constructions elaborated by middle-class physicians in a capitalist society, would be rejection or regulation, by means of political, socio-economic or cultural factors, of treatments or practices that did not reflect the mores of the populace. In addition to the prudent cautions imposed by strife within the medical community, there was a pervading hostility toward the profession in the public sector that mandated a measure of circumspection and reticence relating to novel observations and treatment particularly when an 'aura of experiment' was concerned. There is no more apt illustration of this chilling atmosphere than the stark pillorying of Dr Arthur H Wentworth in the cause of public relations.

Public response to lumbar puncture

At the end of the nineteenth century cerebrospinal meningitis was one of the deadliest of diseases. Faced with the diagnostic dilemma of differentiating cerebrospinal meningitis from other diseases of the brain and spinal cord, in 1895, Wentworth, Professor of Pediatrics at Harvard Medical School, with exemplary insight performed lumbar puncture to obtain cerebrospinal fluid for bacteriological examination. Accounts of twenty-seven children formed the basis of his 1895 and 1896 publications on the diagnostic value of lumbar puncture. When he presented his research at the Annual Meeting of the American Pediatric Society in 1896 commentators were emphatic in support of his investigations and had no doubts as to the diagnostic value of the procedure - an innovative medical advance, seemingly innocuous, except to those who were aware of the latent, barely concealed hostility throughout those years.

Within a year, in an article entitled 'Human vivisection' published by the Philadelphia Polyclinic Medical Journal, he was castigated for conducting what were seen as experimental operations on children. In 1896, antivivisectionists proposed a bill to the Massachusetts legislature restricting animal experimentation in medical schools. Hearings on the bill captured and held the attention of Bostonians in an extraordinary way. Not since a campus murder 50 years earlier was so much public attention, curiosity and concern exhibited by the general
public about the activities of the scientific and medical establishment. The scientists and practitioners of Boston stressed that the antivivisectionists' attacks were directed against medical science and endangered the freedom to acquire knowledge. To the President of Harvard the proposed legislation represented an attack on academic freedom and the entire educational process. The bill was not passed. But the attack was continued in 1900; 'animal experimentation ultimately leads to human experimentation' and the centre piece was to be Wentworth's experimental operations in children, i.e. lumbar puncture.

Nathaniel Bowditch (Dean of Harvard Medical School and one of the founders of the American Physiological Society, as well as its first President) and members of the Boston Society Medical Defense Committee deliberately decided to mount no defence. They felt that a vigorous public debate on the issue might interfere with their efforts to raise funds for the new Medical School buildings. In an effort to avoid controversy during the hearings, Bowditch prepared a public apology to defuse the issue: 'Dr Wentworth's experiments on lumbar puncture have been universally and emphatically condemned by the medical profession... Dr Wentworth himself now entirely agrees with the opinion here expressed and regrets extremely that his enthusiasm for the advancement of medicine led him to forget his duty to his patient.' Wentworth himself had no input to the deliberations, nor to the statement. He resigned from Harvard. No-one at the medical school spoke in his defence or in the defence of lumbar puncture, not even his chief Dr T M Rotch who had co-authored Wentworth's first paper in the 'Boston Medical and Surgical Journal'.

Such an occurrence could only emphasise the cultural and scientific attitudinal lag between European developments and American medical assimilation that Corning had been conscious of while establishing his practice. The contrast was stark and severe. In Europe discipline was internal to the profession, scientific data and laboratory techniques defined medical practice; achievement was measured only in terms defined by the world of academic science. Whereas in American medical schools political and financial considerations were still factors in professional success and in medical practice, external social attributes determined distribution of status and influence. During the years that the American publications of Corning, Jacoby (1895) and Caille (1896) were pointedly overlooked, similar European studies of Quincke (1887,1891), von Ziemssen (1893), Sicard (1898), Bier (1899) and Tuffier (1899) were openly proclaimed and discussed at international meetings.

