
Historical Article

Gardner Quincy Colton: Pioneer of Nitrous Oxide Anesthesia

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At the fiftieth anniversary celebration of Horace Wells' discovery of the anesthetic properties of nitrous oxide in Philadelphia, Professor Garetson, presiding officer of the United States Dental Association, commented: "Had there been no Colton, there would have been no Wells" (1). Although this may well be true, Colton, for his part, claimed very little reward for his involvement in one of the most important events in the history of the speciality of anesthesia. His modest and humble personality has ensured that his varied and eventful life story is poorly known to anesthetists.

Gardner Quincy Colton (Figure 1) was born in Georgia, Vermont, a small village on the shores of Lake Champlain, on February 7, 1814. His father, Deacon Walter Colton, a poor but deeply religious weaver, was descended from Quartermaster George Colton who had sailed from England in the early 1600s and had settled in Springfield, Massachusetts. Gardner's mother was Thankful (Cobb) Colton (2). Gardner, the youngest of 12 children,* 10 sons and two daughters, recalls:

Being the youngest of the family, I was the last to be provided for. . . . I had to wear the mended and patched garments of my older brothers which were reduced to my size. . . . Many a time I would wake up in the morning and find a snow drift on my bed, the snow having blown through the leaky roof. I

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*Colton, in his text *Boyhood Recollections—A Story With a Moral* (4), comments that there were only 11 offspring. He forgets that one brother, Luther, Calvin's twin, lived for only 15 days.

think I did not have an overcoat till I was near twenty years of age (3).

At the age of 14, Gardner went to work on a farm for one of his brothers. His father had hoped that Gardner would attend college, but he had to give up because of poor eyesight (5). For 5 years he was apprentice to Mr. Azel Church, a chairmaker in St. Albans, Vermont (6). Allowed five dollars a year for spending money but requiring more, Gardner rang the church bell at six o'clock in the morning, receiving one dollar from each local merchant for the service (3). Colton's story continues:

After finishing my apprenticeship in 1835, I came to New York and commenced work as a journeyman. I was set to making birds' eye-maple and scroll-top cane-seat chairs. After a few months' practice, I got so that I could easily make one dozen a day, for which I was paid \$2.50 a dozen, or \$15 a week. I paid \$2.50 a week board (3).

After working several years at chairmaking, Colton married Eleanor Pomeroy on November 28, 1839. Their only child, Ellen Kathleen, was born on September 21, 1840. Sadly, Eleanor died on February 10, 1841 (2). Colton's older brothers then offered to help him through medical school if he desired. Gardner eagerly accepted (3).

Colton entered the Crosby Street College of Physicians and Surgeons in New York in 1842 (6) at the age of 28. He studied under Robert Watts, Jr., Professor of Anatomy and Physiology, and Willard Parker, Professor of Surgery (7) (Figure 2). However, after 2 years, having taken no degree (5), he decided to "throw physic to the dogs" and went off to lecture on chemistry and natural philosophy. Nitrous oxide was one of the subjects on which he lectured.

Colton had probably learned of the effects of nitrous oxide gas during his medical studies (5), as it is likely that medical students often experimented



Figure 1. Gardner Quincy Colton (1814–1898) from an engraving by George E. Perrine of New York (Yale Medical Historical Library, New Haven, Conn.).

College of Physicians & Surgeons		System of 1842-43	
Name	Address	Signature	Signature
21. Charles H. Halliday	New York	W. C. Halliday	W. C. Halliday
22. John A. King	New York	John A. King	John A. King
23. James H. King	New York	James H. King	James H. King
24. John W. Ballou	New York	John W. Ballou	John W. Ballou
25. Andrew A. Hall	New York	Andrew A. Hall	Andrew A. Hall
26. John F. Thompson	New York	John F. Thompson	John F. Thompson
27. John W. Ballou	New York	John W. Ballou	John W. Ballou
28. John F. Thompson	New York	John F. Thompson	John F. Thompson
29. John F. Thompson	New York	John F. Thompson	John F. Thompson
30. Robert Watts, Jr.	New York	Robert Watts, Jr.	Robert Watts, Jr.
31. Willard Parker	New York	Willard Parker	Willard Parker
32. Henry H. Hall	New York	Henry H. Hall	Henry H. Hall
33. John C. Chapman	New York	John C. Chapman	John C. Chapman
34. James H. King	New York	James H. King	James H. King
35. John W. Ballou	New York	John W. Ballou	John W. Ballou
36. Henry H. Hall	New York	Henry H. Hall	Henry H. Hall
37. James H. King	New York	James H. King	James H. King
38. Andrew A. Hall	New York	Andrew A. Hall	Andrew A. Hall
39. John F. Thompson	New York	John F. Thompson	John F. Thompson
40. John W. Ballou	New York	John W. Ballou	John W. Ballou

