

John Matthews Father of the Soda Fountain

by Donald Yates

Since the dawn of history, naturally carbonated mineral water has been bubbling out of springs and spas and tickling Man's curiosity. One of the many proclaimed benefits of some of these springs was their use as a cure for obesity; I would guess that if you drank enough, it could work!

Europe had world-famous soda water springs in England, France, and Germany. In the United States, thousands of springs and spas had also been developed into desirable destinations for the celebrated medicinal and healing attributes of their various waters. Saratoga Springs in Upstate New York had several artesian geysers which were naturally effervescent or bubbly. These were similar to the Old Faithful geyser, except they were continuously spouting, never taking a break.

Early scientific thinkers in Europe, like Paracelsus back in the 16th century and Lavoisier and Dr. Joseph Priestly in the 18th century, studied and experimented with these mineral waters. Lavoisier of France identified carbonic acid and stated that it was composed of carbon and oxygen. In 1772, Dr. Joseph Priestly first recognized that soda water was impregnated with carbonic acid gas; he also tried to use the aerated water to produce a cure for scurvy.

The next phase in the history of soda water was for Man to produce it artificially. Top scientists from many nations were trying to produce carbonated soda water, which would imitate the natural mineral waters and still be safe, palatable, and profitable.

The first attempts at manufacturing soda water was done by men named Thurneisser in 1560, Hoffman in 1685, and Geoffroy in 1724; their success was less than remarkable. Von Helmont in 1630 first explained carbonic acid gas. In 1750 progress was made and Venel produced carbonic acid by combining muriatic acid in a solution of carbonate of soda. Dr. Black, in 1757, isolated carbonic acid from all other gasses and called it "Fixed Air."

Similarly in the United States, Professor Benjamin Silliman of Yale University

began manufacturing and bottling small quantities of mineral water in New Haven Connecticut, in 1806. A few years later, in 1810, an early New York City soda fountain began dispensing various homemade Vichy, Kissingen, and Apollinaris seltzer waters for the thirsty public. The first carbonation patent in the U.S. was granted to Simmons and Rundell of Charleston, SC in 1810.

Acid + Marble = Soda

Englishman John Matthews sailed over the briny Atlantic waters to find his fortune with soda water in the United States. The greatest soda fountain development at the time of his arrival in 1832 was occurring in New York City. Like their European cousins, Americans had developed a great passion and thirst for mineral water. Spas had been built at many of the great springs, where many gladly paid for the opportunity to drink and bathe in the mineral waters.

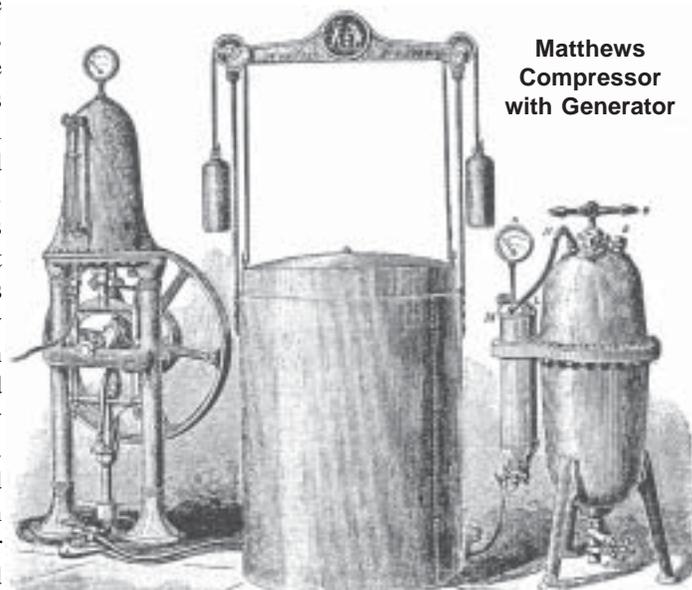
Taverns were very plentiful across the nation, serving rum, beer, and all manner of libations, but for the first time, John Matthews offered them some competition with his soda fountain. In addition to selling the air-charged waters to retail stores and drug stores, he also sold them full-sized soda fountains. He established his soda water manufacturing plant at 55 Gold Street, in New York City. His first equipment was quite simple: a cast iron box, lined with lead, where carbonic acid gas was formed by the chemical reaction of sulfuric acid on marble dust. (Sulfuric acid was called oil of vitriol at that time.) The gas was then purified by passing it through water, and transported into a tank partially filled with cool water. An employee rocked the tank for half an hour until the water became impregnated

with the gas and was bubbly. Salts were then added to imitate the popular mineral waters of the world.

