The history of anaesthesia is a large subject; paradoxically, it is also true that it does not exist at all. Anaesthesia is merely a branch of medicine, and its history can only be understood by examining the whole subject. Equally, medicine is a branch of science, while science is but one facet of human activity; it follows, therefore, 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.

F. The Pre-Anaesthetic Era (1754–1846).

This period of just under a century saw tremendous changes in the organization of the polity of Western Europe, in the habits and manner of thought of the people, so that, at the end of this period, we unmistakably enter upon a scene familiar to us in almost every particular. The preceding three centuries had seen the marshaling of the forces which, now prepared, were to sweep away the last remnants of medievalism, and found a system of life bound, not upon agriculture and feudalism, but upon science, industry and democracy.

The loss of the American Colonies and the outbreak of the French Revolution practically coincided. The Napoleonic Wars which followed excluded British trade from the Continent of Europe, but the result was only to make Britain stronger and more resourceful. The conquest of India and Canada and the colonization of Australia led to an extension of trade, the more so because Britain had been forced to concentrate on naval rather than land forces. The prosperity which came in the wake of trade was necessarily unevenly distributed, but all classes benefited to some extent, and this was reflected in a tremendous increase in population which rose from about 8,000,000 in England and Wales in 1754 to about 17,000,000 in 1846. Meanwhile, the flow of people to the towns as a result of the increasing mechanization of industry brought about the industrial Revolution. Similar changes, of course, occurred elsewhere, but Britain's grip on the seas and Napoleon's on the land, delayed the development of the Continental countries, so that Britain's pre-eminence was assured, while the invention of the steam-engine and its adaptation to locomotives and steamships revolutionized transport and greatly influenced both mental and material growth.

Liberalizing influences were everywhere at work, not only in politics, but in Art and Religion as well. It is no accident that the final extinction of the Holy Roman Empire occurred only fifteen years after John Wesley's death. In literature, the work of Samuel Johnson, Kant, Goethe, Burns, Scott, Wordsworth, Byron and Shelley falls within this period; in art, Constable and Turner, in music, Mozart, Haydn and Beethoven; while public consciousness of the importance of art was revealed by the opening of the British Museum and the Royal Academy of Arts. The culminating political event was the passing of the Reform Bill in 1832.

In science, the work of such men as Priestley, Lavoisier, Cavendish, Galvani and Volta laid the foundations for the achievements of Thompson (Count Rumford), Humphry Davy and Michael Faraday, and the work of all these was united by close bonds with political, economic, religious and medical thought. In medicine, the power of diagnosis was greatly assisted by the discovery of percussion by Auenbrugger and of stethoscopy by Laennec, while the study of disease was advanced by John Hunter with his interest in comparative and morbid anatomy, and by Cullen...
who greatly influenced medicine, not only in Edinburgh, but also on the American Continent. Obstetrics were revolutionized by William Smellie and William Hunter; James Lind had opened the door to the study of vitamins; physiology was advanced by Sir Charles Bell's discovery of the separate sensory and motor functions of the posterior and anterior nerve roots; and surgical skill reached a great height in the hands of Liston. However, for its immediate results, the most important therapeutic discovery of the period was the introduction of vaccination by Edward Jenner. The mortality from smallpox was enormous, and the publication of Jenner's Inquiry into the Causes and Effects of Variolae Vaccinae in 1798 disclosed a safe way to save countless lives. So important was the discovery deemed that Parliament voted Jenner a reward of £10,000, later supplemented by a further £20,000. Among all the benefactors of mankind, Jenner's name must stand high on the list.

Until the War of Independence, medicine on the North American Continent was mainly a pale shadow of British medicine, but with political separation came scientific and medical independence: the Medical School at Philadelphia was founded in 1765, and others followed, the Harvard Medical School being opened in 1783. Greatly influenced by the Edinburgh school, American medicine quickly grew to full stature and began to break new ground, particularly, for example, when in 1809 Ephraim McDowell successfully removed an ovarian tumour weighing 22½ lb., this being almost the first time in which the peritoneal cavity had been invaded by the surgeon. Knowledge of the physiology of digestion was much advanced by the work of Beaumont (1825–1833) on his patient, Alexis St. Martin, who was suffering from a gastric fistula caused by a gunshot wound; and in 1843 appeared an essay On the Contagiousness of Puerperal Fever by the doctor and man of letters, Oliver Wendell Holmes. Of considerable importance in the development of both psychology and anaesthesia was the work of Franz Anton Mesmer (1734–1815). At first working with magnets, and later using the "animal magnetism" which, he believed, flowed from his own body, Mesmer developed a system of therapy, first in Vienna and later in Paris, which had many adherents. In 1784, a commission appointed by Louis XVI, which comprised such famous men as Dr. Guillotin, Lavoisier, Bailly and Benjamin Franklin, reported that no evidence of "animal magnetism" was to be found and that Mesmer's results were entirely due to imagination. Mesmer's treatment consisted of bringing his patients into hysterical convulsions; it was a follower of his, de Puységur, who discovered hypnotic somnambulism, otherwise the mesmeric trance.