Figure 2. Registration ledger from the Crosby Street College of Physicians and Surgeons (now Columbia University) for 1842 and 1843, demonstrating Colton's signature against his entries on line 30 as student to Robert Watts, Jr., and Willard Parker. (Published with permission of the Augustus C. Long Health Sciences Library, Columbia University, New York, N.Y.)

with the gas. In addition, exhibitions of the effects of "laughing gas" given by itinerant lecturers in the United States have been documented since the 1830s (8), when Samuel Colt, in the guise of Dr. S. Coult, presented a show in an attempt to fund the patent for his revolver. Before Colton finished his medical studies, he gave a series of lectures on chemistry to a young ladies' seminary in New York. A demonstration of nitrous oxide was included in the experiments and under the gas' exhilarating influence the young ladies laughed and danced (3).

His fellow students learned that Colton could make the gas and asked if he could do so for them. He obliged and they "had lots of fun with it in the anatomical lecture room" (3). One student suggested that Colton put on an exhibition of the gas in the Broadway Tabernacle in order to make some money. This Colton did in the spring of 1844:

I went to Mr. Hale, proprietor of the *Journal of Commerce*, who owned the Tabernacle, laid the matter before him, but said that I had no money. He finally agreed that I might have the Tabernacle one evening for \$50, and pay him after the exhibition. I then wanted \$75 to get out bills and advertise. . . . The tickets were put at twenty-five cents each, and I gave away a good many in order to be sure of a respectable show. Well, the affair came off, and my receipts were \$535! I cleared over \$400 above all my expenses (3).

The exhibition was reported by N. P. Willis in "Diary of Town Trifles" in the *New Mirror* of April 6 (9). Between three and four thousand people attended the event. A platform in the hall was hemmed in by benches, and it was advertised that "twelve strong men" would be there to prevent injury to the spectators. After some impatience on the part of the audience, Dr. Colton appeared with his specimen of the "highest possible heaven" in an India rubber bag. However, a "thick necked and bony youth" got possession of the bag and, after inhaling its contents, assaulted Colton. The "twelve strong men" rushed to the rescue, the audience applauded, and the lad returned to his senses. It is reported that "A dozen others took their turn and were variously affected"; one participant even acting out a scene from *Richard the Third!* (9)

The success of this initial exhibition spurred Colton on to further similar exhibitions throughout New England. Tuesday, December 10, 1844, found his show at Hartford, Connecticut. The now famous bill in the *Hartford Courant* advertised the event:

A Grand Exhibition of the effects produced by inhaling nitrous oxide, Exhilarating or Laughing gas will be given at Union Hall this Tuesday evening. Forty gallons of gas will be prepared and administered to all in the audience who desire to inhale it. Twelve young men have volunteered to inhale the gas to commence the entertainment. Eight strong men are engaged to occupy the front seats to protect those under the influence of the gas from injuring themselves or others. This course is adopted that no apprehension of danger may be entertained. Probably no one will attempt to fight. The effect of the gas is to make those who inhale it either laugh, sing, dance, speak or fight according to the leading trait of their character. They seem to retain consciousness enough to not say or do that which they would

have occasion to regret. Note that the gas will be administered only to gentlemen of the highest respectability. The object is to make the entertainment in every respect a genteel affair (10).

