

From Edinburgh to Pictou, Nova Scotia: An Early History of Anaesthesia in the Maritime Provinces

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Anaesthesia was one of the most important medical discoveries of the nineteenth century. The use of ether and chloroform for painless surgery and childbirth had an immediate and positive effect on the comfort of patients. News of painless surgery traveled rapidly throughout the world; anaesthetic was being used on patients in the Maritime Provinces within weeks of its discovery. This paper provides a brief overview of the discovery of anaesthetic and its implementation in the Maritime Provinces. Particular attention is paid to the contributions of local medical pioneers such as James D. B. Fraser of Pictou, Nova Scotia. The controversy surrounding the use of anaesthesia during childbirth will also be discussed.

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The 19th century was a period of significant progress and discovery in the field of medicine. It was during this century that physicians became a central part of the lives of most human beings. The medical community asserted itself as an indispensable source of comfort, health, and well-being. The emergence of medicine during the 19th century as a universally respected profession can be attributed to several major discoveries. Charles Roland formed a list of the epochal discoveries in medical science made during the 19th century.¹ These discoveries include the stethoscope, invented in the 1820s by Laennec; germ theory, which was developed by Louis Pasteur; antiseptic surgery, which Lister introduced in 1867; x-rays, first used by Roentgen in 1896; bacteriology, developed by Koch and others in the 1880s; and improved sanitation and nutrition, which emerged throughout the nineteenth century. Each of these discoveries allowed physicians to provide their patients with unique services and a knowledge that could not be found anywhere else.

More than any of the above advances in knowledge and technology, the innovation that had the most immediate effect on the comfort of patients was the discovery of surgical anaesthesia. Anaesthesia made such a significant difference in the practice of medicine and the lives of patients that it was embraced almost immediately by the medical profession. Knowledge of this discovery moved rapidly across the globe, and was put into practice by physicians everywhere within months of its discovery. The story of how chloroform was used on patients in Halifax and Pictou, Nova Scotia just weeks after its discovery in Edinburgh, Scotland will highlight how quickly information spread and how eager physicians were to ensure the health and comfort of their patients.

Surgery Before Anaesthesia

Before the discovery of anaesthesia, patients viewed even the simplest surgery with dread. The unbearable pain induced by the surgeon's knife made elective surgery exceedingly rare.¹ According to Roland, "a regular part of the surgeon's equipment was a team of strong men who would attempt to

hold the patient steady while the surgeon did his work."¹ Because of the extreme suffering caused by surgery, it was essential that a surgeon was efficient and speedy. Roland tells the story of Robert Liston, a famous English surgeon of great skill, strength and speed. Liston once "amputated a leg at the thigh, along with one of the patient's testicles and two of his assistant's fingers, all in less than a minute. If exaggeration exists here, it relates to the number and identity of the organs sacrificed, not to the duration of the operation."¹

With painful and frequently fatal surgical operations the rule rather than the exception in the early 19th century, the stage was set for the discovery of a surgical anaesthetic. In 1799, Sir Humphrey Davy, a young English physician, published a pamphlet entitled "Researches, Chemical and Philosophical, Chiefly Concerning Nitrous Oxide," in which Davy writes about the temporary pain relief he noticed when he breathed nitrous oxide ("laughing gas") following a painful tooth extraction.² Davy proposed that nitrous oxide could be used to lessen pain and anxiety during surgery. As one historian has noted, "for a moment, science stood on the verge of a great discovery. Indeed, a great discovery had been made, if anyone had recognized it. No one did."³ Nearly half a century passed before inhalation anaesthetic was discovered.

The effects of ether and nitrous oxide on human consciousness and inhibition were widely known in the first half the nineteenth century. "Ether frolics," and nitrous oxide parties, organized by an itinerant chemist were common in North America. A Mr. Copeland organized one such party in Halifax in November of 1847. "The cunning exhibitor shrewdly calculated that if there was anything like a good audience, there would be some six or seven who, after paying for their tickets, would have the curiosity to take the gas, and display their various propensities for the amusement of the company."⁴

The Discovery of Ether Anaesthesia

It was also at one of these parties that Horace Wells, a Hartford dentist, got the ball rolling on one of the most significant discoveries in the history of medicine. In

