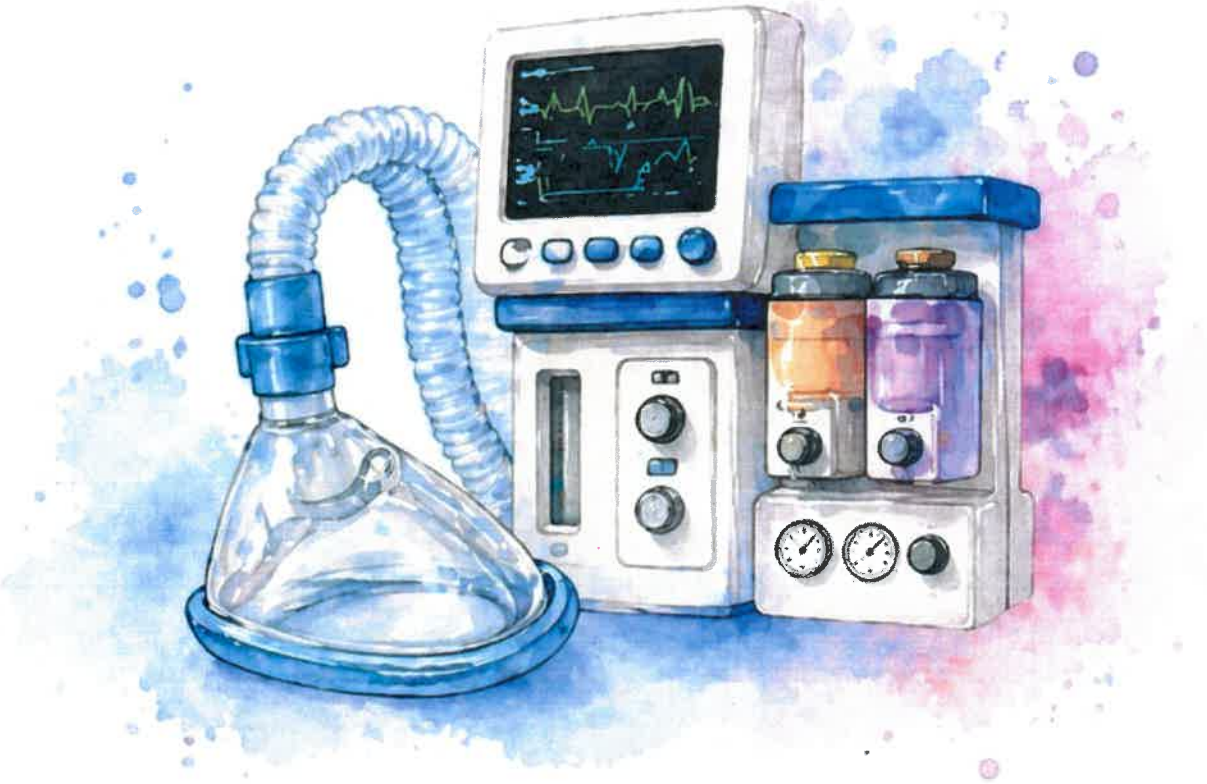
NEET SS ANESTHESIA

Updated Notes 2026



GENERAL ANAESTHESIA PART-1

Contents

Volume - 1

Basics of Anaesthesia

1. History of Anaesthesia 1
2. Anatomy of Larynx & Vocal Cord Palsies 19
3. Autonomic Nervous System Physiology & Autonomic Function Tests 27
4. Temperature Regulation During Anaesthesia 43

Physiology

5. Basics of Respiratory Physiology 51
6. Lung Mechanics 60
7. Lung Volumes 64
8. Compliance, Elasticity & Resistance 67
9. Ventilation, Perfusion & Deadspace 72
10. Shunt & Alveolar Gas Equation 79
11. Pulmonary Circulation & Hypoxia 81
12. Transport of Gases 83
13. Renal Anatomy & Physiology 85
14. Glomerular Filtration & Regulation 88
15. Renal Blood Flow 94
16. Renal Tubular Absorption 96
17. Renal Tubular Secretion 101
18. Regulation in the DCT & Collecting Duct 103
19. Countercurrent System & Urine Concentration 107
20. Acid Base Balance 110
21. Fundamentals of Oxygen 117