Paradoxically the discoveries of the century under review had destroyed the confidence of the public in its doctors, and the doctors in themselves. The old humoral theory of disease had been swept away, and there was nothing to replace it. In the face of disease, the doctors, knowing their ignorance of the cause, were helpless, and there arose, both within and without the field of orthodoxy medicine, theorists and quacks who attempted to reduce all therapy to simple terms, such as John Brown of Edinburgh, whose theory was that all diseases were sthenic (i.e., caused by over excitation) or asthenic (i.e., caused by under excitation). The former were to be treated with opiates and the latter by stimulants. Such theories led nowhere and merely weakened the power of the profession by promoting feuds and discords among its members, each championing his own futile system, claiming successes which were often exaggerated for his own method, and denying success to his rivals.

With all the great changes in way of life during this period, an even greater change in the habit of thought was taking place; the idea of humanity was beginning to blossom and bear fruit. It may be that the carnage of the Napoleonic Wars and the frightful conditions in the towns which accompanied the Industrial Revolution caused a change in men's hearts. However that may be, the change disclosed itself in many ways, such as the abolition of the Slave Trade (1807), the founding of the Humane Society, the passing of Acts against bull-baiting and bear-baiting and cock-fighting, and the great reduction in the number of crimes for which a capital punishment could be inflicted. Meanwhile, conditions were improved in lunatic asylums and prisons, and the great and
rewarding advances in Public Health were set on foot by Chadwick and Southwood Smith. In the field of medical teaching, the passing of the Anatomy (Warburton’s) Act and the licensing of schools of medicine in Britain brought about a great improvement in the standard of teaching and released the teachers from co-operation with body-snatchers.

It was only to be expected that this humane interest in the welfare of others which characterized the early years of the 19th century would soon extend itself to surgery, and that a demand for surgical anaesthesia would soon be felt; accordingly, we find that efforts in this direction were made by an increasing number of people at this time. Thus, in 1807, Baron Larrey rediscovered refrigeration anaesthesia, when he noticed that soldiers who had lain some time in the snow felt no pain during amputation; in 1821, Récamier used hypnotism during cauterization; in 1829, Cloquet successfully amputated a breast while the patient was in a mesmeric trance; in 1832, Wardrop employed bleeding to syncope for a surgical operation; and in the early 1840s, Esdaile in India and Elliotson in London were advocating and practising hypnotism during surgical operations.

It is not to be thought that all these advances occurred easily or without opposition. Every advance was opposed, often with violence, whether in the field of politics or of medicine. Thus, Elliotson was rewarded for his efforts to produce painless surgery by being branded as a quack and driven from his teaching post at University College Hospital.

In 1754, the year in which the pre-anaesthetic era may be said to have begun, Joseph Black announced the discovery of carbon dioxide, and also laid the foundation of the atomic theory by showing that a given weight of calcium carbonate always yielded a definite quantity of carbon dioxide, which could, in turn, be united with calcium hydroxide to form the original quantity of calcium carbonate. In 1772, Joseph Priestley discovered nitrous oxide, and a few years later both he and Scheele announced the isolation of oxygen (dephlogisticated air).

The work of Black, Priestley, Lavoisier and Laplace brought gases very much to the notice of the public. Early in 1799, Dr. Thomas Beddoes opened the Pneumatic Medical Institution at Bristol, with the young Humphry Davy as superintendent. Davy had already experimented with nitrous oxide, and, in 1800, he published his suggestion that nitrous oxide might be used with advantage during surgical operations. The advice fell on deaf ears.

In 1824, Hickman published A Letter on Suspended Animation, in which he advocated anaesthesia with carbon dioxide and, in 1828, he applied, through King Charles X, to the Royal Academy of Medicine of France. Hickman’s proposal received no support, which was probably as well, since his method of anaesthesia was indubitably dangerous.