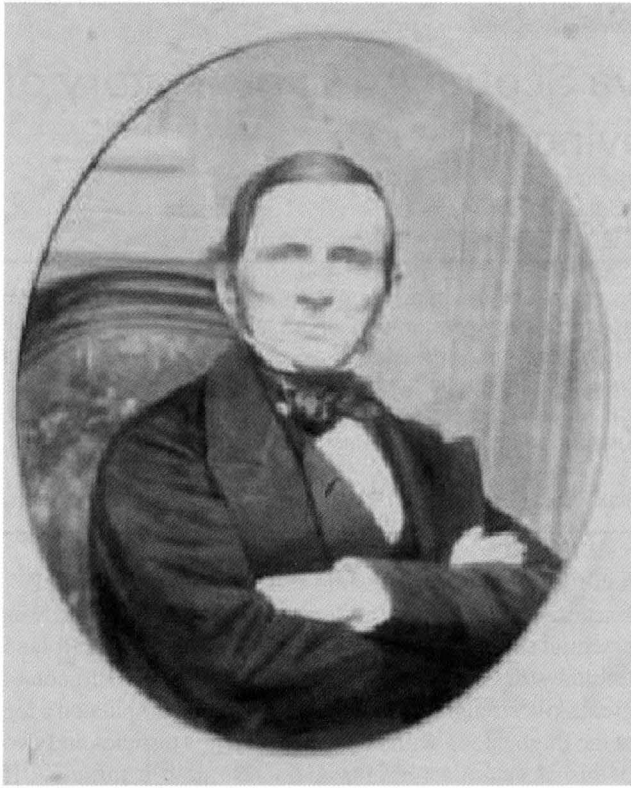


Figure 1. James Daniel Bain Fraser (1807-1869): pharmacist, civic leader, medical innovator and founding member of the Pictou Scientific and Literary Society. Within months of its discovery, Fraser was manufacturing and distributing chloroform to physicians throughout the Maritime Provinces. (Photo courtesy Gordon Duff).

December, 1844, Wells attended an exhibition in Hartford of “the effects produced by inhaling Nitrous Oxide, Exhilarating or Laughing Gas.”⁵ Wells noticed during this exhibition that when those under the influence of the laughing gas staggered or fell down, they displayed no expression of pain.³ After the frolic, Wells returned to his office and had a wisdom tooth removed by another dentist while under the influence of the gas. The experiment was a success, and within a month, Wells had carried out 15 painless extractions on patients in his dental practice.³

Wells traveled to Boston and communicated his discovery to his old partner, Gilbert Morton. Morton was intrigued by Wells’ discovery, and he began to experiment with ether. Morton worked with a Boston instrument maker to develop a manageable device for the administration of this gas. He then approached John Collins Warren, senior surgeon at the Massachusetts General Hospital, and proposed a second demonstration of painless surgery.³ Morton brought the inhaler to the operating room, and anaesthetized a man of 20 suffering from a tumour in the neck. The operation was a success and an initially skeptical Warren proclaimed at the end of the operation: “Gentlemen, this is no humbug.”⁵

On November 9, 1846, a paper describing the “new anodyne process, by means of which surgical operations have been performed without pain” was read before the Boston Society of Medical Improvement.⁵ In his detailed chronology of early anaesthesia in Canada, Matsuki describes how news of this

discovery reached Canada very quickly.⁶ On December 1, 1846, The British American Journal of Medicine and Physical Science announced in its column of “Books etc. Received during the Month,” that they had received the November issue of the Boston Medical and Surgical Journal which includes H.J. Bigelow’s paper on ether anaesthesia.⁷ The first reported surgical operation in Canada with anaesthesia occurred just seven weeks later, in Saint John, New Brunswick. On Monday, January 18, Dr. Hunter Peters removed a tumour from the arm of a man under ether anaesthesia.⁸ The ether was provided by Dr. Lawrence VanBuskirk, a dentist and medical doctor. VanBuskirk brought his knowledge to Nova Scotia in March 1847 and administered ether to a patient during a leg amputation performed by Dr. D. M. Parker of Halifax.⁹ By the Spring of 1847, ether anaesthetic was being used by surgeons throughout Canada¹⁰ and around the world.