The introduction of marble dust was an American invention. A man named Bramah had used whiting and chalk – calcium carbonate in Europe – but marble was easier and cheaper to acquire in New York City. At one point, the enterprising John Matthews acquired all of the scrap marble from the construction of St. Patrick's Cathedral in New York City for use in his soda fountain factory. As might be expected, some of the church's faithful complained about Matthews' use of the marble. Undaunted by their objections, Matthews' factory created about twenty-five million gallons of soda water before the supply of marble remnants from the cathedral ran out.

One of the most common hazards in the creation of carbonated water in those early days was the high pressure created in the generator and in the bottles and siphons. Explosions were, of course, not desired, and several of John's competitors had bottle and siphon explosions. The Matthews Soda Fountain Company, however, had a special, unique device for preventing the pressure in the fountain from exceeding the desired 150 pounds per square inch (PSI).

The safety valve was provided by an ex-slave named Ben Austen, one of Matthews' earliest employees. Austen was a man of intelligence and, above all, strength. When the force of a new batch of soda water needed to be measured, the job fell to Ben, who simply placed his powerful thumb over the pressure cock. When it blew his thumb away, the Matthews people estimated that they had reached 150 PSI and that the water



Matthews
Compressor
with Generator

was fully charged. "Ben's Thumb" was long a term in the jargon of the soda fountain trade. During the Civil War draft riots, when angry Irish mobs roamed the New York streets seeking to hang any Negro they could find, John Matthews was obliged to ship Ben out to safety in a packing case, as though he was a charging cylinder of the product.

Water, Water Everywhere

The manufacture of soda water required a pure source of water, since it was to become a beverage. The water must be selected with great care and purified with equal thoroughness. The ideal water source for this soda water should come from a deep, cool, sparkling well, in a good location, without contamination.

Cool spring water could also be used as a source of soda water. The spring water had to be filtered to achieve an acceptable degree of purity. As rain water falls on the earth's surface, it absorbs the soluble particles found there, and gradually becomes more and more contaminated, percolating through the different layers of the ground and dissolving out mineral compounds found locally. Due to these dissolved compounds, these waters were called "Natural Mineral Waters."

Carbonic Acid Gas

Carbonic acid gas is the most important ingredient in the manufacture of soda water, besides pure water. All effervescent drinks depend for their refreshing attributes, their sparking, prickling and excellent taste, on the carbonic acid gas incorporated into them. Carbonic acid gas must be perfectly pure, free from air, and should not contain

any disagreeable odors, such as sulfur compounds.

An ideal gas pressure for glass bottles is 45 PSI. Higher pressures present no advantage and are dangerous to the apparatus and the bottles. Siphons are pressurized to 130 PSI.

Carbonic acid gas was obtained by combining ground marble dust with sulfuric acid. The gas was then collected and purified by passing it up through a column of water. Chemical purification such as bicarbonate of soda was also very effective.

A Frenchman's Revolutionary Idea

A dramatic soda water development to stimulate business was created in the shop of a Pennsylvanian perfumer in 1838. Frenchman Eugene Roussel, was selling plain soda water at his perfume shop in Philadelphia. With the ingenuity that characterizes Frenchmen when dealing with the opposite sex, Roussel decided to add flavors to his customer's drinks. Voilà! Despite the enormous interest in and competition over soda water business, no one had thought of flavored soda water until then – and just like that the soda industry experienced its own French Revolution!