As early as 1795, Richard Pearson was advocating the inhalation of ether in the treatment of phthisis, and in the succeeding years both ether and nitrous oxide were inhaled from time to time on account of their intoxicating effects, especially in the U.S.A. These experiences led to the use of both ether and nitrous oxide as anaesthetics, first in 1842, when Clarke gave ether to a patient while Elijah Pope extracted a tooth, and when Crawford W. Long used ether on several occasions for minor surgery. Neither Clarke nor Long published his experiences. In 1844, Horace Wells used nitrous oxide for dentistry, but a demonstration arranged at the Massachusetts General Hospital proved unconvincing. It was left to a former partner of Wells, one William Thomas Green Morton, to demonstrate anaesthesia with ether, which he did at the hospital where Wells had failed, and, from that day, October 16, 1846, the “deepest furrow of the wrinkled brow of agony has been smoothed for ever”.

1754. Joseph Black’s M.D. thesis. De Magnesia Alba, announces the discovery of carbon dioxide, and, by establishing a quantitative basis for chemistry, paves the way for the atomic theory. His paper was first published in 1756, and appeared in book form in 1777 and 1782.
1754. Benjamin Pugh describes an “air-pipe” for the resuscitation of the newly born. It was made of a wire spring, 10 inches long covered with thin, soft leather, and was to be introduced into the infant’s mouth digitally “as far as the larynx”.

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1755. John Hunter (1728–1793) conducts experiments on artificial respiration on dogs by means of a double acting bellows, one chamber of which filled the lungs with fresh air, while the other exhausted the lungs and discharged the "mephitic" air into the atmosphere. The bellows became popular for resuscitation of the apparently dead. Hunter's contributions to surgery, dentistry and medicine were outstanding. His name is intimately associated with the Royal College of Surgeons of England.

1756–1763. The Seven Years War: Frederick of Prussia beats France in Europe; and Britain wins India and North America.


1756–1763. The Seven Years War: Frederick of Prussia beats France in Europe; and Britain wins India and North America.

1759. British Museum opened.

1759. Quebec, Minden.


1761. Giovanni Battista Morgagni (1682–1771) publishes his Inventum Novum, in which percussion is described, and the various differences in sound caused by hydrothorax, enlarged heart, etc., are pointed out. No notice of the invention was taken until Corvisart republished the Inventum Novum in 1808.

1761. Giovanni Battista Morgagni (1682–1771) publishes his De Sedibus et Causis Morborum, which has earned him the title of the Father of Pathology. It was translated into English in 1769.

1763. James Boswell becomes the faithful follower of "The Great Cham", Dr. Samuel Johnson (1709–1783).

1765. Foundation of the Medical School of Philadelphia.


1768. Foundation of the Royal Academy of Art. The inventions of Watt, Arkwright and others begin the era of manufacturing industry.

1770–1850. Wordsworth.


1771–1832. Sir Walter Scott.

1772. Prussia, Austria and Russia begin dividing Poland.

1772. Joseph Priestley (1733–1804) discovers nitrous oxide, which he names "dephlogisticated nitrous air". The exact date of the discovery is not recorded, but the experiments which Priestley describes are related to 1772 or, at latest, the early part of 1773 (vide Experiments and Observations on Different Kinds of Air, 2nd edition, 1775). He first produced oxygen ("dephlogisticated air") in 1771, but left his invention of this gas unfinished until 1774–5; Scheele also discovered oxygen independently at about this time (1772), his discovery being published in 1777 (Chemische Abhandlung von der Luft und dem Feuer, Upsala). Priestley also discovered other gases, notably nitric oxide and methane.

1777. Publication of Experiences on the Respiration of Animals by Antoine Laurent Lavoisier (1743–1794). He was the first to observe the true nature of oxidation and realized that air which had been breathed resembled air which had been used for the oxidation of metals, with the addition of carbon dioxide. He renamed Priestley's dephlogisticated air "oxygène", because he thought it to be a constituent of all acids. He was executed by the Revolutionaries as an enemy to France ("The Republic has no need for scientists.")

