HISTORY OF ANAESTHESIOLOGY

Prepared By: Dr Md Masum Hossain Arif

DA Student, SSMCMH

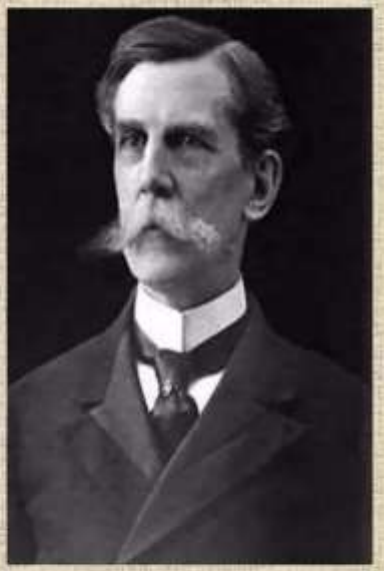
The History of Anesthesiology

A rich mosaic of interwoven events around the world that have created and denned the specialty. From the days of the ancient Greeks and Romans to the computerized operating rooms of the twenty-first century.

Introduction

- The Greek philosopher Dioscorides first used the term anesthesia in the first century AD to describe the narcotic-like effects of the plant mandragora.
- The term subsequently was defined in Bailey's An Universal Etymological English Dictionary (1721) as "a defect of sensation"
- Encyclopedia Britannica (1771) as "privation of the senses."
- Oliver Wendell Holmes in 1846 was the first to propose use of the term anesthesia to denote the state that incorporates amnesia, analgesia, and narcosis to make painless surgery possible.

Dioscorides



Oliver Wendell Holmes

Why study the History of Anaesthesia?

- Understanding of our past guides our future
- The history of surgery is inextricably linked to the development of appropriate anaesthetic techniques and so the history of surgery follows the history of anaesthesia
- We are all part of it.

Brief History of Anaesthesia

- Pre-1846 - the foundations of anaesthesia
- 1846 - 1900 - establishment of anaesthesia
- 20th Century - consolidation and growth
- 21st Century - the future

SOME STRANGE METHODS OF ANAESTHESIA

- Strangulation – Assyrians
- Cerebral concussion
- Applying intense cold or compression

Status of surgery
Barber shop surgeons

- Types of surgery:
- Amputations & dental extractions

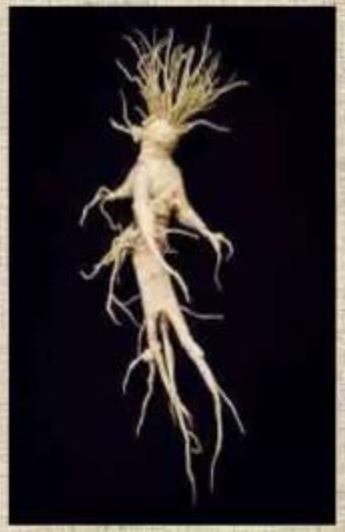
- No antisepsis
- Appalling mortality

- Indications: Unbearable pain Crippling deformity Imminent death

- Surgeons used to boast of speed of surgery

Wellcome Images

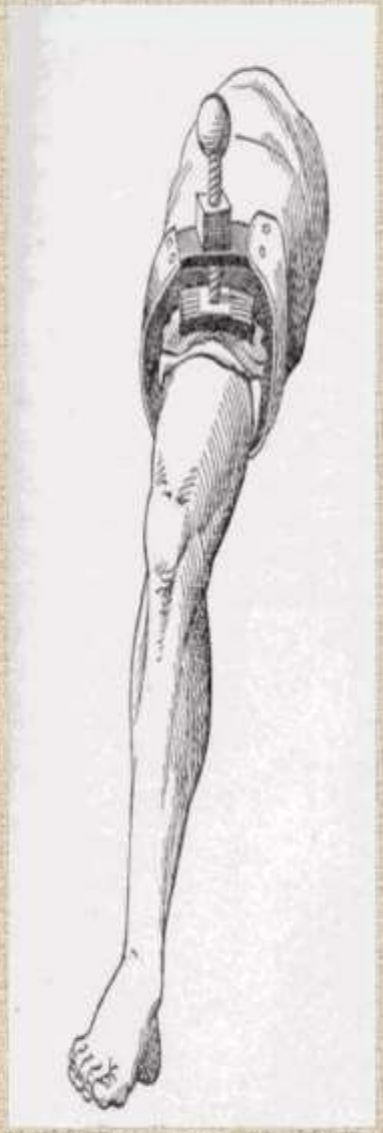
Drug methods



- Alcohol
- Opium (poppy)
- Hyoscine (Mandrake)
- Cannabis (Hemp)
- Cocaine (New World)

Non-drug methods

- Cold
- Concussion
- Carotid compression
- Nerve compression
- Hypnosis
- Blood letting



Ancient Anaesthesia

- BC 2250, Babylonian tablet records a dental filling of henbane to relieve toothache.
- BC 2000, Sushrutha used to perform plastic surgery of cut nose with the use of Opium, Indian hemp and wine to keep the patient sedated.
- BC 500, Hippocrates described the relief of pain by Opium.
- BC 247, In the Buddhist Era, Laparotomy was described using alcohol.
- AD 100, Dioscordes of Greece administered a concoction of the root of mandragora to relieve pain of surgery.