Soon the crude soda fountains of Matthews and his competitors were now keeping on hand many syrup flavors such as Orange, Cherry, Lemon, Ginger, Peach, and Teaberry. If you remember the Teaberry Shuffle, then you are definitely interested in American history. "The Teaberry Shuffle" was a song and dance promoted by the Adams Chewing Gum Company. According to the advertisements, after popping the gum in your mouth you would get so excited by the exhilarating teaberry flavor that you were supposed to spontaneously and uncontrollably start dancing the Teaberry Shuffle! Teaberry is also known as Wintergreen and Checker Berries; it is also the predominant flavor in root beer. Chemically it is methyl salicylate, but root beer clearly sounds much more delicious! Root Beer, Birch Beer, and Sarsaparilla Beer also made their appearance as carbonated soda flavors and were available in bottles or made at the store's soda fountain.

Attempts were made to imitate the flavors of wine and mead, but were not very successful. Ginger was probably the most important flavor. Brewed Ginger Beer was the most popular small beer from England for over two hundred years. The early soda

fountains had a spigot for both Ginger Beer and Ginger Ale. There were international Ginger Ale competitions, often with medals given as prizes. You may remember the unique flavors of Canada Dry Ginger Ale and Verner's Ginger Ale.

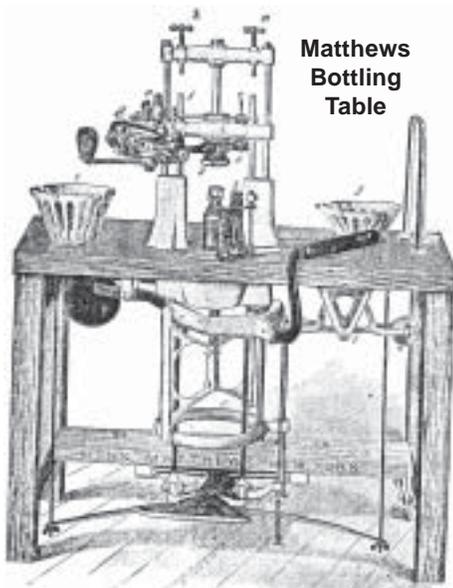
Generations of Generators

In the first half of the nineteenth century, carbonated gas was manufactured in the U.S. by a standard array of machinery that consisted of a *vertical carbonate feeding generator*, in which the gas was produced under moderate pressure; a large, round *cylindrical iron gasometer*, into which the gas was received, and a *beverage carbonating compressor*, which pushed the carbonic acid gas and the liquid into a condenser, where they were thoroughly mixed. From the condenser the carbonate was drawn to furnish the bottling machines or siphon fillers. Steam power was desired to operate the carbonating compressor.

The Matthews Generator – Matthews improved on the manufacture of soda-making with a generator of his own design. This machinery consisted of two horizontal acid feeding generators to produce the gas, three stationary fountains, and a force pump for injecting the fountains with liquid, when they were charged with carbonic acid gas. Its operation was almost continuous because each generator was operated independently of the other. The generators and fountains were made of gun metal iron and tested to 500 PSI.

Heading toward the end of the century, several strong competitors to Matthews entered the soda fountain market: John Lippincott of Philadelphia; A. D. Puffer of Boston; and James W. Tufts of Somerville, Massachusetts. (The Tufts Arctic Soda Fountain prospered quickly and they purchased prime land in North Carolina. This was the famous Pinehurst Country Club, which was originally developed to treat patients with tuberculosis.) Each man had his own favored design of carbonation generator:

The Lippincott Generator – The Lippincott equipment consisted of two generators at each end, and three stationary fountains, constructed of copper. The generator was acid-proof with a lead lining. The fountains were sanitary with a tin lining. The purifiers were controlled at the sides of the generators. The agitators were operated with wheel cranks manually and also to start the agitators before shifting the



belt for automatic operation. There was a gas bell on top of the generator into which the gas rose and to which the pipes and safety relief valves were attached. This would preclude the blocking of the pipes by the foaming of the carbonate. The acid valve was raised and locked by a wheel and screw conveniently located near the operator.

Puffer's Generator – This gas generator consisted of two generators and three cylinders, with two sediment traps, two gas domes, two automatic valves, one patent regulating valve, and a double acting pressure pump. Each valve could be set to take the gas from the generator, which was charged to 200 PSI. This was the proper pressure for charging soda water fountains.

Tuft's Generator – The Tuft's gas generator consisted of two generators with three purifiers at the side, an equalizing valve, three cylinders with water gauges, a pressure gauge, and an injection pump. Gas was developed in the normal manner in one of the generators, and the desired volume of water was pumped into the cylinders. The equalizing valve of the first generator was set at the proper pressure by means of the pressure gauge.