1778. John Brown (c. 1736–1788), originator of the Brunonian System (vide ante), publishes his Elementa Medicinae.

1779. John Ingenhousz discovers ethylene, and publishes the first edition of his Experiments upon Vegetables. He proved that green plants utilize carbon dioxide and give off oxygen in sunlight: he was the first to appreciate that breathing is necessary for all living organisms, and that the carbon in plants comes from the air, not from the soil. At the end of the preface of the Experiments, he wrote, "When this book was entirely printed, and nothing but the latter end of the preface unfinished, I was informed by my friend the Abbé Fontana, that he discovered a few days ago a new method of pro-
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curing to a sick person the benefit of breathing any quantity of dephlogisticated air at a cheap rate.” He goes on to describe the use of a solution of quicklime for this purpose, one of the earliest accounts of carbon dioxide absorption ever published. Scheele had also used “milk of lime” for absorbing “fixed air” from the atmosphere in which he kept bees alive by means of his “fire-air” (oxygen). Priestley was unable to confirm the results of Ingenhousz and Scheele.

1779. Publication of A Medical Commentary on Fixed Air by Matthew Dobson, the first book on the medical uses of carbon dioxide and carbonates.

1779. Publication of the Mémoire sur la Découverte du Magnétisme Animal by Franz Anton Mesmer (1734–1815) born near Lake Constance, Mesmer qualified in 1766 and practised at first in Vienna where he was friendly with Mozart. His mystical outlook and the quackish nature of his claims caused him to remove to Paris, where his treatment soon became popular. “Mesmerism,” consisted in causing hysterical convulsions: the somnambulistic trance, later to be used as a form of surgical anaesthesia, was the discovery of one of Mesmer’s followers, de Puységur. In 1784, a commission of distinguished persons, including the celebrated Dr. Guiliotin, Benjamin Franklin, and Lavoisier, appointed for the purpose by Louis XVI, reported that there was no scientific basis for Mesmer’s claims and that his results were due to imagination. The scientific basis of Mesmerism was to be established by James Braid (vide 1843).

1780. The French Revolution: its anarchy leads to social changes in Europe.

1780. Observations sur le Magnétisme Animal by d’Eslon, who was Docteur-Régent de la Faculté de Médecine de Paris, and was Mesmer’s most devoted pupil and admirer.

1780. Chaussier of Dijon advocates the use of oxygen for artificial respiration on newborn babies. He advocates the use of oxygen.


1781. Henry Cavendish (1731–1810), who had pre¬pared hydrogen in 1766, demonstrates that the combustion of hydrogen and oxygen produces water.

1781. The Abbé Fontana proves that curare affects the “irritability” of muscles without affecting the heart ( Traité sur le Vénin de la Vipère et sur les Poisons Américains”.

1783. Britain acknowledges the independence of the United States.

1783. Foundation of the Medical Institution of Harvard University through the efforts of Dr. John Warren, its first Professor of Anatomy and Surgery.

1783. Von Schreber writes the first botanical account of American arrow-poisons (Ueber das Pfeilgift der Amerikaner in Guiana). He believed that the principal ingredient of “Woorara” (curare) was Strychnos.

1783. De Gardanne issues his Catéchisme sur les Morts Apparents dits Asphyxiis, an early essay on the treatment of the apparently dead.

1784. Laplace (1749–1827) publishes his epoch-making Théorie des Planètes.

1784. James Moore, brother of Sir John Moore of Corunna fame, describes A Method of Preventing or diminishing Pain in Several Operations of Surgery. The method consisted of a sort of vice which could be screwed on to the limb, compressing the main nerves. It was used at St. George’s Hospital by John Hunter, but this revival of a method employed by Paré never became popular.


1786. Desgranges of Lyons describes a pump for artificial respiration.

1788. The colonization of Australia begins.

1788–1824. Lord Byron.

1788. Edmund Goodwin advocates inflation of the lungs of drowned persons by means of Nooth’s pump, which later became popular; he also advised oxygen in preference to common air. His book, The Connexion of life with Respiration received the gold medal of the Humane Society.

1788. Charles Kite of Gravesend makes the first endotracheal tube (“an instrument to pass beyond the glottis”) and describes it in his Essay on the Recovery of the apparently Dead. He also mentions the introduction of the tube through the nose, writing “the crooked tube bent like a male catheter, recommended by Dr. Munro, and mentioned by Mr. Portal, Mr. le Cat, and others, is to be ... introduced through the mouth, or one nostril, into the glottis, when, on blowing through the mouth-piece, or applying the bellows the lungs will be dilated.” The reference to Dr. Munro cannot be identified, but it may be to Alexander Munro, primus of Edinburgh, who apparently advocated the inflation of the lungs by artificial means as a method of resuscitation. Antoine Portal (1742–1832) advocated intubation by tracheotomy, but only as a last resort. Claude Nicolas le Cat (1700–1768) expressed a desire to see a tube designed which could be passed through the glottis to assist in artificial respiration (vide Brit. J. Anaesth. (1951), 23, 239).