After the International Medical Congress of August 1900, Tuffier's surgical clinics were visited by American surgeons. Impressed, they returned to their hospitals, satisfactorily duplicated this new form of surgical anaesthesia, and published a plethora of enthused reports. Now under the protection of 'authoritative' European approval, no longer having to distance themselves from possible accusations of human experiment, and with the further competitive impetus of mastering the latest medical advances, suddenly the American surgeons could fearlessly copy a procedure they could have pioneered. As a Professor of Surgery in Chicago, John B Murphy pointed out: 'It is to be regretted that the Americans were so long in appreciating the great original work of
Corning, and it is only another illustration that original work by Americans is many times not adopted by their countrymen until it is returned to this country with European sanction. 8

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BIOGRAPHICAL DETAILS OF GEORG HIRSCHEL AND DIEDRICH KULENKAMPFF

Dr. M. Geerq & M. Beck (Hamburg)

Georg Hirschel

Georg Hirschel was born in 1875 and studied medicine at the Universities of Heidelberg, Berne, Munich and Berlin. He graduated in 1901 and then became a surgical resident at the University of Heidelberg. Here, he realized the tremendous prospects for the further progress of surgery which had become possible with the introduction of new local anaesthetics and new techniques. A result of his own research in this field, he suggested in 1911 blocking the brachial plexus by the axillary route.2

A few years later, he published the first edition of his textbook on local anaesthesia.3 In this, all currently used and recommended techniques of local anaesthesia were mentioned and comprehensively described. The textbook was written for both students and practitioners and this may explain its worldwide success as several editions in English, French, Spanish and Russian followed the first German publication.1

In the preface of his book, Hirschel emphasized that '...problems ...related to local anaesthesia should never be regarded as solved...several aspects await clarification...old and established methods must be considered and new ones critically examined before being added.' It is worth mentioning that Hirschel published only a few articles on local anaesthesia and related problems.4,5 Nevertheless, because of his textbook and the original description of the axillary approach to the brachial plexus, Hirschel gained well-deserved fame. His technique has become an essential part of the armamentarium of modern anaesthesia, even if his approach was at first regarded with scepticism.

In 1914, Hirschel became the Chairman of the Surgical Department of St Joseph’s Hospital in Heidelberg. He held this position for nearly four decades and died in Heidelberg in 1953.

Diedrich Kulenkampff

Born in 1887, Diedrich Kulenkampff started his career at the Allgemeines Krankenhaus in Hamburg, where he graduated in 1907.6 At that time, his colleague Sudeck published his first description of 'Atherrausch', an anaesthetic technique for ultrashort surgical procedures. As an alternative to the originally suggested narcotic-like ether, Kulenkampff favoured chloroethyle for this purpose and following his recommendations, the method became widely used for many decades.7

At the same time, Kulenkampff reported his first experiences of percutaneous block of the brachial plexus via the supraclavicular route.8 In contrast to Hirschel, Kulenkampff did a lot of research in the surgical field and he was intensively engaged in problems relating to anaesthesia, from the theoretical as well as the practical point of view. For example, he published a notable review of neurolytic
techniques, with highly concentrated alcoholic solutions, on the Gasserian ganglion.9

Several articles dealt with the possibilities of conduction anaesthesia for the differential diagnosis of pain, such as myocardial infarction or gastric perforation, appendicitis or renal colic etc.10 He never ceased his search for a comprehensive understanding of possible interactions (looking at the intensity as well as the triggering of the stimulus) which might be the key to the pain.11,12 In the sympathetic nervous system, he visualised a central component which resulted in syndromes of intractable pain. This model of sympathetically maintained pain is now regarded as valid.13 It is almost impossible to detail all Kulenkampff's various publications on this subject.

In conclusion, Kulenkampff was one of the leading pioneers of modern anaesthesia as well as of pain therapy in Germany, as was his father-in-law, Heinrich Braun. He was successful in his position as Chairman (interrupted for two years) for many years until 1952. Highly honoured, Kulenkampff died in 1961.

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The early use of chloroform in Spain

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The history of the introduction of chloroform anaesthesia in Spain has remained controversial for several years; our group has recently investigated this topic by means of the scientific and daily press of several Spanish cities, mainly Madrid and Barcelona.