Amongst the audience that evening were two men whose involvement in the events of the evening were to be absolutely vital to the introduction of anesthesia. These were Horace Wells, a local dentist, and Samuel A. Cooley, a druggist's assistant. Colton recalls (3):

I gave the gas to a young man by the name of Cooley, and while under its exhilarating influence he began to dance and jump about. He ran against some wooden settees on the stage, and bruised his shins badly. As the effect of the gas passed off, he took his seat next to Dr. Wells, who said to him, "You must have hurt yourself." Cooley began to feel some pain then, and was astonished to find his legs all bloody. He said he did not feel a particle of pain till the effects of the gas had passed off. While the audience were going out, Dr. Wells said to me "Why cannot a man have a tooth pulled while under the gas and not feel it?" I replied that I did not know. Dr. Wells said he believed it could be done, and would try it on himself if I would bring a bag of gas to his office. The next day I went to his office with a bag of gas. Dr. Wells called in Dr. Riggs, a neighbouring dentist, to draw his tooth. I gave the gas and Dr. Riggs took out the tooth. On recovering, and finding his tooth out, Dr. Wells exclaimed, "It is the greatest discovery ever made. I didn't feel it so much as the prick of a pin!" That was the first tooth ever drawn without pain (3).

The exact details of events surrounding the episode recounted above vary in small amounts depending on the time and storyteller. For instance, Cooley, speaking at the 37th Congress in the United States Senate on February 14, 1863 (11), suggests that he inhaled nitrous oxide at a private sitting given by Colton at the Union Hall on Tuesday, December 11, 1844, the day after Colton's public demonstration of the gas. He says that it was at this meeting, attended by Wells, Colton's brother Calvin, Benjamin Moulton, and others, that he bashed his shin. Cooley also remarks that the "tooth-pulling incident" took place later that same day (11). Colton, however, in a letter to the *New York Times* of 1862 entitled "The Invention of Anaesthesia" (12), singles out Wells as having taken nitrous oxide, run against a bench, and "bruised his leg severely." It is also alleged (6) that Colton told Wells that, at an earlier exhibition of nitrous oxide given by him in Bridgeport, Connecticut, a young man, in striking another, had broken a bone in one of his hands, but had been unaware of it until the effects of the gas had worn off. One further

controversy exists and surrounds the question of who actually administered the nitrous oxide gas to Wells on the occasion of the tooth extraction. Colton clearly states in his writings (3,12-19) that it was he, and this is confirmed by Cooley (11). John M. Riggs, the dentist who extracted the diseased molar from Wells, in a letter written in 1872 (20), suggests, however, that:

Wells took the bag in his lap—held the tube to his mouth and inhaled till insensibility relaxed the muscles of his arms—his hands fell on his breast—his head dropped on the headrest. . . . Mr. Colton, Cooley and the two others stood by the open door ready to run out if Wells jumped up from the chair.

He continues:

For the credit of Dr. Colton I can say—he made the gas—gave a bag of it to Dr. Wells to experiment with—witnessed the operation of extracting the first tooth and went on his way to other cities.

Earlier, in the same letter, having suggested that Colton's "object was to make money and nothing else," Riggs states that Colton knew nothing of the discussion Wells and Riggs had on the night of December 10, 1844, and their "determination to try the gas on Wells the next morning" (20).

In many letters and pamphlets written later on in life, Colton's story becomes more consistent regarding the date and sequence of events (3,13-16,19). However, despite the earlier inconsistencies, Colton remained true in his support for Wells as the discoverer of anesthesia. In his pamphlet "ANAESTHESIA. Who made and developed this great discovery?" he writes about the extraction of Well's tooth (13): "This was the FIRST operation performed in modern anaesthesia, and was the forerunner of all the other anaesthetics. Beyond all question, this discovery had its birth in the brain of Dr. Horace Wells!"

After the success of the tooth pulling, Colton taught Wells how to manufacture nitrous oxide, and, with the assistance of Dr. Riggs, Wells used it for both dentistry and surgery (11,12,21). In January 1845 Wells went to Boston to demonstrate the use of nitrous oxide to the students of Harvard Medical School. However, the young boy receiving the nitrous oxide for a dental extraction cried out during the procedure (16,19), and Wells was hissed out of the room as a fraud. Wells returned to Hartford and continued to use the gas in his practice (19), but the introduction of ether, and Wells' subsequent trip to Europe, soon ousted memories of nitrous oxide. Meanwhile, Colton continued his lectures on chem-

istry and natural philosophy and occasionally gave lectures on "laughing gas."