Ancient Anaesthesia

- AD 150, Heron of Alexandria described the first medical piston and barrel syringe.
- AD 250, Hua T'o, a Chinese military surgeon, used Indian hemp (hashish) to render patients unconscious for surgery.
- AD 427, A herbal drug "Sammohini" has been described. Laparotomy with patient standing and tied to a pillar. (Described by King Raja Bhoj in his writing Bhoj Probhand).

The Sleeping Sponge

Mandrake leaves, along with black nightshade, poppies, and other herbs, were boiled and cooked onto a sponge. The sponge was then reconstituted in hot water, and placed under the patient's nose prior to surgery.

During the Middle Ages, the soporific sponge was developed to provide pain relief during surgery.

“Dwale”

- Europeans attempted to relieve pain by hypnosis, by the ingestion of alcohol, herbs, and extracts of botanical preparations, and by the topical application of pressure or ice.
- combination of black henbane (Hyoscyamus niger), opium poppy (Papaver somniferum), and hemlock (Conium maculatum) used at Soutra Hospital in the border region between Scotland and England, together with bone fragments.

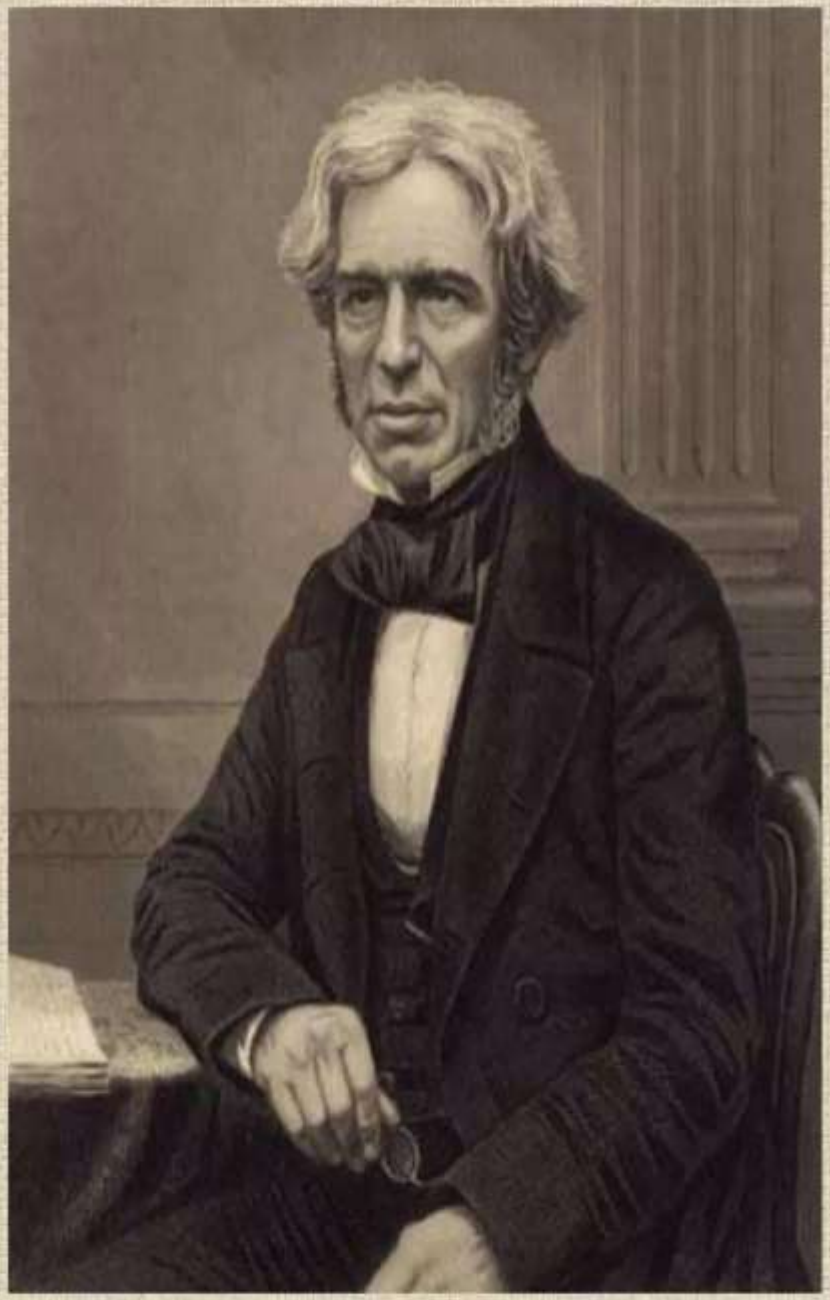
Refrigeration Anaesthesia

- During the Renaissance, local anesthesia, in the form of the application of cold water and ice, was introduced. In the mid-seventeenth century, Marco Aurelio Severino described "refrigeration anesthesia," which involved placing snow in parallel lines across the incision.
- during the Winter War between Finland and the Soviet Union in 1939-40, refrigeration anesthesia was extensively utilize

Ether

- It may first have been compounded by an eighth-century Arabian philosopher, Jabir ibn Hayyam, or by Raymond Lully, an alchemist in the thirteenth century
- 1540- Synthesized and named sweet oil of vitriol bi Valerius Cordus by distilling sulfuric acid (oil of vitriol) with fortified wine to produce an oleum vitrioli dulce (sweet oil of vitriol). taken in wine for the relief of whooping cough and other respiratory diseases.
- Forbenius named Ether.
- Michael Faraday described narcotic effect of Ether.