Kite’s Essay, which received the Humane Society’s silver medal is notable also for the advocacy of the use of oxygen in resuscitation and for the observation that the diaphragm can be stimulated by “throwing a strong galvanic current” across the chest.

1789. Benjamin Rush (1746–1813) is appointed Professor of Physic at Pennsylvania. Rush, one of the great systematists, who sought to simplify the theory of disease and, consequently, treatment, was easily the most famous American physician of this period.
1789. Hans Courtois of Tournai invents a double pump for the ventilation of the lungs through a tracheotomy cannula.

1791. Haydn (1732–1809) visits England, where he is acclaimed.

1791. Luigi Galvani (1737–1798), professor of surgery and anatomy of Bologna, publishes his De Virtus Electricitatis in Motu Musculari Commentarius, in which he showed that electricity could be generated in animal tissues.

1792. James Curry, who qualified at Edinburgh in 1800.

1794. Erasmus Darwin (1731–1802), grandfather of Charles Darwin, in his Zoonymia, suggests blood transfusion for the treatment of nervous and putrid fevers. His offer to transfuse a person dying from "an entirely impervious throat" is interesting for the ingenuity of the method which he proposed (see Keynes, Blood Transfusion, Bristol, John Wright (1949), p. 19).

1794. Thomas Beddoes (1754–1808), a Shropshireman, received his M.D. at Oxford in 1786. A friend of Lavoisier, he was forced to resign his post at Oxford on account of his liberal political opinions. He established the "Pneumatic Institute" at Clifton, for the treatment of diseases by the inhalation of gases, the first superintendent being Humphry Davy. His apparatus was constructed by James Watt. In 1794, Beddoes and Watt published their Considerations on the Medicinal Use of Factitious Airs, in which his ideas are given in greater detail. Pearson states that he had frequent opportunity of administering ether by inhalation to persons suffering from consumption. He found that it relieved the dyspnœa and promoted expectoration.

1795. The British take Cape Colony from the Dutch.

1797. Jacques Garnerin makes a parachute descent of about 3,300 feet from a balloon.

1798. The battle of the Nile.

1798. Edward Jenner (1749–1823), one of the greatest benefactors of mankind, describes vaccination against smallpox, at that time one of the most dreaded diseases of mankind, in his Inquiry into the causes and Effects of the Variolae Vaccinæ, which not only saved countless lives, but also opened the door to the study of immunity.

1800. The union of Great Britain and Ireland.

1800. Benjamin Thompson, Count Rumford (1753–1814), founds the Royal Institution of Great Britain, where Humphry Davy soon became a professor, as did Thomas Young (propounder of a theory of colour vision and instrumental in the decipherment of Egyptian hieroglyphics) and Michael Faraday. Although an American, Thompson was knighted by King George IV, made a fellow of the Royal Society and appointed a Count of the Holy Roman Empire. Fine of Geneva describes a leather endotracheal tube.

1800. Humphry Davy (1778–1829), at this time Superintendent of Beddoes' Medical Pneumatic Institute, issues his Researches Chemical and Philosophical, chiefly concerning Nitrous Oxide ... and its Respiration, which contains the remark, "As nitrous oxide in its extensive operation appears capable of destroying physical pain, it may probably be used with advantage during surgical operations in which no great effusion of blood takes place." Davy deserves great credit for inhaling nitrous oxide in spite of the pronouncement by the celebrated Latham Mitchell that this gas was the dreaded "contagium" or cause of disease. For full details of Davy's life and work, see Cartwright's English Pioneers of Anaesthesia (Bristol), John Wright, 1952.

1803. The Battle of Assaye.

1804. Napoleon Bonaparte becomes Emperor of the French.

1805. The Battle of Trafalgar.

1805. Dr. John Warren of Massachusetts uses the inhalation of ether in the treatment of phthisis.

1806. The Holy Roman Empire declared ended.

1806. The Royal Humane Society authorizes special instruments for resuscitation. Somewhat similar to those designed by Kite, they include a silver endotracheal catheter.

1806. Friedrich Sertürner (1743–1841) announces the isolation of morphine. Not only was this an important event for its own sake, but it also initiated the search for alkaloids and the isolation of the active principle of many substances, which could thereafter be given in definite dosage.