First reports of chloroform anaesthesia

News of chloroform anaesthesia arrived at Cadiz, Barcelona, Santiago de Compostela and Madrid almost simultaneously. Cadiz received the information in November 1847 by an article published in the magazine La Revista de Ciencias Medicas (30 November 1847) entitled Nuevo agente para producir la insensibilidad. El chlorofom . Later, on 20 December, this magazine published another article about this anaesthetic entitled El chlorofom .

The news of the discovery arrived in Barcelona in November 1847 in articles published in both the lay and scientific press. In Santiago de Compostela, Prof. Guamerio wrote that he had heard the news from French newspapers of 24 November 1847. In the same city, Prof. Casares of the Faculty of Chemistry also had heard the news from the foreign press. The information arrived in Madrid - a few days later it was in the daily press of 6 December and the Gaceta Medical of 10 December.

First laboratory experiments

Chloroform was prepared in Barcelona by a pharmacist of Union Street called Francisco Domenech. Having obtained the drug, Mendoza carried out experiments on a dog on Sunday 19 December 1847 which consisted of some painful stimuli and minor surgery performed after the animal had inhaled chloroform.

On 5 December 1847, Professor Casares of Santiago de Compostela had obtained a small amount of chloroform. By the 19th December he had synthesized enough to perform the first experiments and clinical trials, so on that day he and some surgeons chloroformed a dog and also performed experiments on themselves. The results were satisfactory and they decided to try it on patients the following day, Monday 20 December.

Chloroform was first synthesized in Madrid on 15 December 1847 but the amount was so small that no experiments could be undertaken. The anaesthetic was obtained by the pharmacists Drs Lleteq and Andres Checa and on 26 and 29 December, several experiments were performed by professors of the Faculty of Medicine of Madrid.

First operations with chloroform

On 20 December 1847, at the Hospital Real de Santiago de Compostela, Professor Guamerio amputated, for cancer, the penis of one Domingo...
Barrier, aged 53. On the same day, Professor Gonzales Olivares performed mastectomy on 39 years old Georgina Camano. On the next day, the same surgeon amputated the penis of a soldier, Jose Salvador.

Surgery carried out under chloroform anaesthesia achieved good results. On Monday 20 December 1847 in Barcelona, Professor Mendoza successfully amputated the leg of a 39 years old woman who had a huge sarcoma of the knee.

In Madrid, after a number of self-experiments by several surgeons, a 19 years old patient was operated on for anal fistula, with the aid of chloroform, by Dr. Bonifacio Blanco Torres on 30 December 1847. In the same city, Professor Jose Culvo Martin amputated a leg on 16 January 1848 with the aid of the new anaesthetic.

First scientific publications

References to the early use of chloroform in Cadiz are only found some years later, e.g. Revista Medica 1856; 1: 1-5 etc. Once the first clinical trials with chloroform were completed, the surgeons from Santiago de Compostela quickly reported their results to the scientific press - mainly to that of Madrid, e.g. Guarnierio V. Ensayos sobre el chloroform. Gaceta Medica 1847; 3: 282. etc. but also in the daily press, e.g. Operaciones Quirurgicas con el chloroformo. El Heraldo 1846; 1:1 etc.

The first operation by Mendoza under chloroform anaesthesia had little response in the scientific or lay press of the time - notices appeared as: Acerca del cloroforme, La Abeja Medica 1847; 1:331-335 and in El Fomento on 21 December 1847 etc.

Early references to experiments and trials in Madrid can be found in: La Union 1848; 10:55-57, 12:72 and 12:93 etc and in Gaceta de Madrid of 4 January 1848 etc.

Conclusions

The news of chloroform anaesthesia arrived rapidly in Spain through French and British newspapers and was readily reflected in the scientific and daily Spanish press of the time. The speedy synthesis of chloroform and rapid experimentation on animals that followed resulted in its use for surgery, at first in Barcelona and Santiago de Compostela on 20 November 1847. The new anaesthetic agent proved very popular with the surgeons of the time and quickly replaced ether anaesthesia.
ANDREW HUNTER 1915-1991

An appreciation from Dr Jean M Horton (Cambridge)

Professor Andrew Hunter, an Honorary Member of the History of Anaesthesia Society (HAS) died in March 1991 aged 75, having been progressively disabled for some years with Parkinson’s disease. He was one of the founder members of the HAS and a regular attender at its meetings, his last attendance being at Southend in 1988.

