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HISTORY OF ANAESTHESIA IN LIVERPOOL

by

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BEFORE telling the story of anaesthesia in Liverpool, it is interesting to take note of our 'near misses' in subjects which have, in later years, become of importance in anaesthetic practice.

James Currie, a physician of this city who died in 1805, was a pioneer in the study of hypothermia. His was the earliest record of the therapeutic use of cooling to reduce pyrexia. He made observations on this condition which remain valid today, including the drop of temperature which occurs when the individual is removed from the cold environment—the so-called 'after drop'. This is of importance in the technique when using the surface cooling method. His observations were made on individuals who had fallen into the Mersey and had remained in the water for some time (Currie, 1798).

Perhaps the most interesting 'near miss' lies in the interest that Alfred Higginson took in respirology. Higginson was a surgeon to the Royal Southern Hospital, one of the founder members of the Liverpool Medical Institution and the immortal inventor of the syringe which probably in its day relieved more pain and discomfort than most drugs, other than anaesthetics, by affording relief to so many over-burdened colons. He attended the first demonstration of ether anaesthesia in the city and was at once intensely interested and saw the importance of the discovery. He quickly constructed an ether inhaler from an ear trumpet and bladder. He had an inventive brain and designed, among a great variety of 'gadgets', various astronomical instruments, but it was in the field of respirology that he showed himself far ahead of his time. He designed a 'spirometer' with which the vital capacity, a parameter which had just been described by Hutchinson, could be rapidly measured. In years before the introduction of ether there occurs in the Minutes of the Institution the following record: 'Mr. Higginson exhibited and explained a newly invented apparatus for producing artificial respiration, called "the pneumatic chest"; this, we find, consisted of an airtight box upon which a pair of bellows is placed for the alternate introduction and withdrawal of air. The effect is to force air into the lungs by the elevation of the chest consequent on the abstraction of air from the box'.

This is not so much a 'near miss' but the first description of the 'iron lung'. One wonders how it failed to have been accepted as essential in the treatment of various forms of respiratory paralysis. This is one further example of Armstrong Davison's (1965) observation that: ' . . . the history of anaesthesia can only be interpreted correctly by viewing it in the perspective of other human activities, medical, scientific, and social; inventions, discoveries, wars, religious beliefs, and all the manifestations of art and culture'.

On this side of the Atlantic, the first announcement of Morton's demonstration of ether in the Massachusetts General Hospital on 16 October 1846 is to be found in the weekly supplement to the *Liverpool Mercury* appearing on Friday, 18 December 1846. It read: 'A method of mitigating pain in surgical operations by the inhalation of certain ethers has been discovered in America, and it is said that successful experiments have been made' (Sykes, 1960).

On 19 December Dr. Boot and Mr. Robinson in Gower Street, London extracted teeth under ether, and on the 21st of that month Mr. Liston amputated a thigh and evulsed a toenail on patients under the influence of ether at University College Hospital. The letter carrying the news from Boston must have passed through the port of Liverpool. Liston on the evening of the 21st sat down and wrote to Mr. Buchannan, a dentist in Glasgow. The same evening probably he also wrote to Dr. Archer of Liverpool. Archer was surgeon to the Borough Jail in Great Howard Street and later to Walton Prison. Liston in his letter described the first two operations he had performed under ether. Archer read this to a meeting of the Liverpool Literary and Philosophical Society held on 28 December in the Royal Institution in Colquitt Street—a building which still stands and is now the centre of the University's Department of Extension Studies. The Liverpool Literary and Philosophical Society was founded, in the words of its constitution, for 'the promotion of literature and science generally and to modify the local tendency to the pursuit of commerce exclusively'! Incidentally there was a close liaison between this society and the Warrington Philosophical Society of which Joseph Priestley, discoverer of oxygen and nitrous oxide, was a member.

At this meeting of the Society a certain Felix Janiewicz, a respected dentist of the town, was elected secretary. He was the son of Felix Janiewicz senior, who was of Lithuanian birth. A violinist and orchestral conductor of international repute, this latter gentleman had been court musician to the family of the Duke of Orleans in Paris. At the time of the revolution he had emigrated to England. He was a well-known musician and in London gave many concerts including a 'benefit' concert for Haydn. He was incidentally one of the leaders of the London Philharmonic Orchestra at the time of its foundation in 1815. In 1800 he married a Miss Breeze of Liverpool and retiring from the concert platform established a music warehouse in Lord Street. His son Felix qualified as a dentist and became secretary of the 'Lit. and Phil.'. On the evening when the letter from Liston was read by Archer, Janiewicz did not fail to appreciate its importance. He left the meeting determined to prepare an apparatus for the administration of ether. Unhappily I have not been able to trace the description of this. Perhaps he also experimented a little, for time passed before he administered the first anaesthetic in Liverpool at the South Dispensary, 1 Upper Parliament Street,