1807. Abolition of the Slave Trade by Britain.

1807. Chaussier designs an endotracheal catheter with a flange of sponge to secure an airtight fit at the glottis.

1807. Von Humboldt and Bonplana describe the manufacture of curare. (Voyage aux Régions Equinoxiales du Nouveau Continent).

1807. Count Maxime de Puysegur publishes his book, Du Magnétisme Animal, in which reference is made to "somnambulism" — the hypnotic trance which de Puysegur, an ardent admirer of Mesmer, had discovered.
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1807. Baron Dominique Jean Larrey (1766–1842) rediscovers the analgesic action of cold, last noticed by Bartholin in 1661, at the Battle of Preuss-Eylau. Inventor of the “Flying ambulance” and a pioneer in the use of intragastric feeding. Larrey was an outstanding surgeon and a faithful servant who was not forgotten in his master’s will.

1808. The Peninsular War.


1809–1847. Mendelssohn.


1809. William Allen and W. H. Pepys deliver a paper, On Respiration, at the Royal Society, wherein they show that the only change which occurs to air on respiration is the substitution of CO, for a portion of the oxygen; that, when pure oxygen is breathed, nitrogen is excreted by the lungs; and that the lungs do not completely collapse on expiration, but still contain more than 100 cubic inches of air.

1809. Ephraim McDowell (1771–1830) of Kentucky performs the first successful ovariotomy. The tumour weighed 224 lb. and the patient survived for a further thirty-three years, dying at 78. Subsequently, McDowell performed seven more ovariotomies.

1811. Sir Benjamin Brodie (1783–1862) delivers a paper on curare at the Royal Society, in which he shows that artificial respiration is capable of supporting life in fully curarized animals. He performed a tracheotomy and inflated the lungs by means of bellows and a cannula. Subsequently, Brodie opposed the introduction of ether anaesthesia: having killed some guinea-pigs by causing them to inhale ether, he pronounced anaesthesia to be dangerous.

1815. The Battle of Waterloo.

1815. The Apothecaries Act lays the basis for medical teaching in England. It was not until 1828, however, that hospital attendance became obligatory for the student.

1815. Nysten (Dictionary of Medical Science) speaks of the inhalation of ether as familiarly known for mitigating the pains in colic.

1816. René Laennec (1781–1826) invents the stethoscope. He invented many of the terms now familiar, such as râles, pectoriloquy, aegophony and bronchophony.

1817. It is possible that ether was used as an anaesthetic in Edinburgh at about this time, but, in the absence of contemporary evidence, the incident described in the Edinburgh Medical and Surgical Journal of April 1847 is somewhat doubtful. It is said that a bone was removed from the throat of a woman, the operation having proved impossible without the assistance of an inhalation of ether (vide a letter by Dr. Douglas Guthrie in the Lancet, 1947, 2, 921).

1818. James Blundell (d. 1877), on December 22, read to the Medico-Chirurgical Society of London an account of a transfusion of 12–14 ounces of blood. Blundell reported a further six transfusions in 1824, and described his “Impellor”; he subsequently carried out a number of useful experiments on animals proving that life might be saved after blood loss by the infusion of comparatively small quantities of blood.

1818. An article appears in the Quarterly Journal of Science and Arts in which it is stated that “when the vapour of ether, mixed with common air, is inhaled, it produces effects very similar to those occasioned by nitrous oxide.” A method of vaporization of ether by means of a bottle into the upper part of which a tube could be introduced for a variable distance is also described. The article, which is anonymous, has usually been ascribed to Michael Faraday (1791–1867), but there is no proof that he was in fact the author.

1819. Stockman (U.S.A.) demonstrates the exhilarating effects of nitrous oxide.

1819. John Dalton reads a paper, subsequently published in the Annals of Philosophy, entitled “Memoir on Sulphuric Ether”. This is the classic paper on the chemistry and physical properties of ether.

1821. Pierre Bretonneau (1778–1864) reads a paper before the Paris Académie de Médecine in which he asserts that “croup” “malignant angina” and “scorbutic gangrene of the gums” are a specific disease for which he proposes the name “diphtheritis”.

1821. Joseph Claude Anthelme Récamier (1774–1856), Professor of Medicine at the Collège de France, performs the first operation under intentional anaesthesia in modern times: the application of the cautery while the patient was under hypnosis. This epoch-making event appears to have passed unnoticed by the historians of anaesthesia.

