“a curious medley of well-filled phials of medicines”

1721 - 1822

He had a large practice, and was a perfect type of the country doctor of olden time. He made his daily tour of professional visits, through the town and surrounding country, on horseback. When in the saddle, he wore a pair of felt leggings to prevent his trousers from being soiled by the mud or dust of the road. In their accustomed place he carried the ever-memorable saddle-bags, which, when opened at the bedside of the sick, revealed a curious medley of well-filled phials of medicines, various instruments, and other paraphernalia of his profession.

A Necrology of the Physicians of Lowell and Vicinity, 1826-1898, by David N. Patterson, M. D. (1899) from the chapter about Dr. Amos Bradley (1762 - 1817)

This second article in the series discusses people’s lives and their health in and around what was called Wamesit Neck and East Chelmsford from 1726, the year that Wamesit was annexed to Chelmsford, to 1822, the year of the arrival of the workers who built the mills and the canals and the first doctor who treated them. This span of time encompasses the latter decades of the Colonial era, the years of the American Revolution, and the first decades of the United States.

Before discussing this specific area during this period, it is helpful to briefly mention a few more widespread events in the Colonies. While neither gold, nor the Northwest Passage, nor any other relatively easy path to riches was found by the French, English, and Spanish in North America, it did not stop them from wanting to expand their empires into the continent. Between 1689 and 1763 this section of the world became a whole new theater for more geographically widespread wars between the European powers: King William's War (1689 - 1697), Queen Anne's War (1702 - 1713), King George's War (1744 - 1748), and the French and Indian War (1754 - 1763) were North American theaters for the War of the League of Augsburg, the War of Spanish Succession, the War of Austrian Succession, and the Seven Years War, respectively. For 32 of the 74 years
between 1689 and 1763 (43% of the time) wars within larger wars were taking place in North America.

These wars also negatively affected the Indians and damaged both intertribal relations and the relations between the Indians and the Colonists. While the majority of the Indian tribes allied with the French during these wars, many tribes remained neutral, others allied with the English, and some shifted allegiances in their attempts to survive.

In addition to these wars and wars within wars, England, then beginning in 1707 Great Britain, went through periods of internal strife including the English Civil War, the execution of Charles I, the English Interregnum, and the Glorious Revolution. Along with foreign wars and internal wars, England/Great Britain struggled with how to govern or rule the American Colonies.

While doing the research for this chapter, I was reading the encyclopedic 1020-page *History of Chelmsford* by Reverend Wilson Waters (1917), and I saw a two-page “Map of Chelmsford in 1794.” The handwritten features labeled on the map included sawmills, gristmills, an iron works and trip hammer, a clothiers’ mill, bridges, canals, roads, and six surrounding towns. This conflicted with the narratives of Nathan Appleton in *Introduction of the Power Loom and Origin of Lowell* (1858) and Reverend Henry A. Miles in *Lowell, As It Was, And As It Is* (1845) that I had read earlier.

I also read a number of old and modern historical accounts of this period that imply that the inhabitants of this area were eking out a meager subsistence from the land when a few enterprising souls looked to mills as an easier way of life than farming. As will be discussed below, this is not how I came to see this period of our history.

The first census of the United States in 1790 listed a total population for Massachusetts of 378,787. According to this census, Chelmsford had 209 families and a total population of 1,144. The populations for the six surrounding towns listed on the 1794 map (Billerica, Carlisle, Dracut, and Tewksbury, Tyngsborough, and Westford) are listed in the table below.
Table: The 1790 population of Chelmsford and surrounding towns