Pharmacological Principles

22. Pharmacokinetics : Part I 125
23. Pharmacokinetics : Part II 130
24. Pharmacodynamics 142

Physics

25. Biological Signals & Concepts of Monitoring 146
26. Measurement of Gases 151
27. Measurement of Oxygen 156
28. Measurement of Carbon Dioxide 161

Anaesthesia Gas Delivery Sytems and Circuits

29. Medical Gas Cylinders 169
30. Pressure System and Pipelines 178
31. Gas Laws and Anaesthetic Implications 186
32. Breathing Circuits Classification & Mapleson Circuits 192
33. Circle System 201
34. Oxygen Dissociation Curve & Oxygen Therapy 209

Equipments and Monitoring

35. Anaesthesia Machine 224
36. Laryngoscopes 242
37. Masks, Airways & Endotracheal Tubes 255
38. Supraglottic Airway Devices 274
39. Vaporizers 285
40. Pulse Oximetry and Capnography 295
41. Low-Flow Anaesthesia and Scavenging System 304

42. Humidifiers 313
43. Gas Monitoring : Interpretation & Applications : Part I 320
44. Gas Monitoring : Interpretation & Application : Part II 327

Preoperative Assesment

45. Preoperative Evaluation 332
46. Airway Assessment and Difficult Airway 352
47. Pulmonary Function Tests and Bedside Pulmonary Function Tests 374
48. Positioning During Anaesthesia 390

Drugs in Anaesthesia

49. Intravenous Induction Agents 401
50. Inhaled Anaesthetic Agents 416
51. Uptake & Distribution of Inhaled Anaesthetic Agents 432
52. Neuromuscular Physiology, Monitoring, & Blocking Drugs 444
53. Opioid Analgesics 457
54. Cholinergic and Anticholinergic Drugs 466
55. Vasopressors and Inotropes 477
56. Local Anaesthetics : Part I 484
57. Local Anaesthetics : Part II 490

Special Anaethesia Considerations

58. Anaesthesia for Ophthalmic Surgeries 500
59. Anaesthesia for ECT and Psychiatric Conditions 509
60. Anaesthesia for MRI 516
61. Anaesthesia for Laparascopic Surgeries 523
62. Anaesthesia for Thyroid Surgeries 535
63. Anaesthesia in Obese Patients 544

64. Anaesthesia in Geriatric Patients 554
65. Anaesthesia for Tonsillectomy 561
66. Anaesthesia for Laser Surgeries 568
67. Anaesthetic Implications of Diabetes Mellitus 579
68. Anaesthesia for Day-Care Surgeries 591
69. Anaesthesia for TURP 599
70. Anaesthesia for Scoliosis Correction 611
71. Hypotensive Anaesthesia 621
72. Anaesthesia in Pheochromocytoma 628
73. High Altitude Anaesthesia and Deep Diving Physiology 637
74. Anaesthesia for Orthopedic Surgeries 646
75. Anaesthesia for Organ Retrieval 657
76. Anaesthesia for Burns 667
77. Hypertension : Anaesthesia Implications 677
78. Porphyrias : Anaesthesia Management 689

Volume - 2

Postoperative Care and complications

79. Post-Anaesthesia Care Unit : Part I 697
80. Post-Anaesthesia Care Unit : Part II 707
81. Post-Anaesthesia Care Unit : Part III 711
82. Perioperative Fluid Management and Microcirculation 721
83. Malignant Hyperthermia, Neuroleptic Malignant Syndrome, Serotonin Syndrome 741
84. Postoperative Nausea and Vomiting 753
85. Blood, Blood Products and Massive Blood Transfusions 764

Anaesthesia in lung conditions

86. Asthma : Anaesthesia Implications 777
87. COPD : Anaesthesia Implications 783
88. Bronchiectasis : Anaesthesia Implications 791
89. Cystic Fibrosis : Anaesthesia Implications 798