In 1891, Tuft's Arctic Soda Fountain Company consolidated with A. D. Puffer and Sons of Boston, John Matthews of New York and Charles Lippincott of Philadelphia into THE AMERICAN SODA FOUNTAIN COMPANY. James W. Tufts was the President.

The Centennial Exhibition was held in Philadelphia in 1876. On display were the latest inventions, gadgets and machinery. There was a Corliss Steam Engine huffing and puffing that was larger than a residential home. If you carefully looked

around, you would have discovered a Tufts Artic Soda Fountain. James Tufts and Charles Lippincott paid \$50,000 for exclusive rights to sell soda pop and ice cream sodas. They displayed an ornate, thirty foot high soda fountain. It was fabricated from different colored marble, and had elaborate spigots, a hanging chandelier and hanging ferns.

Bottling Machinery

In the late 1880s the process of bottling carbonated beverages was almost universally performed by means of a bottling apparatus that made the bottling process much more cost-effective. The filling machine could be conveniently located near the bottling machine by simply increasing the length of the soda pipe. This connecting pipe was best manufactured from pure tin for sanitary considerations. On American bottling machines, the unit was attached by a flexible rubber hose, which needed to be of high quality to withstand the bottling pressure.

The Matthews filling machine was used for bottling with corks. It had a syrup gauge attached to the cork gauge, allowing all of the corks to be driven in uniformly and to the proper depth into the neck of each bottle. When the cork was well in, the bottling ledge could be raised enough to permit the cork to be properly secured with the cork swing fastener.

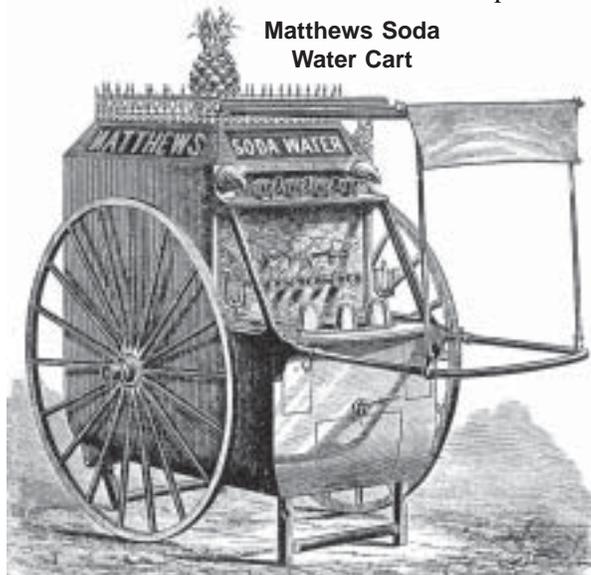
Syrup tanks were the necessary reservoir units of the bottling machine. They contained the ready-made flavored syrup which fed the syrup pump and was intended for flavoring the carbonated water. It was required, where different beverages by continuous bottling processes were being produced, to have each kind of flavored

syrup in a separate syrup tank, which could be immediately connected with the syrup gauge and bottling machine. The tanks were usually constructed of tin-lined copper.