1823. Thomas Wakley founds the Lancet, which, from its first issue, courageously attacked the corrupt management of hospitals and the inadequate requirements for the training of doctors. Wakley became the target of abuse, assault and libel actions, but persisted in his policy until he had caused far reaching reforms to be made.

1824. Henry Hill Hickman (1800–1830) who had already carried out the first planned animal experiments on surgical anaesthesia with carbon dioxide, writes his Letter on Suspended Animation to T. A. Knight, later modified and published. In 1828 Hickman addressed a communication to King Charles X of France, requesting that his method of anaesthesia should be considered by the Académie de Médecine. A committee was formed but reported adversely; in the plenary session, Baron Larrey is said to have been the only person to have commented favourably on Hickman’s proposals.

1825. François draws attention to morphine-like substance present in lettuce at the time of seed-bearing.

1825. Waller and Doubleday, independently, employ blood transfusion in obstetric haemorrhage. Doubleday’s patient who received 14 oz. showed a striking improvement. Waller continued to use transfusion, and reported a successful case in 1859.
1825. Charles Waterton (1782–1865) publishes his *Wanderings in South America*, which contains an extensive and reasonably accurate account of curare.

1827. The Battle of Navarino secures the establishment of the Kingdom of Greece.

1827. Leroy shows that the use of the bellows in artificial respiration may cause pulmonary damage and, in the following year, describes a spatula to aid in endotracheal intubation.

1827. Richard Bright (1789–1858), in his *Reports of Medical Cases*, shows the connexion between diseased kidneys and dropsy.

1827. Boussingault and Roulin prepare a partially purified extract of curare.

1828. The repeal of the Test Act.

1828. Cap (Lyons) describes an endotracheal tube and pump for resuscitation.

1829. William Wright, in his *On the Varieties of Deafness*, shows that, in certain circumstances, carbon dioxide can act as a local anaesthetic.

1829. The French surgeon Cloquet performs a painless mastectomy with the aid of hypnotism.

1830. Opening of the Liverpool and Manchester railway.

1831. Samuel Guthrie (1782–1848) of New York State discovers chloroform ("Guthrie's Sweet Whisky"). He is quickly followed by Eugène Soubeiran in France and Justus von Liebig in Germany; von Liebig also discovers chloral.

1831. O'Shaughnessy of Newcastle upon Tyne shows that during cholera, the fluids and salts in the blood are greatly reduced, with a corresponding increase in fluids and salts in the excreta.

1832. During the cholera epidemic, Thomas Aitchison Latta of Leith, relying on O'Shaughnessy's observation, employs intravenous saline solution with great success in the treatment of severe cholera.

1832. The Reform Bill is passed. The Anatomy (Warburton's) Act institutes the licensing of medical schools and also legislates for the supply of subjects for the teaching of Anatomy, thus freeing the doctors from the activities of the "Body Snatchers".

1832. Wardrop advocates anaesthesia by bleeding to syncope.

1833. Marshall Hall (1790–1857) demonstrates that the spinal cord is a chain of segments whose functional units are separate reflex arcs. His name is associated with a method of artificial respiration, performed by rolling the prone patient to each side, which was an improvement on the earlier method of rolling the patient on a barrel.

1834. J. B. A. Dumas (1800–1884) discovers the chemical composition of, and gives its present name to, chloroform.

1835. Robert James Graves (1797–1853) ("He fed fevers") describes exophthalmic goitre.

1836. Lafargue injects a paste containing morphine under the skin with a blunt syringe, first making small incisions in order to insert the nozzle.

1837. Liégard revives the method of local analgesia by compression of the limb.


1839. The following is quoted from Clutterbuck's *Lectures on Bloodletting* (vide Clement, *Anesthesiology* (1953), 14, 480): "In one of the great hospitals of the metropolis a case occurred lately where 128 ounces of blood were drawn at one time in order, by inducing syncope, to facilitate the reduction of a dislocation of the thigh. The patient lived a week afterwards, and then, as is said, died from inflammation of the vein punctured."


1839. John Scoffern, in *Chemistry no Mystery, or a Lecturer's Bequest*, gives an account of nitrous oxide and its intoxicating effects. This is one of the few scientific books illustrated by Cruikshank ("Phiz") and contains a well-known frontispiece entitled "Laughing Gas".