Miscellaneous Topics

90. Monitored Anaesthesia Care 802
91. Peri-Operative Steroid Management 810
92. Electrical Safety in Operating Room : Part I 816
93. Electrical Safety in Operating Room : Part II 824
94. Anaesthesia for IVF 828

Anaesthesia Practicals - Long Case Presentations

95. Multinodular Goitre Patient for Total Thyroidectomy 835
96. IHD Patient for Laparoscopic Cholecystectomy 843
97. Bronchiectasis for Lobectomy 856
98. Pregnancy Induced Hypertension Patient for Emergency Caesarean Section 868
99. Post Burn Contracture Neck for Release and Skin Grafting 882
100. Mitral Stenosis in Pregnancy 894

Anaesthesia Practicals - Short Case Presentations

101. Diabetic Foot Patient for Debridement 914
102. Pacemaker Patient for TURP 924
103. Paediatric Patient for Adenotonsillectomy 932
104. Forearm Fracture for Internal Fixation 938
105. Normal Pregnancy Patient for Safe Confinement 947
106. Paediatric Patient for Hernia Repair 954

Anaesthesia Practicals - VIVA Station Discussions

107. ABG Analysis 959
108. How to Read An ECG : Part I 967
109. How to Read An ECG : Part II 976
110. How to Read Chest X-Ray 988
111. Capnography 999
112. Interpretation of Pulmonary Function Tests 1005
113. Equipments 1014
114. Drugs 1032

Biostatistics

115. Introduction to Data in Biostats 1046
116. Measures of Central Tendency and Variation 1048
117. Normal Distribution Curve 1051
118. Concept of Probability Value 1054
119. Tests of Significance 1057
120. Correlation, Regression and Skew 1058
121. Sampling Methods and Calculation 1062
122. Probability and Tiles 1065
123. Graphs 1068
124. Biostats Review and QA Round 1080

Epidemiology

125. Analytical Epidemiology 1088
126. Advanced Analytical Study Designs 1090
127. Experimental Epidemiology 1093
128. Evidence Based Medicine 1099

Screening

129. Advanced Concepts in Screening of Diseases 1103

HISTORY OF ANAESTHESIA

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1846

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"Those who don't learn from history are doomed to repeat it."

Pain perception in history :

- Pain was historically seen as a measure of strength (Soldiers) and a challenge for healers (Physicians).
- Medicine and magic were closely related in ancient cultures.

Egyptian & mesopotamian culture

Foundation of anaesthesia (Before 1846) :

Ancient civilizations and pain management :

1. Egyptians :
   - Used topical creams for pain relief.
   - Surgical patients in Egyptian art often had open eyes, suggesting minimal anaesthesia.
2. Mesopotamians :
   - Believed in magic and medicine as interrelated.
3. Greek & Roman influence :
   - Homer's reference : Use of Nephenthes, a drug that supposedly removed pain and sorrow.
   - Separation of medicine and magic : Greeks and Romans began viewing medicine as a science.

Use of Nephenthes

Early anaesthetic substances :

1. Mandragora (mandrake plant) :
   - Used by Egyptians and Greeks.
   - Could be eaten, inhaled, drunk, or applied topically.
   - Contains scopolamine alkaloids, leading to sedation and analgesia.
2. Opium (Poppy seeds) :
   - Unripe seeds were extracted for latex, leading to the development of morphine and heroin.

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3. Turner (Early 1800s):
   - Extracted and purified morphine.
   - Named it after Morpheus (Greek god of dreams) due to its sedative effects.

After 1846:

1846–1900 (Establishment of Anaesthesia):

Defining moment:

- October 16, 1846: Public demonstration of ether anaesthesia by William T. G. Morton at Massachusetts General Hospital (Ether Dome).
- Marked the beginning of modern anesthesia.

Not a sudden discovery:

Anesthesia evolved from many independent observations and changing societal attitudes toward medicine.

Ether dome

20th Century (Consolidation of Anesthesia).

21st Century (Future of Anesthesia).

Contribution by scientists:

- Discordaes:
  - Used wine to reduce pain of operations
  - Memphelic stone for local application.
- Chinese (Huatuo): Used cannabis in 200 AD as an inhalation mode.
- Christopher Wren: Used bladder (Storage) and quil to inject drug intravenously & used opium in dogs.
- Alexander Wood & Parvaez: Introduction of hollow needles.
- Terms: Sammohini → Induction; Sanjeevani → Recovery.