Forbenius



Michael Faraday

Nitrous oxide

- produced by heating ammonium nitrate in the presence of iron filings.
- 1773 by Joseph Priestley, an English clergyman and scientist.
- Humphry Davy- first noted analgesic property in 1800.
- A 580-page book published in 1800, “Nitrous Oxide”.
- he did coin the persisting sobriquet for nitrous oxide, "laughing gas."

Joseph Priestley

Humphry Davy

The discovery Continued

- Henry Hill Hickman In 1823 and 1824 studied inhaled high concentrations of carbon dioxide. Carbon dioxide has some anesthetic properties, as shown by the absence of response to an incision in the animals of Hickman s study.
- William E Clarke may have given the first true ether anesthetic in Rochester, New York, in January 1842.
- Horace Wells of Hartford, Connecticut, recognized what others had ignored, the analgesic potential of nitrous oxide. January 1845, Wells attempted a public demonstration in Boston at the Harvard Medical School but trial was judged a failure.

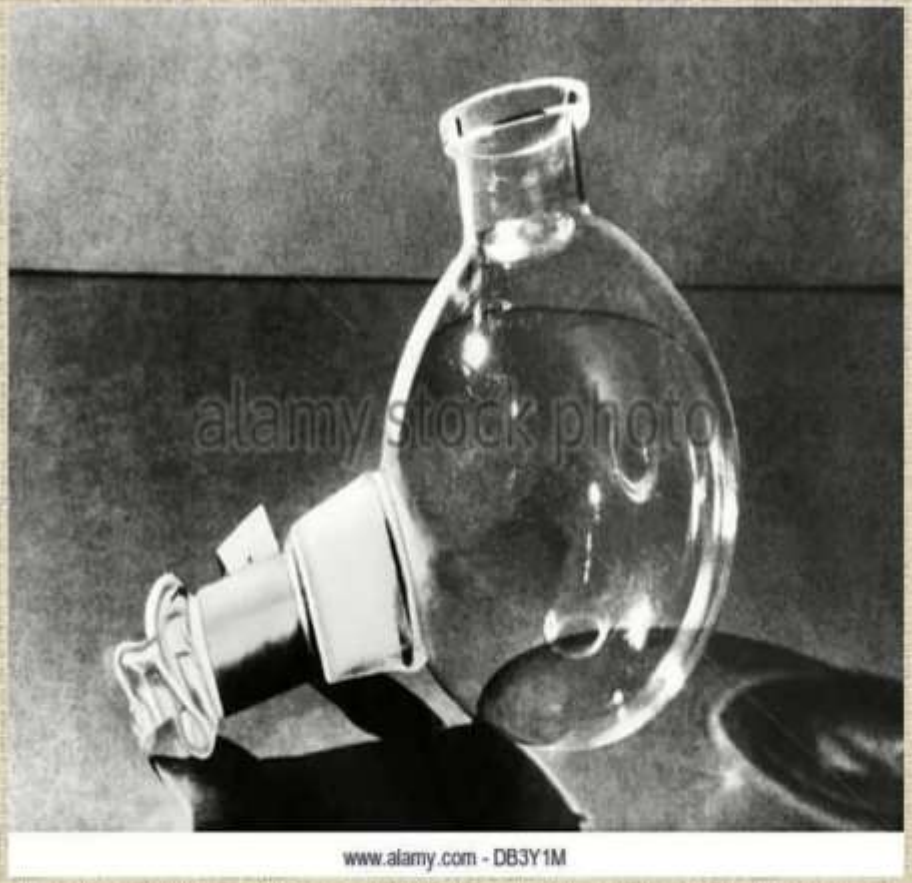
Henry Hill Hickman

Horace Wells

A DISCOVERY - SURGICAL ANESTHESIA!

- On Friday 16 October 1846 First public demonstration of Ether anaesthesia took place in Boston.
- Anaesthesist: William Thomas Green Morton
- Agent: Diethyl Ether
- Patient: Edward Gilbert Abbott
- Surgeon: John Collins Warren
- Operation:Excision of a vascular lesion from the left side of neck.