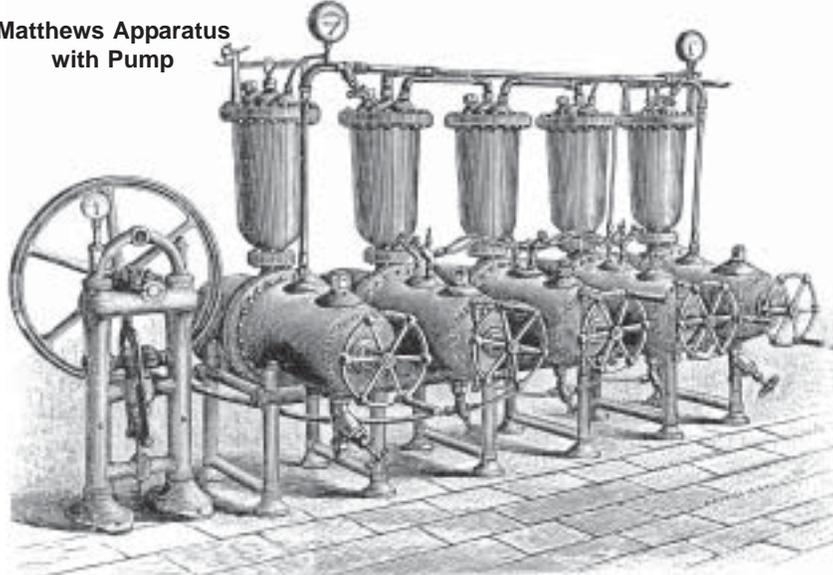
Typical 1880 Soda Bottling

From a period instruction manual comes this step-by-step procedure for filling soda bottles:

- After the bottling machine is properly charged, the syrup is ready, and the bottling machine is in order, also after the corks have been previously well prepared according to the instructions for corks.
- Place the bottle in the filler rack and press down the foot pedal until the filling head is firmly on the mouth of the bottle...
- With your right hand, raise the hand lever, and grab a cork with your left hand, and place it evenly in the cylinder. Drive the cork about half way through the filling head and hold it there in order to close the mouth of the cylinder tightly.
- With your left hand on the syrup gauge lever, make a single stroke, holding open until the bottle fills, thus injecting the required amount of syrup into the glass bottle and allowing it to be filled with soda pop.
- The syrup gauge is pre-set to gauge exactly the required amount of syrup. Then push back the gauge lever and drive the cork into the bottle with the hand lever.
- Release the foot pedal sufficiently, allowing the bottling cylinder to rise, meanwhile holding down the cork with your hand, and put the wire bail securely over the cork.



Matthews Soda Water Cart



Matthews Apparatus with Pump

- Remove your foot from the pedal and you can remove your filled bottle from the filling machine.

American Soda Fountains

Where large stationary counters were established, soda fountains were directly connected with the required generating equipment. It was highly recommended that a special carbonating unit be installed. It would have had two stationary fountains with agitators.

Dispensing fountains were quite adapted for populous places of resort, in the main thoroughfare, or where traffic was great. Ideal locations included major cities, sea shores, amusement parks, and railway stations. Summer boardwalks were ideal. The demand for soda water was greatest during the summer. Cooling the soda drink with ice was a new innovation that contributed to the soda business boom.

Some of the most delicious drinks were supplied by means of these fountains. The typical fountain might have a half-dozen tumblers that could be washed quickly and reused. They were simply rinsed in cold water because no one understood about bacteria at the time. Large profits were the result of repeat customers who craved the sweet bubbly beverages. Since the demand for non-intoxicating drinks was so much on the increase, the opportunity to cash in on the temperance-minded public was perfect for shops and drug stores with a good counter trade that were willing to give the soda fountain experiment a trial. It was one of the most beneficial additions to an existing business – such as an apothecary shop, candy store, hotel, or café – being ornamental and at the same time profitable. The experiment entailed no risk beyond the purchase of the apparatus, because soft drinks were not subjected to excise tax.

Portable Fountains

When a portable cylinder was employed instead of stationary carbonating apparatus, it was attached by its connections to the draught machine and then was ready for use, remaining in its position until empty, when it would be replaced by a full cylinder. These portable cylinders were always fabricated to be strong, testing to twice the working pressure.

Fancy Fountains and Final Monument

For a reasonable amount of capital, John Matthews had enabled any druggist or other

entrepreneur to get into the soda business. Others took the Matthews model and developed it into a fine art. The master of the dramatic, eye-catching soda fountain was G. D. Dows, of Lowell, Massachusetts, who tried to improve the appearance of the crude soda fountain in his brother's store and wound up with a combination fountain and ice shaver housed in white Italian marble. This new fountain quickly became so popular that Dows opened his own marble shop in Boston.

This first marble fountain was called the "Cottage Fountain" and took over the industry. It was basically constructed of boxes resting on a counter and they ran the full range of design. Popular styles included Gothic, Roman, Byzantine, Egyptian, and in any combination. They were given names like: The Frost King, The Ice Floe, the Egyptian, and The Cathedral.