The industrial revolution and the birth of anesthesia :

The impact of the industrial revolution :

New discoveries :

- Steam engine, cotton mills, and rapid advances in chemistry.
- Many gases were discovered and explored for medicinal properties.

Key figures in early gas discoveries :

1. Joseph Priestley (1771-1772) :
   - Discovered Oxygen (1771) and Nitrous Oxide (1772).
   - His mentor, Stephen Hales, had worked on oxygen and carbon dioxide, but Priestley was credited with discovering them.
   - Also discovered : Ammonia, Carbon Monoxide, Sulfur Dioxide, Dinitrogen Tetroxide (N_2O_4), and Nitric Oxide.
2. Humphry Davy :
   - Superintendent of pneumatic medical institution.
   - His thesis focused on nitrous oxide and its effects.
   - Experimenting with gases for medical use : Initially used for treating chronic diseases like asthma & venereal diseases.
   - Key contributions : First to describe the analgesic properties of nitrous oxide. Suggested that it could be used for pain relief, but his findings were ignored. Coined the term "laughing gas" for nitrous oxide.
3. Henry Hickman (1820s) :
   - Attempted to create "surgical anesthesia" using carbon dioxide (Suspended animation).
   - Conducted animal experiments, but his findings were dismissed.
   - Tried to prove his work to : French King Charles X, Royal Academy of medicine. Died at 29 years old before his work gained recognition.

The controversy around the discovery of anaesthesia :

Crawford Williamson Long (1842) :

- Performed surgical anaesthesia using ether.
- Operated on James Venable, removing a tumour from his neck.
- Did not document his work, leading to lack of recognition.

"Publish or Perish" in medicine :

- In medical research, documentation and publication are crucial.
- Failure to publish can result in losing credit for discoveries, as seen in the case of Crawford Williamson Long.
- This principle applied to early anaesthesia pioneers, leading to controversies over who truly discovered anaesthesia.

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The role of ether frolics :

Social gatherings where ether and nitrous oxide were inhaled for euphoric effects. Four key figures attended these gatherings :

- William Clark : medical student, used ether for a tooth extraction but did not publish findings.
- Crawford Williamson Long (1842) : Performed surgery using ether anaesthesia on James Venable. Did not document it, leading to lack of recognition. Reasons for delay in publication were skeptical of mesmerism/hypnosis theories, wanted to gather more evidence before claiming credit, waited 3 years, but Morton had already demonstrated ether by 1846.

Horace Wells

- The tragic story of Horace Wells and the success of W.T.G. Morton Horace Wells and Nitrous Oxide (1844–1845) :
  - Power of observation : Horace Wells attended Ether Frolics and noticed a colleague, Samuel Cooley, injured himself but felt no pain while inhaling nitrous oxide. Realized its potential for pain relief.
  - With the help of Gardner Quincy Colton, he experimented on himself : Inhaled nitrous oxide & had a tooth extracted painlessly. Performed 12 tooth extractions with unsuccessful demonstrations before attempting a public demonstration.
  - He chose Boston for his public demonstration because : His friend, W.T.G. Morton, was studying at Massachusetts General Hospital (MGH). It was easier to obtain nitrous oxide in Boston.
  - The failed demonstration (1845) : He selected a patient who was obese and alcoholic, which affected drug response. During the extraction, the patient groaned, causing the audience to mock him. Doctors shouted "Humbug!" (meaning fraud/deception). Disgraced, Wells returned to Hartford, never fully recovering from the humiliation.
  - Downfall and tragic end : Became alcoholic, addicted to nitrous oxide. In 1848, he threw acid on a prostitute and was jailed. Committed suicide in jail by cutting his femoral artery.
  - Posthumous recognition : In 1870, the American Medical Association (AMA) recognized Wells as the "father of modern dental anesthesia". A statue was erected in Hartford, Connecticut.