on 10 January 1847, for the extraction of teeth. Eight days later there was a public demonstration of ether anaesthesia in the Eye and Ear Infirmary in Mount Pleasant. Mr. Hugh Neil, an extraordinary character who will himself be the subject of a further paper from the writer, operated for cure of cataract and other diseases of the eye before a large audience of dignitaries of the city with the object, he said, of 'removing the impression which generally prevails that operations for the cure of blindness are attended with great pain'. This event was fully reported in the local press. The ether on this occasion was administered by Alfred Higginson with the apparatus I have already mentioned. Thus was etherization launched in Liverpool.

The first reference to ether anaesthesia in the Minutes of the Liverpool Medical Institution occurs on 4 March 1847, when Mr. Chalmers reported the case of a five-weeks-old dislocation of the hip which, after two unsuccessful attempts while the patient was conscious, was successfully reduced when the patient had been anaesthetized with ether. However, in the Minutes of a meeting six years previous to this, in November 1841, there was a discussion of mesmerism; and Dr. Sutherland reported having seen several operations performed under the influence of mesmerism in Paris. Four years later on 26 November 1846, that is seven weeks before the news of the discovery of ether had reached the town, a Dr. Inman opened another discussion on mesmerism and gave details of cases on whom it had been used by a medical friend in Preston. In one patient, lymph glands were removed from the neck without pain. But, although the Institution decided to set up a committee to investigate the claims of hypnotism, as far as I can trace, that committee never met and the introduction of etherization two years later appears to have supplanted any interest in it.

The story of David Waldie's contribution to the introduction of chloroform is sufficiently well known. It can be summarized by drawing a parallel between his part in the discovery of chloroform and his contribution to it and that of Jackson in Boston to ether. Jackson suggested ether to Morton, and there is no doubt whatever that Waldie suggested chloroform to Simpson. David Waldie was born in the little town of Linlithgow in West Lothian, seven or eight miles from Bathgate, the birthplace of Simpson. They knew each other from their earliest days: they were contemporaries at medical school in Edinburgh, Waldie being Simpson's junior by two years. He qualified one year after him.

For two years prior to 1847, Simpson had used a prescription known as 'Chloric ether', an alcoholic and aqueous solution of chloroform, as a so-called 'diffusible stimulant' in place of valerian and camphor. This prescription had been introduced to him by Dr. Richard Formby of Liverpool (Simpson, 1847a) who was, by the way, one of the first four Vice-Presidents of the Institution, elected to office at the first meeting. He and other Liverpool physicians were the first in the country to use this prescription which had been imported from the United States. 'Chloric ether' was produced by the distillation of chloride of lime with spirit. It was prepared for the first time in Liverpool by the chief chemist of the Apothecary's Hall in Colquitt Street, a certain Dr. Brett. David Waldie took over from Brett in 1839 or 1840 and set about purifying his product. In fact he decided to prepare pure chloroform and add spirit to it in a dilution of 1–6 (Waldie, 1848).

In October 1847, Waldie visited Linlithgow where he met Simpson and discussed

with him the various substances Simpson had been using in an attempt to find a smoother anaesthetic than ether. Waldie suggested that he might try chloric ether which though it had been tried before had been abandoned as useless, probably because it was too dilute a solution to be effective. Waldie's promise to send Simpson some of his pure chloroform and alcohol mixture was never fulfilled because when he got back to Liverpool the Apothecary's Hall had been burned down. Simpson, impatient to get on with the trial, had purchased it in Edinburgh from the firm of Duncan, Flockhart and Co. (Simpson, 1847b).

Although Simpson has been accused of failing to give Waldie due credit, there is no doubt of his acceptance that Waldie made the suggestion. Four days after his demonstration he wrote to Waldie enclosing a copy of his first paper on chloroform saying, 'I am sure you will be delighted to see part of the good results of our hasty conversation'. On 29 November, that is fifteen days after Simpson's experiments in his home with Drs. Duncan and Keith, Waldie addressed the Liverpool Literary and Philosophical Society 'On chloroform—a new agent for producing insensibility to pain by inhalation'. Probably the only existent copy of the pamphlet arising from that paper is in the archives of the Institution. Waldie certainly administered chloroform in this city. There is a description of his administration of it for Mr. Hugh Neal, again at the Eye and Ear Infirmary, on 24 November, as reported in the *Liverpool Courier*—the forerunner of the *Liverpool Daily Post*.