Edward Gilbert Abbott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SHARP & SMITH
CHICAGO

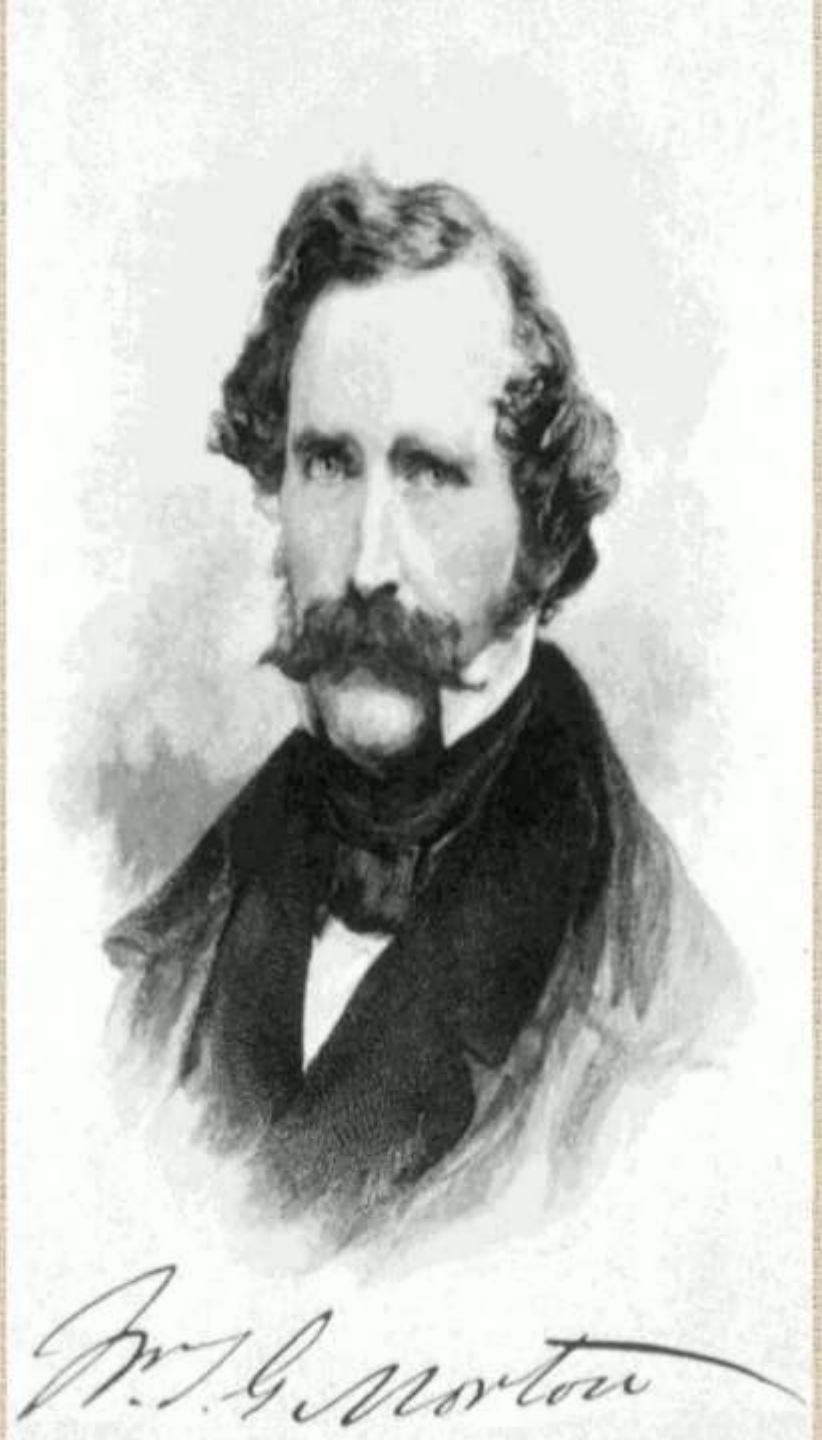
William T G Morton

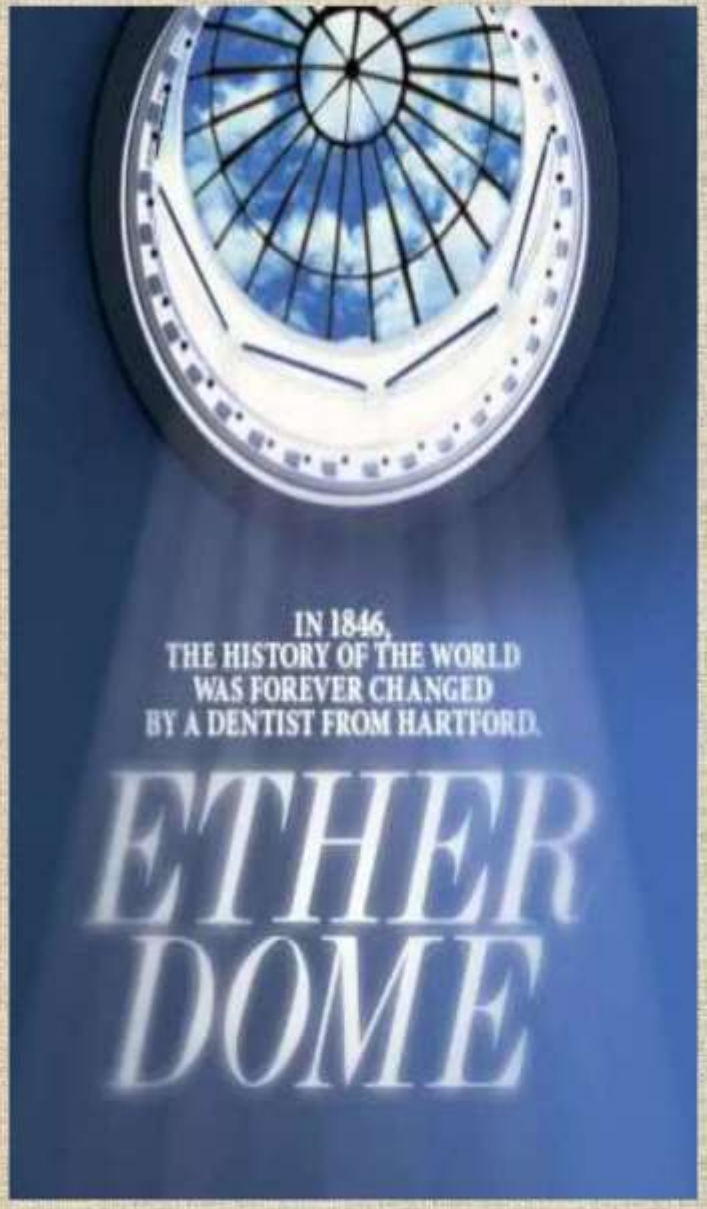
Inventer and revealer of inhalation Anaesthesia