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- W.T.G. Morton and the public ether demonstration (1846) :
  - Inspired by Horace Wells' attempt, W.T.G. Morton sought a more effective anaesthetic. He consulted Charles Jackson, a chemist, who had accidentally discovered ether's unconsciousness-inducing effects.
  - Morton's key advantage : Unlike Wells, Morton personally administered the ether to control the dose (Wells asked an assistant).
  - Successful public demonstration (October 16, 1846) : Took place at Massachusetts General Hospital. The key figures :
    - Patient : Gilbert Abbott.
    - Surgeon : Dr. James Warren.
    - Organizer : Dr. Henry Bigelow.
    - Anesthetist : W.T.G. Morton.
  - The setup for the demonstration :
    - Procedure : Removal of a jaw tumor.
    - Location : Massachusetts General Hospital (MGH) in the Ether Dome.
    - Anesthetic method : Ether soaked in a sponge wick. Administered through a simple inhaler.
  - The moment of luck for Morton : Morton arrived late, just before the surgery was about to begin. Surgeon James Warren was in a hurry to proceed with the operation. Morton quickly administered ether, and the patient became unconscious. Surgeon operated rapidly, ensuring the patient did not feel pain.
  - The famous declaration : After the surgery, Morton confidently addressed the audience "Gentlemen, this is no humbug!" (Referencing Horace Wells' failed nitrous oxide demonstration, where the audience had mocked it as a "humbug").

1846-1900

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Henry Bigelow

Dr Liston

Dr James Robinson

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The spread of ether anesthesia :

Henry Bigelow's role :

- Organizer of W.T.G. Morton's ether demonstration.
- A famous surgeon known for "Bigelow's manoeuvre" (used for kidney stone removal).
- Published the first full account of the demonstration in November 1846 in the Boston Medical Society.
- Sent a letter to his colleague Francis Wood in London, introducing the technique to Europe.

Francis Wood & Dr. James Robinson in London :

- Francis Wood, a dentist, consulted Dr. James Robinson, an anaesthetist.
- Dr Robinson quickly adopted ether anaesthesia, modifying inhalation methods.
- Developed the "Robinson inhaler", which was more efficient than the original sponge-soaked ether inhaler.

Introduction of ether in surgery : Dr. Joseph Liston

- Father of modern surgical asepsis.
- Advocated strict hand washing and antiseptic techniques.
- Introduced carbolic acid (Phenol) for surgical asepsis.

The famous "300% mortality surgery" :

- Dr. Liston was known for his extreme speed in amputations.
- Incident :
  - Patient bled out and died.
  - Spectator collapsed from shock and died of cardiac arrest.
  - Assistant's fingers were accidentally amputated → Sepsis & death.
  - One surgery, three deaths = 300% mortality rate.

Ether use in surgery : Liston's contribution

- Used ether anaesthesia for the first time in Europe.
- Anaesthetist : William Squires, who designed the Squires inhaler.
- After witnessing its effects, Liston famously declared :
  - "Yankee dodge beats the mesmerism of hollow!"
  - This meant ether anaesthesia was far superior to mesmerism (Hypnosis), which was widely used before anaesthesia.

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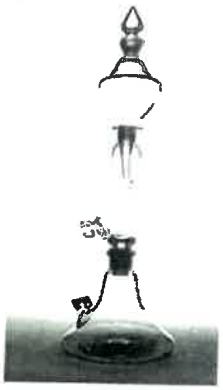

Knuth's apparatus

Squire's apparatus

Early ether apparatus :

- Knuth's apparatus : used for collecting and administering gases.
- Inspired later inhalers like the Robinson Inhaler & Squires Inhaler.

Downfall of morton :

Morton's attempt to patent ether :

- After his famous demonstration (1846), morton became ambitious.
- Instead of calling it "Ether," he re-branded it as "Letheon."
- Applied for a patent worth $100,000 (A massive sum at the time).
- Partnered with chemist Charles Jackson for the patent.

The backlash against morton :

- Scientific community rejected patent, arguing ether was not his invention.
- Crawford Long, William Clark, and Horace Wells' prior work resurfaced.
- American medical Association (AMA) denied his patent three times.