He was born in Cambuslang, near Glasgow, and educated at Hutchinson’s School, Glasgow, receiving his medical education at Glasgow University and graduating in 1937. After a House Surgeon post at Glasgow Royal Infirmary, he spent a year at Falkirk Infirmary as resident medical officer and resident anaesthetist, Scotland’s finest exports are her people, and in 1943 he was head-hunted and appointed Consultant Anaesthetist to the Neurosurgical Unit (lead by the neurosurgeon Sir Geoffrey Jefferson) at Manchester Royal Infirmary. He was also appointed Consultant Anaesthetist to the Thoracic Surgical Unit at Wythenshawe and Baguley Hospital, and to Cheadle Royal Hospital. Thus his main clinical activities, to which he contributed so much, were in anaesthesia for neurosurgery and thoracic surgery. Latterly he worked mainly at Manchester Royal Infirmary (MRI) and although officially retired in 1978 at the age of 63, he continued to work for five years at the MRI as a Clinical Assistant and was Curator of the museum in the Anaesthetic Department, and Consultant Transplant Adviser to the North West region from 1975 to 1981.

These are the bare outlines of the clinical career of a much-loved and admired anaesthetist, a father figure and mentor to many. His interests in clinical anaesthesia were manifold; he was a giant and pioneer in neuro and thoracic anaesthesia. He was one of the first to demonstrate the value of controlled ventilation for craniotomies and pioneered total intravenous anaesthesia with his thiopentone drips.

He must have been one of the few, if not the only anaesthetist with the diploma of FRFPS (Fellow of the Faculty of Physicians and Surgeons of Glasgow) which he obtained in 1940. In 1942 he was awarded the Glasgow MD for his thesis on 'Postoperative pulmonary complications', and passed the DA. He was elected FFARCS in 1953.

In Manchester, his academic and teaching abilities were recognised by the Faculty who appointed him as Honorary Lecturer in Pharmacology in 1947, (there being no academic department of anaesthetics). He was appointed Honorary Reader in 1961, to a personal chair in 1971 and Emeritus Professor in 1975. He was saddened that he was not appointed to be the first holder of the Chair of Anaesthesia at the University of Manchester. He founded the Manchester and District Society of Anaesthetists, which later became the Section of Anaesthetics of the Manchester Medical Society of which he was President in 1982.

Andrew Hunter’s activities were not confined to Manchester or clinical work. He was always to be seen on the first Friday of the month, never failing to contribute to the discussions of the Section of Anaesthetics
of the Royal Society of Medicine which he served as Council Member, Secretary and then President in 1973. He was a Council Member of the Association of Anaesthetists from 1956 to 1959 and elected as an Honorary Member in 1980. In the Faculty of Anaesthetists of the Royal College of Surgeons of England he served as a member of the Board for sixteen years, was Vice-Dean and awarded the Clover lectureship and Dudley Buxton Prize. He was an examiner for the Primary and Final FFA and Chairman of the ANQ and core group and demonstrated to critics that the FFA examination was not competitive.

He was one of the founders of the Neuro-anaesthetists' Travelling Club and a founder member of the Anaesthetic Research Society and Intensive Care Society.

His publications were numerous: three books and many papers and chapters, and when met at meetings he always seemed to be carrying the galley proofs of his most recent work. His first publication was in Volume 1 of 'Anaesthesia' in 1946 on 'Local analgesia for abdominal operations' and his last was also in 'Anaesthesia' in 1984 when he described 'Idiopathic alveolar hypoventilation in Leber's disease'. One of his main contributions to the anaesthetic literature was in his work on the development and success of the 'British Journal of Anaesthesia', which he served as Treasurer, Assistant Editor of Postgraduate Numbers and Chairman of the Board of the Journal from 1959 to 1985.

An appreciation such as this cannot do justice to Andrew Hunter's contribution to the specialty of anaesthesia. For those of us who specialised in neuroanaesthesia, he was our mentor. We will all remember this tall, kind and helpful man through his writings and the fine example and standards that he set.
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