1840. Penny Postage introduced under Rowland Hill's scheme.

1840. The "Health of Towns Association" founded by Southwood Smith (1788–1861).

1841. Death of Sir Astley Cooper (b. 1768).

1842. In January, William E. Clarke, who had frequently participated in "Ether Frolics", in Rochester, Minn., administered ether from a towel to a Miss Hobbie while one of her teeth was extracted by Elijah Pope. Neither Clarke nor Pope published an account.

1842. R. M. Glover of Newcastle upon Tyne describes (in his Harveian Prize Essay) the effect of chloroform and other halogenated substances when injected into the bloodstream of animals. He observed, among other effects, depression of the blood pressure and respiration.

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1842. In March, Crawford Williamson Long (1815–1842) of Jefferson, Georgia, administered ether to a man called James Venable and excised a sebaceous cyst. Long carried out several operations under ether, but finally gave up its use. He published no account of his cases until after the demonstration of ether anaesthesia by Morton.

1842. In October, W. Squire Ward of Wellow, near Ollerton, Notts, painlessly amputated a leg of a black negro without causing pain.

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again in the modern sense in his Harveian Oration of July 1846.

1843. Oliver Wendell Holmes (1809-1894), poet and man of letters, issues his essay On the Contagiousness of Puerperal Fever, in which he showed that the contagion of erysipelas and puerperal fever was the same and that the disease was frequently carried from one patient to another by the physicians.

1844. F. Rynd of Dublin uses an ingenious trocar for injecting morphine subcutaneously in the treatment of tic douloureux. He did not publish an account until 1861.

1844. E. E. Marcy of Hartford, Conn., “administered the vapour of rectified ether in my office to a young man...and after he had been rendered insensible to pain, cut from his hand an encysted tumour the size of an English walnut.”

1844. December 10: Horace Wells of Hartford, Conn., attends a demonstration on Laughing Gas by Gardner Quincy Colton. Impressed by what he sees, the following day he allows Colton to administer the gas to him, while another dentist, Riggs, extracts one of Wells’ teeth. Wells used nitrous oxide in some dozen cases with success and then, later in December, obtained permission to demonstrate his method of anaesthesia at the Massachusetts General Hospital. The demonstration was a failure and Wells abandoned the use of nitrous oxide.

1844. Dr. E. R. Smilie of Boston, claimed (in 1846) that he had rendered a certain John Johnson insensible to pain for the opening of an abscess in the neck by the use of an ethereal tincture of opium.

1845. Erichsen advocates the use of oxygen in the resuscitation of drowned persons. Depaul modifies Chaussier’s endotracheal tube (vide ante, 1807), giving it a terminal, instead of a lateral, eye.

1845. George Wilson, Lecturer in Chemistry at Edinburgh, advocates the use of oxygen in resuscitation, describes its method of preparation and gives directions for constructing a sort of oxygen tent and its method of use. He also advocates the use of oxygen in diving bells and suggests the absorption of carbon dioxide by sulphate of soda and lime.

1846. Repeal of the Corn Laws.

1846. James Esdaile (1808-1859) publishes his Mesmerism in India and its Practical Application in Surgery and Medicine. He had performed his first major operation under hypnosis in 1845; he reported in all 261 cases, with a mortality of 5.5 per cent, and a committee reported very favourably on his results.

1846. March: Ducos recounts experiments on animals with ether, in which insensibility with recovery was noted. Like Glover (vide ante, 1842), Ducos failed to grasp the implications.

1846. September 30: William Thomas Green Morton (1819-1868) administers ether to Eben Frost for the extraction of a tooth. October 16: Morton anaesthetizes Gilbert Abbott at the Massachusetts General Hospital, the surgeon being Dr. John C. Warren (1778-1856). The patient suffered from a vascular tumour on the left side of the neck, which was to have a ligature passed around it in order to reduce its blood supply. The ether was placed in a glass vessel, containing a sponge, with two orifices, one of which had a mouthpiece attached to it. The patient was asleep within 4 minutes, and the inhaler was then removed, the anaesthetic not being administered during the operation. An incision about 3 inches in length was made over the tumour, a curved needle was then passed round it, and the ligature fastened. During most of the time, the patient showed no sign of sensibility, but a short time before the end of the operation he moved his head, body and limbs, and began to mutter. On recovering consciousness, he declared that he had felt no pain, but simply a scraping sensation. Dr. Warren, expressed his satisfaction in the words: “Gentlemen, this is no humbug”; and Dr. Henry J. Bigelow, who was one of the numerous spectators, with greater realization of the dignity of the occasion, announced, “I have seen something today which will go round the world.”

(To be continued)