Simpson and Chloroform

As much as ether anaesthetic improved surgery and improved the lives of patients, physicians were looking for an alternative. It was necessary to store ether in heavy glass bottles, and large amounts of the gas were needed to produce the desired effect. It was also flammable, and this was a concern for physicians who often treated patients by candlelight. Although it was clearly a favourable alternative to the pain of surgery, ether was irritable to the eyes and often caused patients to vomit.³ Because of these and other problems, physicians and chemists began to search for alternative anaesthetic agents. In November 1847, Dr. James Simpson, Professor of Midwifery at the University of Edinburgh, published a paper entitled “On a New Anaesthetic Agent, More Efficient than Sulphuric Ether.” Simpson declares that “as an inhaled anaesthetic agent, it possesses . . . all the advantages of sulphuric ether, without its principal disadvantages.”¹¹ Chloroform is superior to ether, claims Simpson, because a much smaller quantity is required to produce the desired effect. Also, chloroform can be inhaled simply by placing a few drops in a sponge or a handkerchief, and does not require any special inhaler. As a result, chloroform is easier to transport and administer, and because it is required in smaller quantities, it will be less expensive.¹¹ The discovery of chloroform was a major breakthrough in medicine.

Perhaps the most significant aspect of chloroform anaesthetic was that it could be used to ease the pain of childbirth. Physicians could never be sure if ether was safe in childbirth, and because labour could last hours, large amounts of ether were necessary.³ Because chloroform was easier to use and was required in smaller quantities, it was ideal for childbirth. Simpson used chloroform for childbirth and found it an unqualified success. His first patient awoke after childbirth refreshed and energetic:

Shortly afterwards, her infant was brought in by the nurse from the adjoining room, and it was a matter of no small difficulty to convince the astonished mother that the labour was entirely over, and that the child presented to her was really her ‘own living baby’.^(a)

In the years that followed, chloroform would revolutionize the field of obstetrics.

Like ether, chloroform was used by other physicians almost immediately. Just one week after Simpson's presentation in Edinburgh, Dr. Protheroe Smith, a London physician, published an account of administering chloroform during a complicated pregnancy.¹² By early December 1848, Simpson published detailed accounts of over ten deliveries during which chloroform was used.¹³ News of Simpson's discovery traveled quickly across the Atlantic, and the December 29, 1847 edition of the *Boston Medical and Surgical Journal* contains a letter from Dr. C. A. Harris of Baltimore, who claims that he has tested chloroform during a complicated surgery with "complete success."¹⁴ In the very next issue of the *Journal*, Gilbert Morton, who had administered ether for the first time just one year earlier, published an account of successful preparation and administration of the new anaesthetic during dental surgery.^{15(b)}

The first use of chloroform anaesthetic in Canada was by Dr. E.D. Worthington of Sherbrooke, Quebec. On January 24, 1848, Dr. Worthington used chloroform to alleviate pain during the manual reduction of a femoral fracture in an elderly woman. The pain relief was only partial. The next day, Dr. Worthington removed a tumour from the right hand of a child under chloroform anaesthesia.¹⁶ Dr. Worthington, also a pioneer in ether anaesthesia, declared: "truly chloroform has been a blessing to mankind, and womankind, too."¹⁷ In Canada, womankind first experienced this blessing when Dr. A. F. Holmes of McGill College used chloroform to relieve the pain of childbirth on January 25, 1848.⁶ The first use of chloroform anaesthetic in Nova Scotia was by Dr. W. J. Almon, who performed a surgery on February 8, 1848 to amputate the thumb of a woman at the Halifax Poor Asylum. The anaesthetic was provided by James D. B. Fraser, a pharmacist in Pictou.¹⁸

Pictou's Scientific Pioneer

For many years, Mr. R. P. Fraser of Pictou, Nova Scotia, son of the famous pharmacist, James Fraser, boasted that he was the first child in Canada born while his mother was under chloroform anaesthesia.¹⁹ The Fraser family Bible contains the following entry: "Robert Peter, born March 22, 1848. At the birth of this, the seventh child, chloroform was used for the first time in Canada during child birth."²⁰ Although James Fraser might have been mistaken in his claim that he was the first to administer chloroform for childbirth, it cannot be argued that he was a visionary and a leader in medical and scientific thought in Nova Scotia.