Before whom, in all time surgery was agony.

By whom pain in surgery was averted and annulled.

Since whom science has control of pain.




IN 1846,
THE HISTORY OF THE WORLD
WAS FOREVER CHANGED
BY A DENTIST FROM HARTFORD.
ETHER
DOME

A "BLESSING" TO OBSTETRICS: Chloroform

- David Waldie suggested chloroform, which had first been prepared in 1831.
- 1847- James Young Simpson used chloroform for obstetric Anaesthesia.
- John Snow an English contemporary of the Simpson, who achieved fame as an obstetric anesthetist by treating Queen Victoria.
- During the delivery, Snow administered analgesic doses of chloroform on a folded handkerchief, a technique that was soon termed “chloroform a la reine”.

James Young Simpson

John Snow

THE EARLY PIONEERS

- Snow developed anesthetic apparatus.
- His best known apparatus featured unidirectional valves within a malleable, well-fitting mask of his own design, which closely resembles the form of a modern face mask. The face piece was connected to the vaporizer by a breathing tube, which Snow deliberately designed to be wider than the human trachea so that even rapid respirations would not be impeded.
- The following year, John Snow introduced an agent-specific chloroform inhaler.
- Despite the limitations of technology in 1848, this element of his work anticipated the modern concept of minimum alveolar concentration (MAC).
- Snow published two remarkable books On the Inhalation of the Vapour of Ether (1847) and On Chloroform and Other Anaesthetics (1858), which was almost completed when he died of a stroke at the age of 45.

NINETEENTH-CENTURY BRITISH ANESTHESIA- AFTER JOHN SNOW

- Joseph Clover became the leading anesthetist in London following the death of John Snow in 1858.
- Clover had observed the effect of chloroform on animals and urged other anesthetists to monitor the pulse at all times and to discontinue the anesthetic temporarily if any irregularity or weakness in the strength of the pulse was observed.
- first anesthetist to administer chloroform in known concentrations through the Clover bag.
- After 1870, Clover favored administration of nitrous oxide and ether in sequence and designed a very complex apparatus for this purpose.
- He was the first Englishman to urge the now universal practice of thrusting the patient's jaw forward to overcome obstruction of the upper airway by the tongue.

Clover's Portable Regulating Ether Inhaler

This most ingenious and useful apparatus is represented in Fig. 37. F is the face-piece; E is the ether reservoir through which the air-current passes; and B is an india-rubber bag. When the face-piece fits the face accurately, the patient breathes backwards and forwards into the bag. Mr. Pridgin Teale has very properly drawn attention to the importance of the face-piece in ether administration; and in an excellent article[1] gives diagrams of good and bad face-pieces. Clover's apparatus possesses no valves, nor does it contain any contrivance for the admission of fresh air. The face-piece tightly plugs on to a tube (T), which fits into one end of a shaft passing through the ether reservoir. The mount of the bag B fits into the other end of this shaft. By revolving the ether reservoir on the tube T the current is made to pass to any desired extent over ether. The apparatus is charged with ether at the funnel-shaped tube FT, the stopper of which

Fig. 37.—Clover's Portable Regulating Ether Inhaler. (Original pattern.)

Joseph Clover

The first English anesthetist to be knighted, Sir Frederick Hewitt.

Frederic William Hewitt.

- designed the first anesthetic apparatus to deliver oxygen and nitrous oxide in variable proportions.
- He was also influential in ensuring that anesthesia was taught in all British medical schools.
- His book, Anaesthetics and Their Administration, in 1893 is considered the first true modern textbook of anesthesia.
- 1908, Hewitt developed an important appliance that would assist all anesthesiologists in managing an obstructed upper airway. He called his oral device an "air-way restorer,"