<table>
<thead>
<tr>
<th></th>
<th>Number of houses</th>
<th>Number of families</th>
<th>Free white males &gt; 16</th>
<th>Free white males &lt; 16</th>
<th>Free white females</th>
<th>All other persons</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chelmsford</td>
<td>......</td>
<td>209</td>
<td>327</td>
<td>233</td>
<td>572</td>
<td>12</td>
<td>1,144</td>
</tr>
<tr>
<td>Billerica</td>
<td>......</td>
<td>217</td>
<td>335</td>
<td>256</td>
<td>595</td>
<td>5</td>
<td>1,191</td>
</tr>
<tr>
<td>Carlisle</td>
<td>......</td>
<td>96</td>
<td>149</td>
<td>99</td>
<td>305</td>
<td>2</td>
<td>555</td>
</tr>
<tr>
<td>Dracut</td>
<td>160</td>
<td>186</td>
<td>310</td>
<td>284</td>
<td>584</td>
<td>39</td>
<td>1,217</td>
</tr>
<tr>
<td>Tewksbury</td>
<td>......</td>
<td>163</td>
<td>239</td>
<td>229</td>
<td>483</td>
<td>7</td>
<td>958</td>
</tr>
<tr>
<td>Tyngsborough on north side of Merrimack</td>
<td>26</td>
<td>32</td>
<td>43</td>
<td>50</td>
<td>87</td>
<td>......</td>
<td>180</td>
</tr>
<tr>
<td>Tyngsborough on south side of Merrimack</td>
<td>31</td>
<td>35</td>
<td>52</td>
<td>46</td>
<td>87</td>
<td>17</td>
<td>202</td>
</tr>
<tr>
<td>Westford</td>
<td>......</td>
<td>220</td>
<td>301</td>
<td>306</td>
<td>618</td>
<td>4</td>
<td>1,229</td>
</tr>
<tr>
<td>Column totals</td>
<td>1,158</td>
<td>1,756</td>
<td>1,503</td>
<td>3,331</td>
<td>86</td>
<td>6,676</td>
<td></td>
</tr>
</tbody>
</table>

As mentioned on the map, it was 11 miles to the county court house in Concord. In 1790, Concord had 293 families and a total population of 1,590. This was approximately the same population as Charlestown (1,583) and three-quarters the size of Cambridge (2,115).

At this time Boston was the third largest city in the U.S. with a population of 18,320. Roxbury, Dorchester, and Charlestown were incorporated as towns and were not part of
Boston at this time. Brighton, West Roxbury, Hyde Park, and other sections of today’s Boston were parts of other towns. Boston grew geographically over the decades by annexing and landfill, but at this time was only approximately five percent of the Massachusetts population.

As a port, Boston had significance beyond just population numbers; however, the numbers show that there was considerable human activity outside of Boston. The other major population centers included Salem (7,921), Marblehead (5,661), Gloucester (5,317), Newburyport (4,837), Sherburne (4,620; in 1795 Sherburne became Nantucket), and Middleborough (4,526). Boston and these other six cities and towns were among the 24 largest in the U.S. in 1790 when the total population was 3,929,214.

This chapter is divided into three major sections: the area, the people, and the health and medicine of the period. A major theme for this chapter is that as the Indians paved the way for the first European settlers; then the early settlers and subsequent generations of their descendants, as well as new immigrants, paved the way for the later developments. In addition to establishing farms, early residents of this area were fighting wars, both with and against Great Britain, and building mills, roads, quarries, bridges, churches, courts, schools, and other infrastructure.

Part 1 - The area

“a sup of New England’s aire”

And therefore I think it is a wise course for al cold complections to come to take physic in New England, for a sup of New England’s aire is better than a whole draught of Old England’s ale.

Reverend Francis Higginson, 1629

Between 1635, when Simon Willard and others followed the Concord and Merrimack Rivers into today’s New Hampshire, and 1726, when Wamesit was annexed to Chelmsford, the area of today’s Lowell went from being an Indian community with no Europeans to being the eastern section of a town of European settlers with few or no Indians. The Indians were doing quite well here before the arrival of the Europeans and the Europeans seemed to do quite well here in the ensuing decades. All this in a climate
that seems far from ideal, with a short growing season, without the best soils for agriculture, and without many natural resources of great commercial value.

In thinking about what was and was not present in the environment, being a New Englander, of course I thought about the weather and climate. That was certainly part of the story. The Europeans adapted well to the four seasons with their advantages and disadvantages. The annual cycle of wet springs, hot summers, cool autumns, and cold winters were not always perfect, but were salubrious in many ways. With the addition of a lot of hard work and ingenuity, it was a relatively healthy time and area.

Credit must also be given to the Indians for the Europeans’ successful adjustment. It is ironic that, despite the sufferings inflicted on each other, the settlers benefitted greatly from having the Indians here before them. Successful Indian technologies and practices caused the environment to be welcoming and many could be adopted and adapted by the settlers. This does not mean that the settlers became like Indians. There was a huge shift in the way that the environment was treated. At the same time it is important to acknowledge that the settlers did not enter an uninhabited wilderness, nor did they wipe the slate clean and start from scratch.