Over the next few years Colton became involved in two major scientific inventions—the telegraph and the electric engine. First, he became friends with Professor Samuel F. B. Morse, inventor of the telegraph and was involved in the first telegraph message ever to be received in New York. In his book *Boyhood and Manhood Recollections. The story of a busy life* (3), Colton writes:

About this time, Professor Samuel Morse took me into his office and gave me full instructions in regard to the construction and operation of his magnetic telegraph, and afterwards allowed me to announce a lecture on the telegraph under his "auspices," in the Broadway Tabernacle. . . . Professor Morse said I made one or two slight mistakes in my lecture, but on the whole he was so well pleased with it that he gave me . . . a letter of unqualified recommendation to the public as being able to explain his telegraph. With this letter I travelled and lectured all over the United States.

While lecturing on the telegraph, Colton, using the principles of the electromagnet, conceived the idea of an electric engine that could be driven on a track. According to Mr. George Prescott, author of *Dynamo-Electricity* (1885) (22), Colton was the first man to apply electricity to the "propulsion of cars." Gardner took his plans for the engine to a machinist named Lilly, who manufactured it. Attached to the engine were two or three passenger cars filled with dolls for passengers. It was one of the first motors in electric railroad history and figured in a patent suit involving Oliver Kelly, the General Electric Company, and the Springfield Railway Company (23). Importantly, it differed from other such engines because electricity was applied to the track rather than to the engine itself. The engine (Figure 3), measuring 5" × 12" × 8", consisted of two magnets so arranged that metal bars placed on the ends of the rocking arm were attracted as the magnets were alternately energized. A reciprocal motion was imparted to the arm and then transmitted through a driving rod to a wheel geared to the driving wheels of the chassis. It ran on a circular railroad about 6–8 ft in diameter around Colton's office in the Cooper Union, New York, and is now displayed, minus the passenger cars, in the Smithsonian Institute in Washington.

In 1849, after his brother Walter's appointment as Civil Governor of California, Gardner sailed on the steamer Panama around Cape Horn to join him in San Francisco (24). Walter, who had been Naval Chaplain on the USS Congress during the War with

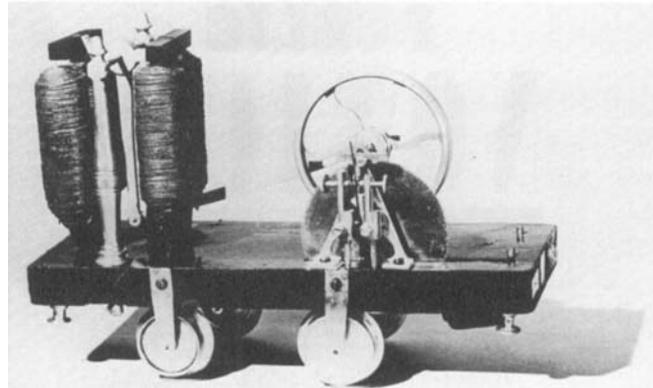


Figure 3. Electric engine, invented by Colton, currently on display at the Smithsonian Institute, Washington, D.C. (Courtesy of the National Museum of American History, Smithsonian Institute, Washington, D.C.) The engine measures 5" × 12" × 8".

Mexico, had already established California's first newspaper *The Californian*, set up trial by jury, reported the discovery of gold in California to the East Coast states, and built California's first schoolhouse (5,25). Gardner arrived in San Francisco on May 10, 1849, and soon became caught up in the Gold Rush of that year. To provide an income for himself he practiced medicine, prospected for gold, and ferried miners across deep fast-flowing mountain streams using an India rubber boat (24). As there were no coins in circulation, Colton took a "pinch" of gold dust in exchange for the 50-cent fee for the river crossing. However, he soon learned that "a fellow with a broad thumb and big finger would 'pinch' \$2." During the rainy season it was impossible to work the mines, and he returned to San Francisco. In partnership with another, he opened a hospital using money borrowed at 10% per month interest. So successful was this venture that only months after the hospital had opened he was able to send a bank draft of \$10,000 back to his second wife Emily in New York (3).