Ornate spigots projected out of tombs and temples and chalets decorated with sphinxes, lions, nymphs, and knights. The

names of famous mineral waters would appear on the larger models. Some of the springs included Saratoga, Deep Rock, Kissingen, and Washington.

John Matthews died in 1870 and is buried in the Greenwood Cemetery in Brooklyn, New York. His marble grave site has an ornate Gothic architectural monument with carved illustrations showing different activities throughout his life. Ironically, this elaborate edifice is slowly dissolving in the sulfuric acid rains that soak the marble – the destruction of his grave is undergoing the same process that made him a soda water giant in life.

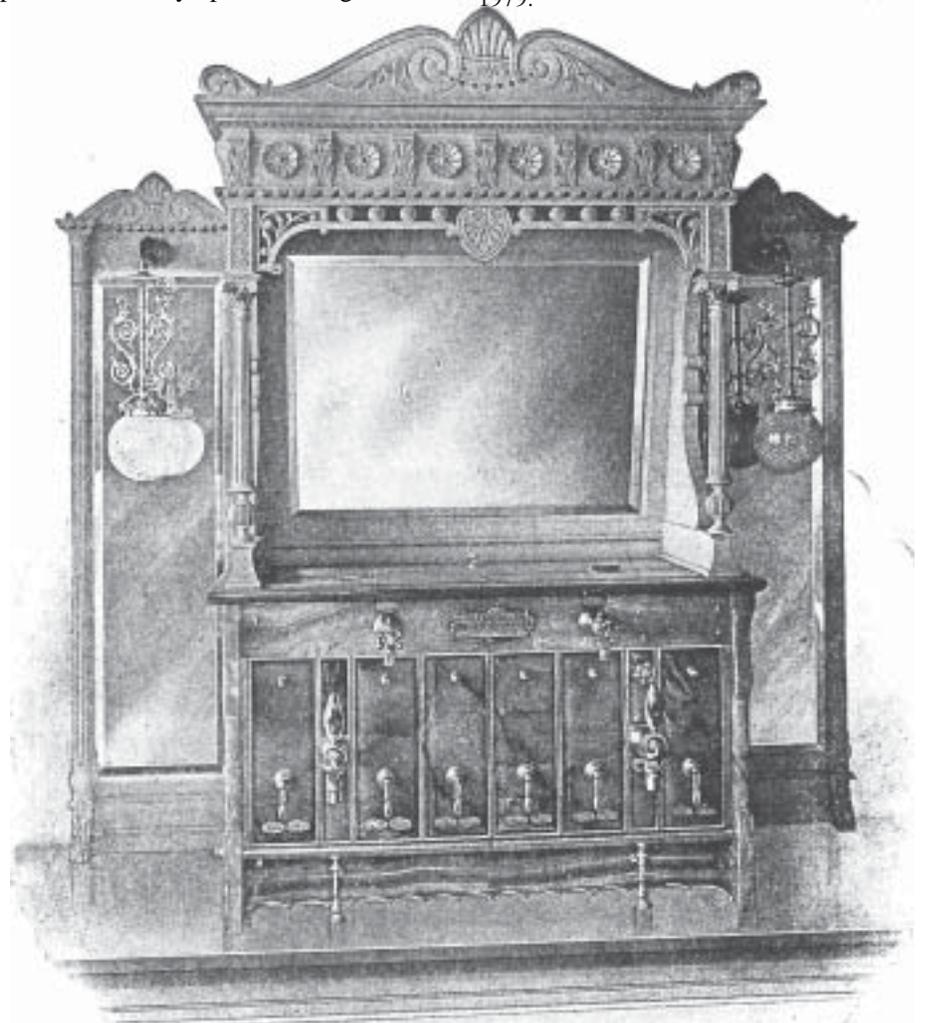
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Druggists Circular; New York; June 1902.

Joseph L. Morrison, "The Soda Fountain," *American Heritage Magazine*, August, 1962.

Audrey Moriarty, *Pinehurst Beginnings*, 1979.



1890 ad showing a Matthews Soda Fountain.

Ad reads: "The apparatus above illustrated is made at our Matthews factory and all correspondence relating to this construction should be addressed to the American Soda Fountain Company, 449 First Avenue, New York City, N.Y."