After the destruction of the Apothecary's Hall, Waldie worked at Clay and Abraham's pharmaceutical chemists' shop in Bold Street until in 1853 he emigrated to India. He died on 23 June 1889 and was buried in the Scots' Cemetery in Calcutta.

It seems without doubt that Waldie felt that he had been badly treated, for in a letter to John Abraham also in the archives, he complains that, 'though I have never said much on the subject, I was never satisfied with the recognition of my share in the matter got because I could never admit that the acknowledgment made by Dr. Simpson was at all adequate. He did as little as he could possibly do, and the statement he made was not a fair one.' However, he acknowledges Simpson's priority when in the same letter he writes, 'pity that the place had been burned down at the time of Simpson's enquiries, I should in all probability have made the discovery in the first place myself'.

During the years following, several papers were given on chloroform, its uses and abuses, but the next significant contribution in Liverpool was made by another migrant Scot, Dr. Thomas Skinner. Qualifying in Edinburgh and receiving the gold medal in obstetrics and gynaecology from the hands of Simpson himself, he became Simpson's private assistant and fervent disciple. He came to Liverpool in 1857 and gave a paper to the Medical Institution on 4 March, entitled 'Chloroform in Midwifery' and surprisingly enough, a month later, another on 'The Use of Carbonic Acid as an Anaesthetic'. Skinner recommended carbon dioxide, topically applied, for the relief of pain in such diverse conditions as open ulcers, and cancers, burns, otalgia, ophthalmia, and conditions described as 'ozoena of the os uteri, rectum and bladder'. He also describes its benefits when inhaled in chronic chest conditions.

In anaesthesia Skinner is mainly remembered for his introduction of the wire frame mask in 1862 designed for the inhalation of chloroform and ether (Skinner, 1862).

Figure 1
Watson Alcock (1770–1855), the founder of the practice. (From an engraving by C. Turner after the oil painting by J. H. Taylor.)

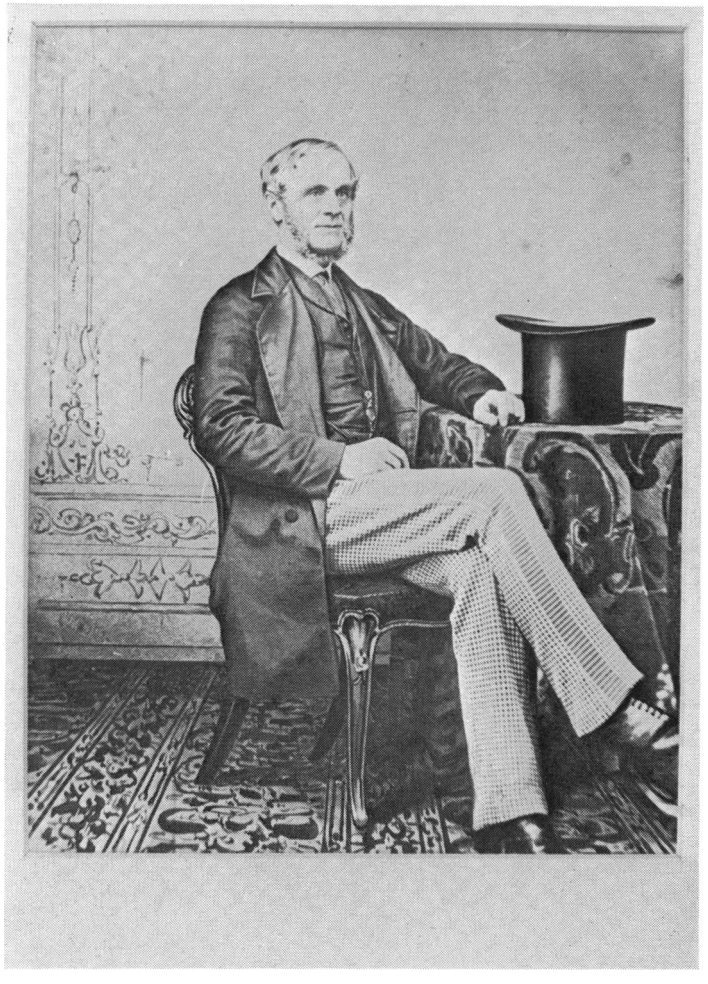

Figure 2
Charles Trotter (1803–1877), who became Alcock's partner in 1826.