In the late fall of 1849, despite having no legal background, Colton was appointed as the first Justice of the Peace for San Francisco by Governor Riley and Prefect Horace Hawes. As a result, he found himself in charge of the coroner's business, all trials for causes under \$100, and the controversial matter of the sale of town lots in the city. After the formation of the State of California in November 1849, a great deal of confusion existed regarding the ownership of land in San Francisco. However, acting under the powers that he believed had been granted to him, Colton commenced selling city lots, often at bargain prices (26). Believing Colton to be acting without authority, the Town Council took action on December 21.

PUBLIC NOTICE.

Whereas, it has this day been made to appear to the Ayuntamiento, that

G. Q. COLTON,

a Justice of the Peace, in and for the town of San Francisco, has assumed the authority, and pretends to exercise the right of selling, granting and disposing of Lots, within the limits of said town. Therefore,

Resolved, That ARCHIBALD C. PEACHY, Esq., City Attorney, be directed to institute legal proceedings against the said Colton, to restrain him in such illegal and unwarrantable practices, and to make him amenable by due process of law, for a misdemeanor and malfeasance in office.

Resolved, That a copy of these Resolutions be published in the *Sta Californica*, the *Pacific News*, and in handbills, to warn all persons against trespassing upon the public property under pretence of titles obtained by such fraudulent means, and under such pretended authority.

BY ORDER OF THE TOWN COUNCIL.

FRANK TURK,

President

H. L. DODGE,

Secretary.

San Francisco, Dec. 21, 1849.

ALTA CALIFORNIA PRESS

Figure 4. Public Notice from San Francisco, dated December 21, 1849, "outlawing" the sale of land in the city by Colton. (Beineke Rare Book & Manuscript Library, Yale University, New Haven, Conn.)

Archibald Peachey, a city attorney, was directed to institute legal proceedings against Colton and to restrain him from such "illegal and unwarrantable practices" (27) (Figure 4).

The city council adopted the following resolution on December 24, 1849: "Resolved, that the Town Council hereby declares all grants of town lots made and signed by G. Q. Colton, Justice of the Peace, void and of no effect, the same having been . . . illegally made" (27). Colton replied:

I received my commission as Justice of Peace from Mr. Hawes, Prefect of this district, about the first of November last. It was sent to Monterey and came back 'approved by the Governor' about the 15th of the same month, as near as I can recollect. . . . I made the grants, first because I believed, and still believe the law authorized me to make them. Second, because I believed, and still believe it the most equitable mode of distributing the public lands. Third, because I was instructed to make them by the Prefect (27).

Rather remarkably, Prefect Hawes then stated: "I never ordered Mr. Colton to make any grants of land, nor did I ever see his face to my recollection" (27).

Colton contended that the cases brought against him were abandoned before trial (3), but confusion continued to reign in San Francisco for some time

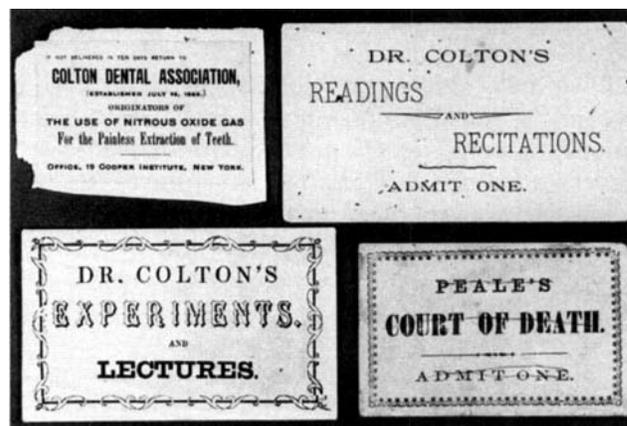


Figure 5. Artifacts belonging to Colton. Upper right is an entry ticket for Dr. Colton's Readings and Recitations; lower right is an admission ticket to Colton's exhibition of Rembrandt Peale's celebrated picture "The Court of Death," displayed by Colton at his shows in the 1840s; upper left is an address label for the Colton Dental Association; lower left is an admission ticket for Colton's Experiments and Lectures. (Courtesy of Mrs. R. Butler.)

afterward over the ownership of land titles known thereafter as the "Colton Grants" (28). Colton left California a rich man (5,29), and the record is blurred as to whether he ever made any accounts of the proceeds of lands sold by him.