James Daniel Bain Fraser was born at Pictou on February

(a) The mother, the wife of a physician, was so pleased with the results of Dr. Simpson's intervention that she named her child, a girl, "Anaesthesia."

(b) For the rest of his life, Morton struggled aggressively but unsuccessfully to patent his ideas for ether anaesthesia. He never made any money from his ideas, and died poor and broken in 1868. Horace Wells, his former partner and the man who had first discovered gas anaesthetic, had committed suicide in 1848.

11, 1807 to Daniel Fraser, trader and Scottish immigrant, and Catherine (MacKay) Fraser.²⁰ Fraser lived in Pictou during the 1830s, a period of "intellectual awakening" in the province of Nova Scotia.²⁰ Societies, clubs and literary associations began to form in communities all over the province, and Pictou was no exception. The Pictou Literary and Scientific Society was formed when twenty-three men, including Fraser, met at Pictou Academy on December 8, 1834.²¹ Interestingly, one of the first sessions, in January 1835, consisted of a demonstration of "exhilarating gas" by Fraser. The members were "seen to exhibit various specimens of dancing and pugilistic [sic] philosophy."²² Fraser was one of the most influential members of the society, and performed demonstrations of the electric light (March 5, 1850), and chloroform (April, 1848). Interestingly, the principle of electric light using a carbon filament was not perfected until 1860, ten years after Fraser's demonstration.²¹

Fraser was deeply involved in the scientific advancements of the day, and he was quick to integrate these advancements into everyday life. Simpson's pamphlet about chloroform was published in November, 1847, and by the first week of February, 1848, Fraser had perfected the preparation of this drug, and had provided it to physicians in Halifax. The instructions for preparation of chloroform in Simpson's were terse:

[Chloroform's] composition is expressed by the chemical formula C_6HCl_3 . It can be procured by various processes, as by making milk of lime, or an aqueous solution of caustic alkali, act upon chloral; by distilling alcohol,



Figure 2. Catherine (MacKay) Fraser. She received chloroform anaesthetic during the birth of her fourth child, Robert Peter, in March 1848. This was the first such use of chloroform anaesthesia in Nova Scotia. (Photo courtesy Gordon Duff).

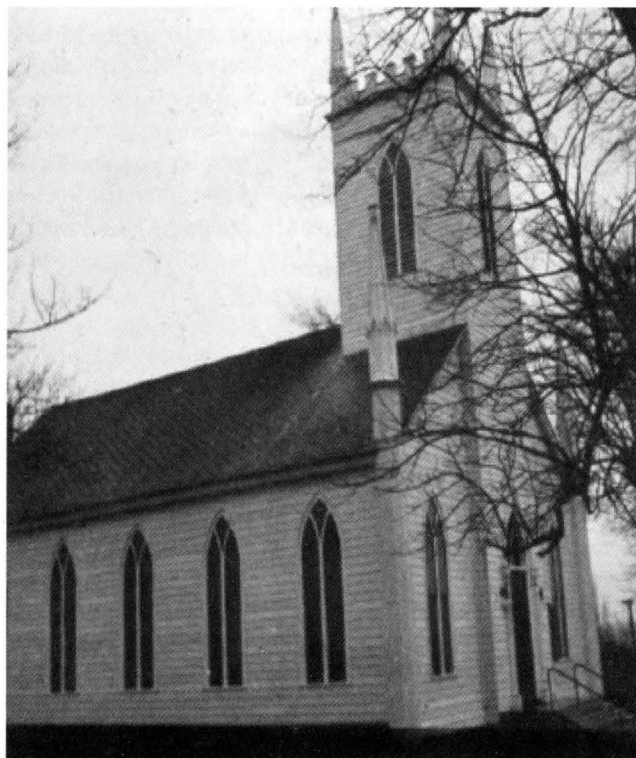


Figure 3. The Prince Street Church in Pictou, Nova Scotia. J.D.B. Fraser and his family were members of this congregation until 1848, shortly after Fraser committed the controversial act of administering chloroform to his wife during childbirth. (Photo courtesy Gordon Duff).

pyroxylic spirit, or acetone, with chloride of lime; by leading a stream of chloride gas into a solution of caustic potass, in spirit of wine, etc.¹¹

In a period of less than two months, J. D. B. Fraser, a pharmacist in Pictou, Nova Scotia, was able to transform a vague set of instructions into a compound that immediately improved the lives of many Nova Scotians. Despite current innovations in communication, such a rapid transition from idea to clinical reality would be exceedingly uncommon today.