Figure 3
Sir Rudolph Smith, Bt., C.B.E., F.R.C.S. (1869–1958), a member of the practice from 1897 to 1912.

https://doi.org/10.1017/S0025727300018007 Published online by Cambridge University Press

This was the prototype of many to follow, such as those of Schimmelbush and Bellamy Gardner. Skinner invented this mask to overcome the insanitary conditions involved in the use of the usual inhalers of the time. His words are colourful, 'if there be one evil more crying, more disgusting than another', he writes in 1873, 'in the practice of inducing anaesthesia, it is the use of inhalers . . . . There is not one inhaler, my own excepted, where every patient is not made to breathe through the same mouth piece, tube and chamber . . . . Sweet seventeen is made to follow a bearded devotee to Bacchus, saturated with the smoke of cigars and the exhalations of cognac; or another whose nasal and pulmonary mucus membranes, leave alone the cutaneous surroundings of the mouth and nose are exhalant of all odours but those of purity and innocence and when looked into may be found sensible to sight as well as smell . . . a mouthpiece in time becomes loaded with grease, and filthy enough to upset one's digestion and sleep for a considerable time to come' (Skinner, 1873). His mask folded up, and he is described as walking up Mount Pleasant to the lying-in hospital where he worked with the mask in his top hat.

At first he was a most vigorous opponent of homeopathy and persuaded the Institution to pass a rule debarring all practitioners of that art from membership. Tragically this very rule was applied to him when later, after a serious illness, he was converted to the opposite view. He was forced to resign his membership. In his own words he says, 'the existence of this law was tantamount to drawing up and signing my own death warrant, I resigned my membership'. This by the way is telling evidence of the regard of which practitioners of the city regarded the Medical Institution and of its importance in their life. He left Liverpool for London in 1881, where he practised in gynaecology and homeopathy very successfully until his death in 1906 at the age of eighty-one.

Three years after Skinner's death Melzer and Auer (1909) in the United States described their experiments on the endotracheal insufflation of ether in animals. And a year later in 1910 Elsberg produced a machine designed to insufflate ether into the human trachea. Sir Robert Kelly, surgeon to the Royal Infirmary and later Professor of Surgery in Liverpool University, visited the U.S.A. in 1912 and saw this technique in use. On his return he commissioned Down Brothers to construct a modification of the Elsberg apparatus. It is not without interest to compare the Elsberg apparatus with that of Kelly. In the Elsberg version the air was warmed before being passed over the ether. This may have helped the vaporization of ether. Kelly's modification was to warm the air-ether mixture immediately before its insufflation into the trachea and his apparatus was designed for this purpose. However, in fact, the mixture was at room temperature by the time it reached the trachea. The seven cases described by Kelly in 1912 having been anaesthetized with this machine were the first in this country with which endotracheal insufflation was used (Kelly, 1912).

It is probable that Sir Francis Shipway visited Down Brothers where possibly he was told of Kelly's modification of the Elsberg apparatus. He produced his own practically identical machine. There is no doubt, however, as to who was the original introducer of this technique into this country.

Even before this and indeed contemporary with Elsberg, H. Morriston Davies, ultimately one of Liverpool's most distinguished surgeons, was pioneering intrathoracic surgery in London. Seven years previously Sauerbruch had introduced his

'unterdruch kammer' and Braun his 'überdruch apparat' in which, respectively, the pressure around the open thorax was reduced or that in the lungs was increased in order to reduce the degree of ventilatory disturbance when the pleura was opened. Morriston Davies decided that the maintenance of a positive pressure in the lungs when the thorax was opened was the correct approach and devised a special apparatus for this purpose. The apparatus was designed to deliver chloroform and air and oxygen at a raised pressure and so keep the lungs expanded. I think more interesting, however, was his design for a cuffed endotracheal tube which not only permitted the sealing of the trachea by the cuff but also suction and drainage of secretions during operation. He thus anticipated the modern cuffed tube (Morriston Davies, 1911). It seems strange that one who could devise such elaborate apparatus using the physical principle of positive pressure and also see the advantage of a 'to-and-fro' endotracheal tube could still fail to appreciate the great disadvantage of the enormous resistance to respiration created by the narrow bone of his tube. It is perhaps not justifiable to claim Morriston Davies as a Liverpool pioneer for this work was done while he was at University College Hospital, London. Nevertheless, following injuries to his hand, he migrated from London to his private sanatorium just outside Ruthin and from there pioneered the development of intra-thoracic surgery in the North West and became the founder of the Liverpool Cardio-Thoracic Centre when his anaesthetist was the late John Halton.

So we come to what would be widely acknowledged as Liverpool's greatest single contribution to the relief of suffering—the use of gas and air analgesia in midwifery. The story of the development of the method by which nitrous oxide could be administered by the mother herself under the supervision of a midwife is well known, although it is perhaps appropriate on this occasion to put on record the genesis of the idea as related to me by Dr. R. J. Minnitt.