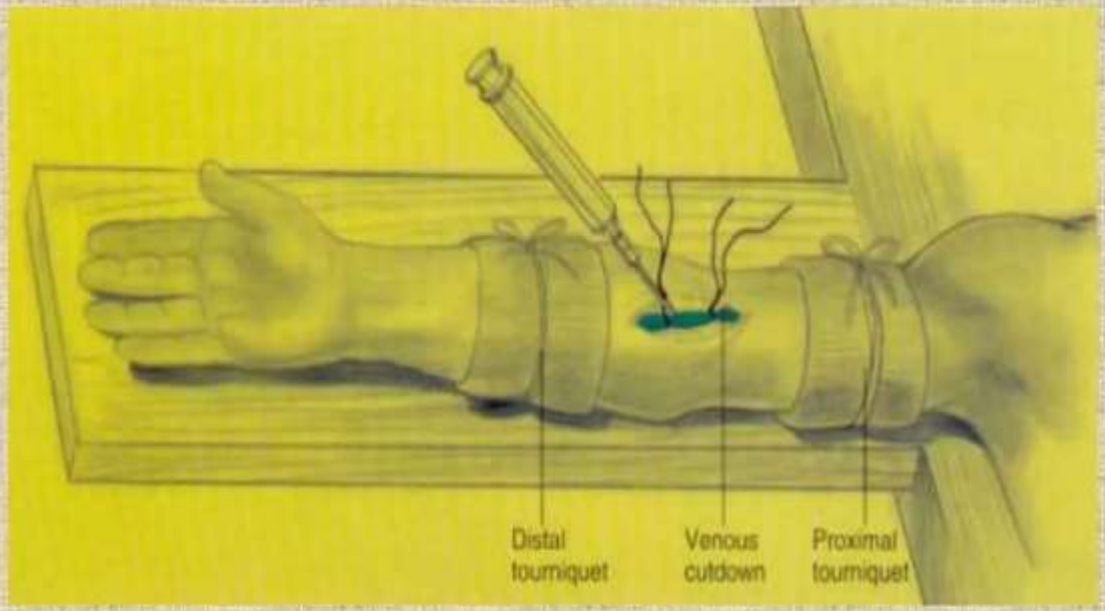
Ether remained the standard inhaled anesthetic until the early 1960s.

- The only inhalation agent that rivaled ether's safety and popularity was cyclopropane (introduced in 1934).
- both are highly combustible and both have since been replaced by a succession of nonflammable potent fluorinated hydrocarbons:
- halothane (developed in 1951; released in 1956),
- methoxyflurane (developed in 1958; released in 1960),
- enflurane (developed in 1963; released in 1973), and
- isoflurane (developed in 1965; released in 1981).

THE DISCOVERY OF REGIONAL ANESTHESIA IN THE NINETEENTH CENTURY

- Cocaine, an extract of the coca leaf, was the first effective local Anaesthetic.
- in Peru, where folk surgeons performing trephinations of the skull chewed coca leaves and allowed their saliva to fall onto the surfaces of the wound.
- Cocaine was isolated from coca leaves in 1855 by Gaedicke and was purified in 1860 by Albert Niemann.
- 1884, the action of cocaine was realized by Carl Koller, a Viennese surgical intern.
- In 1884, his friend, Sigmund Freud, became interested in the cerebrum-stimulating effects of cocaine and gave Koller a small sample in an envelope, which he placed in his pocket. When the envelope leaked, a few grains of cocaine stuck to Keller's finger, which he casually licked with his tongue. It became numb. At that moment, Koller realized that he had found the object of his search. he practiced ophthalmology for the remainder of his career.

- He and Gustav Gartner, a laboratory associate, observed its anesthetic effect on the eyes of a frog, a rabbit, and a dog before they dropped the solution onto their own corneas. To their amazement, their eyes were insensitive to the touch of a pin.
- 1884 William Halsted used cocaine for intradermal infiltration and nerve blocks (including blocks of the facial nerve, brachial plexus, pudendal nerve, and posterior tibial nerve).
- The term "spinal anesthesia" was coined in 1885 by Leonard Corning, a neurologist



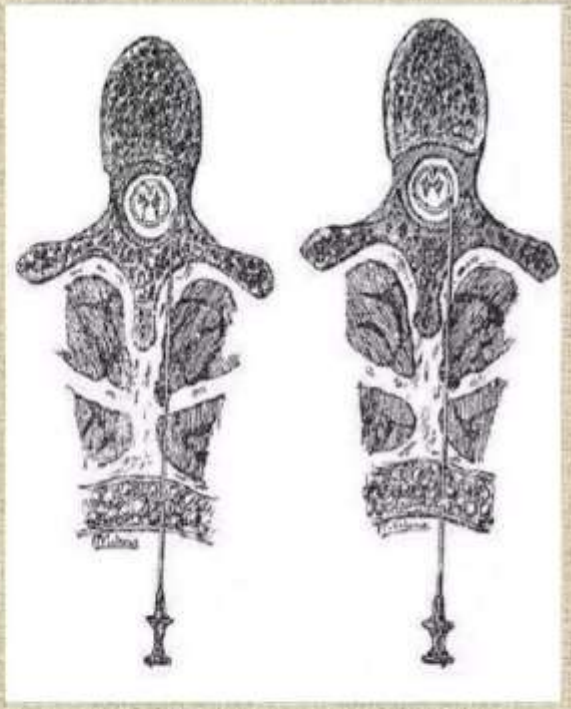
August Bier

- August Bier is credited with administering the first spinal anesthetic in 1898. He was also the first to describe intravenous regional anesthesia (Bier block) in 1908.
- Bier injected procaine into a vein of the upper limb between two tourniquets.
- was reintroduced 55 years after its first use by Mackinnon Holmes, who modified the technique by exsanguination before applying a single proximal cuff.