After arriving home, Colton "floated about several years doing little or nothing." He spent one winter in Boston, writing paragraphs and reporting sermons for the *Boston Transcript*. Many authors have suggested that in his wanderings from town to town, Colton began to compile and publish a series of war maps that bear his name (1,5,29,30). However, in his copious writings, Colton never mentions this, and it is more likely that they were produced by a very distant relative, Joseph Hutchings Colton, who was world-renowned for the manufacture of maps, atlases, and school biographies (2).

About this time, Gardner invested much of his money in the ill-fated Salt Works of Syracuse. Having rapidly lost his investment, he resumed his lectures and laughing gas exhibitions (Figure 5). After Wells' death, the use of nitrous oxide for all anesthetic purposes had ceased; Colton was solely responsible for its reintroduction. Again, the exact details relating to events at this time are a little blurred. In one of his writings Colton comments that he was persuaded to administer nitrous oxide for dental surgery to a lady in New Britain, Connecticut, in the summer of 1862 (16). It is reputed that when Colton returned to New Britain in 1863, he found that the local dentist, later identified as Dr. R. C. Dunham (31), had subsequently administered the gas to more than 600 patients (16). Colton states that he and Dunham then

joined forces with another dentist, one Joseph H. Smith of New Haven, Connecticut, for 3 weeks in the summer of 1863 (16,32). In Colton's other writings his story is somewhat different (3,13,14,17,19). These other versions allege, for example, that in June 1863 Colton visited New Haven, Connecticut, for another of his exhibitions. He invited a number of gentlemen to attend a private preliminary entertainment at which he gave a history of the discovery of anesthesia, stating also that he had never been able to encourage a dentist to try the gas. A local dentist, Joseph H. Smith of Olive Street, New Haven, who was present, agreed to try the gas provided Colton administered it. The next day they extracted seven teeth from a well-known wealthy lady using nitrous oxide as the anesthetic. After the successful extractions the woman said, "Don't go, doctor; I want to give you my blessing!" She indicated that Colton could mention her name to his audience and state the fact that she had had seven teeth drawn, while under the gas, without any pain or unpleasant effects.

Colton then abandoned the "Exhibition" business and agreed on a partnership with Smith. Colton would provide and administer nitrous oxide for 1 week and Smith would extract the teeth. They were so successful that they continued for 23 days, during which time they extracted "a little over 3,000 teeth!" (17). Colton, ever an entrepreneur, writes:

Thinks I, this is a better business than lecturing, sometimes to a "beggarly account of empty boxes." . . . I at once determined to go to New York and establish an institution devoted exclusively to the extraction of teeth with the gas. The gas had laid dead and forgotten as an anaesthetic for seventeen years . . . when I revived it. . . . The world is indebted to me for the gas. . . . I opened my office in the Cooper Institute in July 1863, and called my institution "The Colton Dental Association" as my name had been so long identified with the gas (3).

By November 1863 Colton had associated himself with two eminent New York City dentists, Dr. John Allen and his son William, and they began to devote their time exclusively to the use of nitrous oxide for the extraction of teeth at the Colton Dental Association. The dental and medical professions declared, however, that the gas had been used years before without much success, and thus, initially, Colton and his colleagues were the target of ridicule, sarcasm, and misrepresentation. Month after month, their expenses exceeded their receipts and during the first year it is alleged that Colton spent \$8000 in advertising, advocating, and defending, "his invention" (6).

Gradually, business and support increased and over the next few years nearly all the leading dentists of New York sent patients requiring an anesthetic to Colton. According to *The New York Times*, his office was known to "seven out of every ten New Yorkers who had ever lost their sleep from troublesome grinders" (1). From the commencement of records on February 4, 1864, until 1897, more than 193,800 patients were recorded as having had nitrous oxide at the Colton Dental Association (Figure 6). The patients' ages ranged from 3 to 90 years, and there were apparently no fatalities (3). Colton claimed to use about 300 gallons a day at this time (14). In 1865 Colton used nitrous oxide during three surgical operations—a mastectomy and two limb amputations—performed by J. M. Carnochan (33).