Minnitt had long been especially interested in nitrous oxide and knew from his personal observations that it could produce relief of pain and loss of memory without complete loss of consciousness. He had in fact used nitrous oxide and oxygen anaesthesia for obstetrical procedures and occasionally extended its use during the antepartum period. In the autumn of 1932 he attended, in the Chandos Street premises of the London Medical Society, one of the first meetings of the newly formed Association of Anaesthetists of Great Britain and Ireland. The subject under discussion was the relief of pain in labour. Howard Jones, reputed for his work on spinal anaesthesia, suggested that nitrous oxide given by the 'injector' principle might be the answer. Presumably this 'injector' was to entrain air. Minnitt was already of the opinion that gas and air caused less nausea and vomiting than gas and oxygen and went home determined to investigate this possibility. In October of that year the Clinical Investigation Committee of the Liverpool Maternity Hospital had written to him asking him to devise a method of obstetrical analgesia and in a later letter pointed to the desirability of any such method being applicable in general practice and preferably fit for use by midwives. He thought gas and air might be the answer and on 19 July 1933 the first meeting with Charles King, the manufacturer of anaesthetic apparatus of Devonshire Street, took place at which they decided to use the McKesson oxygen apparatus which they saw could be adapted for the delivery of nitrous oxide, instead of oxygen,

with the entrainment of air. So was born the Minnitt's Gas and Air Apparatus. The first cases were done in late September and early October in Minnitt's private practice—and in the Liverpool Maternity Hospital on 16 October, when Minnitt was assisted by a research assistant, Dr. Hilda Garry Gibbons. One might suggest that Minnitt's greatest contribution was not so much to design the apparatus but his continued campaign firstly to persuade the Central Midwives Board to permit their graduates after suitable training and certification to supervise patients using the technique, and then over thirty or more years in teaching and propagating the method.

Minnitt made many other forward-looking contributions to anaesthesia and in particular one remembers his very careful investigation of the use of insulin and glucose in the shocked patient. He became the first Lecturer in Anaesthesia (part-time) in the University and the first anaesthetist to serve on the Faculty of Medicine. As a result of his approach to anaesthesia which was scientific when most practitioners laid more emphasis on the 'art', he attracted a school of young aspirants and eventually was able to persuade the University to found a full-time Department under the direction of a Reader.

The history of anaesthesia in Liverpool in the thirties would not be complete without mentioning Rawdon Smith who did a deal of work to develop dental anaesthesia, and published an early book dealing exclusively with this field (Rawdon Smith, 1926). Nor should we forget Henry Roberts, a general practitioner anaesthetist, who devised a continuous flow apparatus for dental anaesthesia which became almost exclusively the machine used by dental surgeons in the North West. His main contribution perhaps was to interest in the design of anaesthetic apparatus a motor mechanic who had a small garage opposite to Roberts' residence in Moreton on the Wirral. This man, Mr. John Blease, still happily alive, developed the first really portable anaesthetic machine incorporating CO_2 absorption in the country. Eventually he founded his own firm to market his machines and especially his 'Pulmoflator'. This was the first British intermittent positive pressure pulmonary ventilator. It has been exported to most parts of the world and is still widely used.

John Halton, a strongly individualistic practitioner of anaesthesia whose art and ingenuity might almost permit the use of the term genius, worked closely with Blease and by encouragement, if not more directly, helped in the design of his machines. Halton, of course, was my colleague in the local curare story—but on this I will not dwell. It is too recent. However, I cannot refrain from recalling how, frustrated by an inability in the last year of the war to obtain more than the occasional vial of the American preparation 'Intocostrin', we both remembered the little tubes of white powder we had used as students in physiology experiments. We found it labelled 'Curarin' by Burroughs Wellcome. With the connivance of Dr. R. Gregory, then Lecturer in the Department and now its Professor, every ampule was commandeered from the Department of Physiology, autoclaved, and, dissoved in pint bottles of normal saline to a dilution of 15 mg/ml, was infused into patients. This appears to have been the first use of the pure alkaloid d-tubocurarine chloride. Had the Committee on the Safety of Drugs existed and had we the refined conscience on the dangers and ethics of human experimentation of later years, several consequent developments might have been delayed for a very long time; this would also have been the case if the

American Food and Drug Regulations had been in evidence when Harold Griffiths revolutionized anaesthesia by the use of 'Intocostrin' (Griffiths, 1942).

Liverpool may claim to have played no mean part in the story of the relief of pain in these islands. Many trained in its School of Anaesthesia carry on this compassionate tradition.

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