- Holmes used lidocaine, the very successful amide local anesthetic synthesized in 1943 by Lofgren and Lundquist of Sweden.
- Procaine was synthesized in 1904 by Alfred Einhorn and within a year was used clinically as a local anesthetic by Heinrich Braun. Braun was also the first to add epinephrine to prolong the duration of local anesthetics.
- local anesthetics subsequently introduced include dibucaine (1930), tetracaine (1932), lidocaine (1947), chloroprocaine (1955), mepivacaine (1957), prilocaine (1960), bupivacaine (1963), and etidocaine (1972). The most recent additions, ropivacaine and levobupivacaine.

EPIDURAL ANESTHESIA

- Ferdinand Cathelin and Jean Sicard introduced caudal epidural anesthesia in 1901.
- Lumbar epidural anesthesia was described first in 1921 by Fidel Pages and again (independently) in 1931 by Achille Dogliotti.
- 1944- Edward Tuohy developed the now familiar Tuohy needle for continuous spinal techniques.
- In 1949, Martinez Curbelo of Havana, Cuba, used Tuohy's needle and a ureteral catheter to administer the first continuous epidural anesthetic.



Edward Tuohy

INTUBATION OF THE LARYNX

- Trachea was intubated either via a tracheostomy or through the larynx in an attempt to provide an airway for an asphyxiated or dead animal or human.
- Joseph O'Dwyer's pioneering work with intubation of the larynx in children with diphtheria
- Brief adoption of tracheal tubes by McEwen in Glasgow in 1920.
- Inflatable cuff to this rubber tube by Ralph Waters and Arthur Guedel paved the way for closed-circuit anesthesia and true isolation of the airway.
- Introduction of the laryngeal mask airway by Brain in the late 1980s that any major advance in airway care occurred.

INTRAVENOUS INDUCTION AGENTS

- invention of the hypodermic syringe and needle by Alexander Wood in 1855.
- Early attempts at intravenous anesthesia included the use of chloral hydrate (by Oré in 1872), chloroform and ether (Burkhardt in 1909), and the combination of morphine and scopolamine (Bredenfeld in 1916).
- The first barbiturate used for induction of anesthesia was diethylbarbituric acid (barbital).
- Thiopental, synthesized in 1932 by Volwiler and Tabern, was first used clinically by John Lundy and Ralph Waters in 1934.
- Ketamine was synthesized in 1962 by Stevens and first used clinically in 1965 by Corssen and Domino; it was released in 1970.
- Etomidate was synthesized in 1964 and released in 1972.
- The release of propofol in 1986 (1989 in the United States) was a major advance in outpatient anesthesia.

THE INTRODUCTION OF MUSCLE RELAXANTS

- In 1940 scientists discovered the active ingredient in South American amazon Indian arrow poison, it's Curare.
- The introduction of curare by Harold Griffith and Enid Johnson in 1942 was a milestone in anesthesia.
- Succinylcholine was synthesized by Bovet in 1949 and released in 1951.
- gallamine, decamethonium, metocurine, alcuronium, and pancuronium—were subsequently introduced.
- Recently introduced agents that more closely resemble an ideal NMB include vecuronium, atracurium, rocuronium, and cis-atracurium.

CURARE

BALANCED ANAESTHESIA AND OPIOID

- Morphine, isolated from opium in 1805 by Sertürner, was also tried as an intravenous anesthetic.
- introduction of meperidine in 1939.
- The concept of balanced anesthesia was introduced in 1926 by Lundy and others and evolved to include thiopental for induction, nitrous oxide for amnesia, an opioid for analgesia, and curare for muscle relaxation.

THE INTRODUCTION OF HALOTHANE

- the introduction of halothane in the mid-1950s that simplified the induction and maintenance of anesthesia.
- Halothane was first described by the research chemist Raventos 62 after preliminary work by Fergusson and Suckling at the ICI Laboratories, in Alderley Edge, England, and was introduced into anesthetic practice by Michael Johnstone at Manchester Royal Infirmary.
- Halothane s smooth induction, combined with its relatively pleasant smell and potent action, made it the ideal agent for the next two decades.
- Halothane is only now being fully supplanted by new agents such as sevoflurane.

20TH CENTURY CONSOLIDATION AND GROWTH

- Intubation and airway advances.
- Anaesthetic equipment.
- Monitoring
- Drug advances
- Anaesthesia and intensive care
- Pain management
- Organization of Specialty

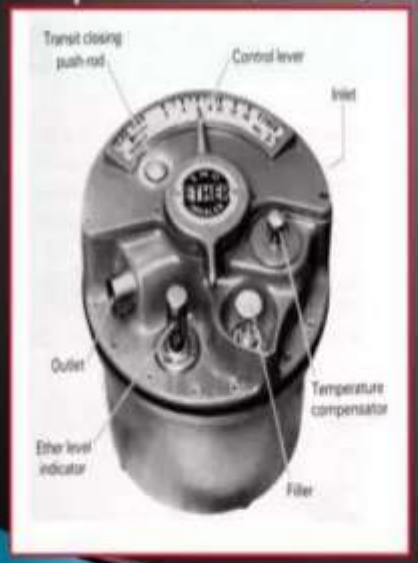
Intubation and airway advances

- 1919- Endotraceal intubation
- 1928- Blind nasal intubation
- 1950- PVC tube introduced
- 1980- LMA introduced