Despite Colton's background in medicine and chemistry, and his unrivaled expertise in the administration of nitrous oxide, he remained unaware of the true chemical and physiological effects of the gas. This can be seen from his writings:

It is composed of precisely the same elements—oxygen and nitrogen—as the common air, only the proportions are different. . . . In this gas there is half oxygen and half nitrogen, or by volume, one of oxygen to two of nitrogen. Oxygen is the life-giving principle of the air, and in the gas *we have more of it*; a person *lives a little faster* while under its influence. . . . The laughing gas . . . [in contrast to chloroform and ether] . . . acts as an *exhilarant*, as by supplying an extra supply of oxygen to the lungs, the pulse is increased 15 to 20 beats to the minute (13).

Many critics contended that nitrous oxide produced insensibility from asphyxia, not anesthesia (34,35). In response to such criticism, Colton wrote:

Dr. Foster says: 'That it [nitrous oxide] cannot support respiration or life but a few moments, is seen in that frightful gasping of the patient, growing deeper and faster, as he dies for want of air.' *These symptoms never attend the operation where the quantity breathed from is large enough* (36).

and:

Dr. Richardson has probably only seen the gas given for exhilaration, where a two or three gallon bag was used. Now if anaesthesia is attempted by the use of such a bag, *the very result which Dr. Richardson describes will follow*. The oxygen—all that sustains life—will be absorbed before anaesthesia is produced. Nothing but nitrogen and carbonic acid remains in the bag, and these, if breathed, will produce asphyxia and insensibility. But let a bag of *eight gallons* of gas be used, and anaesthesia is reached *before* the oxygen is absorbed, and no such ill effects attend the operation (14).

administration of nitrous oxide gas, exhibited by Dr. J. Q. Colton of New York. It is but just to observe that through the efforts and researches of Dr. Colton, the attention of surgeons has already been directed to the protoxyde of azote or nitrous oxide gas. . . . Dr. Colton has reestablished by thousands of experiments the superiority of the protoxyde of nitrogen gas over other anaesthetics in Dental Surgery. . . . The gas has recently been employed with success in Paris under my own direction, in the gravest surgical operations (39).

On March 30, 1867, Evans visited London and, using Sprague's apparatus, gave demonstrations of nitrous oxide at the Dental Hospital and at Moorfield's Eye Hospital. The demonstrations were observed with interest but had a mixed reception in the *Lancet* and the *British Medical Journal* (40,41). Convinced of the utility of nitrous oxide, Evans offered the Dental Hospital £100 to be used for the purchase of apparatus and materials to manufacture the gas. The Odontological Society of Great Britain responded by forming a committee to investigate the anesthetic properties of nitrous oxide (42).

Colton, having returned to Paris from his trip around Europe, then traveled to London and on Friday June 5, addressed a meeting of medical and dental practitioners at the house of Mr. C. J. Fox, a dental practitioner (43). He then administered the gas to four patients with complete success and repeated his address 5 days later. Later, Fox went on to champion the cause of nitrous oxide in England. Colton returned home in 1868 and opened dental offices in St. Louis, Chicago, Brooklyn, Cincinnati, Boston, Baltimore, and Philadelphia, all of which operated simultaneously. Apparently, Colton did no extractions himself but hired competent dentists as associates (44).

From his first meeting with Wells, Colton continued to support Wells' claim to be the discoverer of anesthesia. In Colton's own words:

If I am remembered at all by posterity, it will be on account of my connection with the discovery of anaesthesia. I do not claim that the discovery originated in my mind, only that I was the *occasion* of the discovery, and that I gave the nitrous oxide gas for the *first* surgical operation where pain was destroyed (45).