Morton's downfall :

- Spent his life fighting for financial credit rather than practicing medicine.
- Three patent attempts, all rejected.
- In 1868, suffered a cerebrovascular accident (CVA) and died.

Posthumous recognition :

- In 1870, the AMA credited morton for popularizing ether anaesthesia.
- Today, Massachusetts hospital preserves "Ether Dome" as a tribute.
- A statue of W.T.G. Morton stands in Boston, recognizing his contribution.

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Ether's introduction to India :

First ether demonstration in India:

- March 1847 (One year after morton's demonstration).
- Location : Calcutta medical college.

James Simpson and the discovery of chloroform :

James Simpson's experimentation :

- Professor of midwifery in Edinburgh.
- Disliked ether due to paradoxical excitement (Stage 2 of anaesthesia).
- Ether was pungent and nauseating, making it less favourable for childbirth.

Simpson's parties :

- Organized dinner parties where guests inhaled experimental gases.
- One night, his friends inhaled chloroform and lost consciousness.
- Upon waking up, one friend was found under the table, leading to the realization of chloroform's anaesthetic potential.
- 15 days later, Simpson published his findings.

James simpson

Simpson party

Controversy & public perception :

- Obstetric anaesthesia wasn't widely accepted d/t religious & societal beliefs.
- The first child born under chloroform anaesthesia was allegedly nicknamed "Anaesthesia" (written in his daughter's autobiography).
- His chloroform administration method : Soaking a handkerchief and having patients inhale.

The rise of chloroform over ether :

- A patient allegedly died from ether, causing fear.
- Chloroform became widely popular, despite being more dangerous (Ventricular arrhythmias).
- 1st reported chloroform death (1848) : Hannah Greener, during toenail removal.
- Chloroform's cardiotoxicity (Ventricular fibrillation) made it riskier than ether.

John Snow : The first anesthesiologist

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John Snow

Chloroform inhaler devised in 1850 by John Snow

Contributions to anesthesia :

- First specialist anaesthetist & anaesthesiologist.
- Published a book within a year of morton's demonstration (1847).
- Described anaesthesia stages, which remained unchanged for 80 years until Gudel refined them.
- Warned that chloroform should be administered in a controlled fashion, unlike Simpson's handkerchief method.

Influence on epidemiology :

- Father of epidemiology.
- Identified the London cholera epidemic source.

Queen Victoria's labor & Chloroform's royal endorsement :

- Queen Victoria's 8th delivery (Prince Leopold) was extremely painful.
- John Snow personally administered chloroform, leading to royal approval of obstetric anaesthesia.
- La Reine method : A controlled release technique for chloroform. Chloroform was dripped onto a handkerchief and inhaled in a regulated manner. Used by John Snow to administer 53 minutes of anesthesia to Queen Victoria during childbirth.

Chloroform in India :

- First used in India in 1848.
- Mahatma Gandhi received chloroform anaesthesia for emergency appendicectomy in 1925. Surgery performed at Sassoon Hospital, Pune.
- Interesting anecdote : Surgery was performed under a Kerosene lamp due to a power cut.

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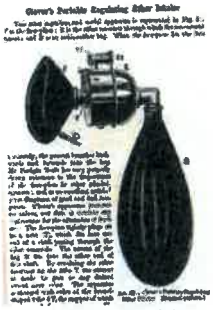
Thomas Clover: The chloroformist

Thomas Clover



Clover portable inhaler

Innovations in chloroform delivery :

- Followed John Snow's research and developed a 2% fixed concentration of chloroform.
- Used a large inhaler bag for controlled administration.
- Always kept his hand on the patient's pulse to monitor circulation.

Other contributions :

- Clover's ether inhaler : Popular for delivering ether anaesthesia safely.
- Clover's clutch : Device for holding patients in the lithotomy position.

Clover's ether inhaler

Junker's chloroform bottle

Gardner Quincy Colton :

The return of nitrous oxide :

- After Horace Wells' failure, Colton revived nitrous oxide use.
- Established a dental anaesthesia practice in Connecticut (1849).
- Partnered with Dr. Evans to manufacture nitrous oxide in hotels.
- By 1873, Coextor & Sons started marketing nitrous oxide in cast iron cylinders.