Anaesthetic equipment

- 1908- Rotameter
- 1917- Boyle's machine
- 1938- Artificial Respiration
- 1940- Oxford vaporizer

Epstein macintosh oxford vaporiser (emo)



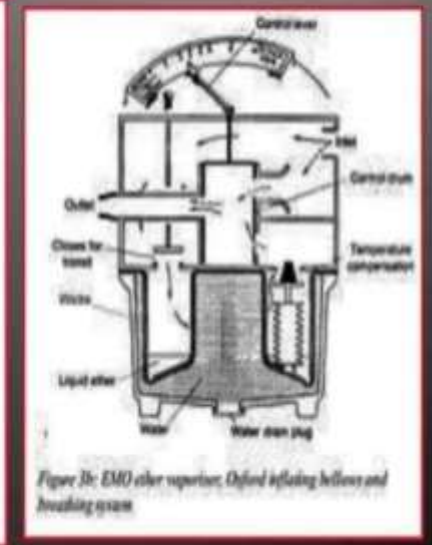


Figure 3b: EMO ether vaporiser, Oxford inflating bellows and breathing system

Monitoring

- 1946- Oxygen analyzer
- 1949- Nerve stimulator
- 1956- Blood gas monitoring
- 1960- ECG and CAPNOGRAPH, CVP, ARTERIAL MONITORING

Pain management

- 1967- Patient controlled analgesia
- 1990- Acute pain team, Multimodal analgesia, Epidural analgesia.

Organization of specialty

- 1893, the first organization of physician specialists in anesthesia, the London Society of Anaesthetists, was formed in England by J.F. Silk.
- The first organization of physician anesthetists in the United States was the Long Island Society of Anesthetists formed in 1905.
- renamed the New York Society of Anesthetists in 1911.
- The International Anesthesia Research Society (IARS) was founded in 1922.
- In 1936, the New York Society of Anesthetists became the American Society of Anesthetists, and later, in 1945, the American Society of Anesthesiologists (ASA).
- In England, the first examination for the Diploma in Anaesthetics took place in 1935
- 1947, when the Royal College of Surgeons established its Faculty of Anaesthetists.
- 1992 an independent Royal College of Anaesthetists was granted.

History of anaesthesia in SAARC region

- In 1843 Esdale reported surgical anaesthesia in Hoogly hospital,West Bengal.
- Ether anaesthesia was used in India only six months after October 16, 1846.

Anaesthesia development in Bangladesh

- Local anesthesia and regional blocks were practiced by the surgeons at DMC.
- General anaesthesia was under supervision of the surgeons.
- Dr Beni Madhab Basak, a House surgeon was responsible to administer General anaesthesia till December 1948.
- Dr S M Mokhlesur Rahman was the first physician appointed as an Anaesthetist, DMCH.
- The first post graduate anaesthetist is Dr K A S M A Quader, DA (London).
- 1951- Dr Abdul Quader, DA (London) has been in charge, Dept of Anaesthesia DMCH.

Drugs and Techniques used

- Procaine used for local anaesthesia
- Chloroform, Ether and ethyl chloride were the volatile Anaesthetics.
- First machine was the Boyle's apparatus available since 1949 at DMCH.
- Halothane was introduced in late fifties.
- Suxamethonium was introduced in early sixties.
- Pancuronium Bromide was introduced in mid eighties.
- Vacuronium was introduced in early sixties.
- Pipecuronium was introduced in late nineties.
- Piped Medical gases and vacuum was introduced in DMCH on 19th February 1985 and extended in many hospitals.

Manpower development in Anaesthesia

- In 1947 there was no recognized trained anaesthesiologist.
- In 1948 two self trained and one in 1951.
- Anaesthesia service was recorded with a very short of trained manpower in Chittagong Medical College & Hospital in 1956.In this way anaesthetics services were started gradually in Mitford Hospital, Mymensingh Medical College; Sylhet Medical college;rajshahi Medical College.
- 1981- gradually increased interest in this field due to national demand.
- Prof. K.M. Iqbal, Prof. M.Khalilur Raman, Prof Rashiduddin Ahmmed , Prof.Golam Rasul , Prof Afzalunnessa contribute for the development and expansion of modern anaesthesia in Bangladesh and able to grow interest to the juniors become as anaesthetist.

Post graduation

- DA: First two were Dr Fakhrun Nissa and Dr Dilip Kumar Das.
- MCPS: Dr M Khalilur Rahman in 1976
- FCPS: The first fellow was Dr Selim M Jahangir 1983. First female fellow was Dr U H Shahera Khatun Bela.
- MD: The first MD was Dr Md Abdul Hai.

Bangladesh Society of Anaesthesiologists

- Formed in 1974 with prof K A S M Quader and Dr Md Shafiqur Rasul as its President and Secretary respectively.

Anaesthesia in the 21st century

- The future of Anaesthesia is bright but we may see our roles and how we practice might change the history.
- Because WE ARE THE FUTURE.

Thank you