Colton's determination that Wells should receive recognition for his discovery was reiterated at the 50th anniversary celebrations held on December 10, 1894, at a banquet at Habenstein's Cafe in Hartford under the auspices of the Connecticut State Dental Association (32). At the meeting, during which a tablet was unveiled in memory of Horace Wells, Colton retold the story of the discovery. At the

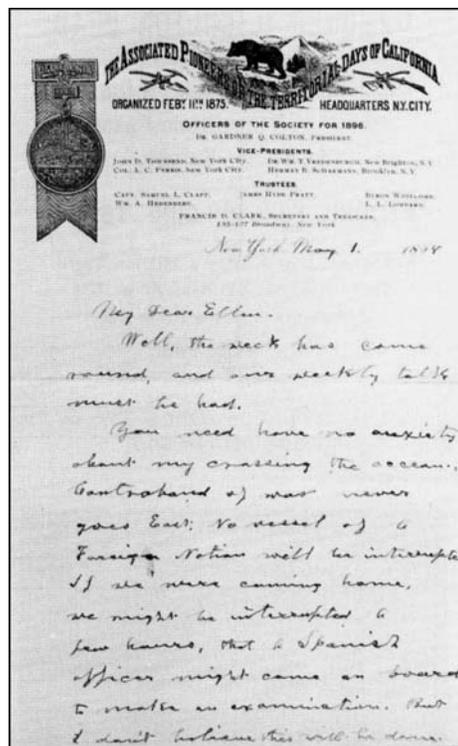


Figure 7. Letterhead of the "Associated Pioneers of the Territorial Days of California" indicating Colton as president of the Society in 1896. This letter was almost certainly the last written by Colton to his daughter Ellen. (Courtesy of Mrs. R. Butler.)

beginning of the meeting, an apology for absence was received from Samuel Cooley, the druggist's assistant who had banged his shin 50 years before and started the whole story of nitrous oxide.

Colton continued to practice dental anesthesia until, 4 years later, in 1898, he died while visiting Europe. In keeping with the confusion regarding the dates and events surrounding the introduction of nitrous oxide anesthesia, uncertainties have occurred in relation to Colton's death and his subsequent resting place. His obituaries (Figure 8) state that he died in Rotterdam (1,5,29,46) on August 9 (5,46) or August 12, 1898 (29). However, the Colton family records show that he died on August 10, 1898, in Geneva, Switzerland (personal communication, Mrs. R. Butler, Colton's great-granddaughter). Colton's body was returned to the United States where it was cremated and his ashes buried in the Aurora Hill plot of Woodlawn Cemetery in The Bronx, New York City (47) (Figure 9). To add further confusion, the interment register at Woodlawn indicates that Colton died in Germany (47).

Gardner Quincy Colton's life was varied in its extreme. To the activities already described one can add his interests in geology, circuses (he was a good friend of P. T. Barnum), and death. He was a devout

GARDNER Q. COLTON DEAD

The Dentist Responsible for the Discovery of Anaesthesia Passes Away in Europe.

RECORD FOR PULLING TEETH

Estimated that Nearly a Million Teeth Were Removed by Himself or His Assistants — Recognition for Dr. Horace Wells.

Figure 8. Announcement of Colton's death in *The New York Times* of Friday, August 12, 1898. (Copyright © 1898 by *The New York Times* Company. Reprinted by permission.)

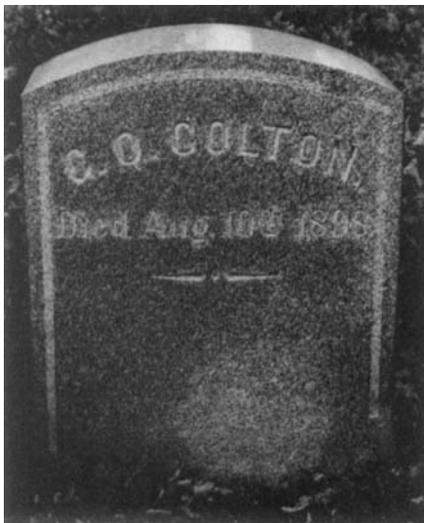


Figure 9. Colton's gravestone in the Aurora Hill plot of Woodlawn Cemetery, The Bronx, New York, N.Y.

Christian and a prolific author of many pamphlets, books, and letters on varied topics. However, without doubt, his great legacy to humanity has been the gift of nitrous oxide anesthesia. Without Colton, it is unclear if this agent would ever have found the position in modern anesthesia that it now holds.

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