Soon, Fraser was providing chloroform to many physicians in the Maritime Provinces.⁹ On one significant occasion, Fraser administered the anaesthetic to his own patient. On March 22, 1848, Fraser gave chloroform to his wife during the birth of their son, Robert. In the conservative, Presbyterian town of Pictou, this act was controversial. Historian Allan Dunlop notes that Fraser left the Prince Street Church soon after the incident, and it is unclear whether the chloroform incident precipitated his departure.²⁰

The Controversy: Chloroform and Childbirth

The moral objection to the use of anaesthetic during childbirth arose from a literal interpretation of the third chapter of

Genesis. As God was expelling man and woman from the garden, He placed a curse on each of them. He decreed that man would have to work hard all his life just to get enough food to feed his family. To woman, God said: "I shall greatly multiply thy sorrow and thy conception; in sorrow thou shalt bring forth children; and thy desire shall be to thy husband, and he shall rule over thee (Genesis 3:16)." To many 19th century Christians, this meant that the pain that women experienced during childbirth was God's will.

Simpson himself had anticipated these arguments, and published a pamphlet in November 1847^(c) entitled "Answer to the Religious Objections Advanced Against the Employment of Anaesthetic Agents in Midwifery and Surgery." Simpson forms at least seven separate arguments against the "strange and irrational view" that the use of anaesthetic for childbirth is immoral. He shows himself to be a very competent theologian and Greek scholar as he argues that "sorrow" does not necessarily mean physical pain, but could mean the labour and toil of childbirth, which is not removed by anaesthetic.²³

The debate over the use of chloroform for childbirth came to an abrupt halt in April 1853. Queen Victoria's fourth son and eighth child, Prince Leopold, was born on April 7, 1853, and the Queen's labour pains were relieved by chloroform anaesthetic.²⁴ The Queen was greatly pleased with the results, and referred to "that blessed chloroform" as "soothing, quieting and delightful beyond measure." When she was ready to give birth to her ninth child in 1857, she again asked for chloroform.²⁴

By using chloroform herself, Queen Victoria made it instantly acceptable for well-bred women to accept anaesthesia during child birth. Simpson had been prescient enough to note, in 1847, that "medical men may oppose, for a time, the superinduction of anaesthesia in parturition, but they will oppose it in vain; for certainly our patients themselves and their friends will force the use of it upon the profession."¹³ The weight of Queen Victoria's influence forced the medical profession to accept anaesthesia as an essential part of childbirth. One historian claims "Queen Victoria's greatest gift to her people was a refusal to accept pain in childbirth as woman's divinely appointed destiny."²⁵

Although there were some lingering concerns about the medical safety of chloroform during parturition, by the end of the nineteenth century, chloroform anaesthesia had become an indispensable part of every physician's practice. In 1896, G. E. Coulthard, president of the New Brunswick Medical Society, analyzed 1000 of his own obstetrical cases and found he used chloroform in all but 211 of them. In the cases where chloroform was not used, either the woman refused it, or Coulthard had arrived too late in the delivery to administer it.²⁶

Conclusion

The story of how ether and chloroform anaesthetic was integrated into medical practice illustrates how a great discovery can transcend the limitations of incomplete scientific knowledge, slow methods of communication and

^(c) Published in the same month as his pamphlet on chloroform.

negative contemporary attitudes. News of the discoveries of ether and chloroform anaesthetic reached every part of the developed world, including the rural Maritime Provinces, within months. Almost immediately, physicians were applying this new found knowledge to their clinical practice, and patients quickly benefited. In Pictou, with James Fraser, and around the world, people soon discovered that anaesthesia would revolutionize surgery and childbirth. Despite the moral and scientific objections to anaesthesia, this new medical technology thrived, not because physicians encouraged it, but because patients demanded it. It could be argued that when Queen Victoria requested chloroform during childbirth in April, 1853, the seeds of the patient-centered approach to medicine were planted.

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