One major shift was from the direct consumption of the Indians to a less direct consumption for the settlers. The Indians hunted and fished for their protein and consumed grains, beans, and vegetables that were cultivated or gathered. The settlers did some hunting and fishing, but relied more on domesticated animals for protein. This meant that many of their crops were fed to animals and then the animals (cattle/cows, chicken, pigs) and their products (milk, eggs) were consumed. Because energy is lost every time it is transferred from one form to another, more and more land was needed for feed and grazing.

As Reverend Francis Higginson’s quote at the beginning of this section attests, the English anatomy and physiology was a good fit for the area. Centuries later, Oliver Wendell Holmes agreed,

Let us now take a general glance at some of the conditions of the early settlers; and first, as to the healthfulness of the climate. The mortality of the season that followed the landing of the Pilgrims at Plymouth has been sufficiently accounted for. After this, the colonists seem to have found the new country agreeing very well with their English constitutions. Its clear air
is the subject of eulogy. Its dainty springs of sweet water are praised not only by Higginson and Wood, but even the mischievous Morton says, that for its delicate waters “Canaan came not near this country.”

*Oliver Wendell Holmes*

It was in many ways a good “Person-Environment Fit” though not in the way used today in organizational psychology. It was “people” not just “person” and the word “environment” alone did not tell the whole story. It was not only climate, topography, geography, soil, water, etc., it was everything in the area; all the right elements in the right balance. It was the elements in the Periodic Table, but it was also the four classical elements; earth, water, air, and fire.

In thinking about the classical elements I also thought about their relation to the four humors; earth to black bile, water to phlegm, air to blood, and fire to yellow bile. Maybe humoral theory was right, not about the internal health of humans and certainly not for the “treatments” of bleeding, blistering, and purging, but maybe about a balance in a healthy environment for humans.

While researching (i.e., Googling) some concepts of “elements,” I found a 2011 article on “the four elements of modern chemistry”: food, energy, water, and climate, by Javier Garcia Martinez It seems to me that food, energy, water, and climate came together here to create a healthy environment where the Indians, then the Europeans could survive and even thrive. For this discussion, I renamed Martinez’s elements “the four elements of successful colonization.” The Europeans found an area that had these elements in sufficient quantities and balance. It was a lot of work to put them to good use, but they were present.

*Food*

Of all the grain which we plant, the Indian corn is attended with the greatest labour, is the most profitable, and the most necessary, but at the same time the most subject to accidents from seasons, insects, birds, and animals. It is so superlative a grain that all that live would cheerfully live on that grain if they could. Necessity hath taught us different methods to protect it and to baffle the combined sagacities of so many enemies.

*J. Hector St. John de Crèvecoeur, 1782*
The first of the four elements of successful colonization is food. The New England climate, soil, and similarities to English agriculture limited the opportunity for agricultural exports to England. The climate and soil also meant that New England would not be able to subsist by growing only one or two crops, which might have created more of a plantation system. Instead of one or two lucrative crops, like tobacco and cotton in the South or sugarcane throughout the Caribbean, a diversity of crops was grown.

Survival was not easy, but the colonists were, ready, willing, and able to succeed. Their previous knowledge and skills in agriculture and animal husbandry could be applied successfully and could be adapted as needed. Adding to this, the presence of cultivated Indian crops and already cleared land were put to immediate and good use. Wild foods were obtainable at certain times of the year, and opportunities for hunting and fishing were close by.

The preeminent crop grew wild in New England and could be cultivated as well. The key crop for survival, health, and wellbeing in the New World was hay. There was salt marsh hay and meadows with grasses to provide food for cattle, which were the key domesticated animals. Cattle brought from English were preadapted to New England and the English already knew about the care, breeding, and effective use of these animals.

Thinking about hay, I was reminded of the burning of a haystack belonging to Lieutenant James Richardson of Chelmsford (mentioned in Chapter 1) by some “skulking” Indians who were very likely not from Wamesit. This burning would not have been considered a prank or inconvenience by the people of the town, but an attack on an essential commodity.

Hay was a key crop and a key to health and survival even though it is not directly consumed by humans. Hay was food for cattle, horses, and sheep. In turn, female cattle provided milk, butter, and cheese, and the males provided meat and energy. Both provided leather for clothing and other items. Cattle were not the main source of meat, protein, or clothing, but cows and oxen played critical roles. The availability of hay allowed these animals to eat year-round.

The cows provided milk that was used in baking and rarely as a beverage, made into butter, which kept longer than milk, and made into cheese, which kept even longer.
Oxen were the farm machinery of the day and pulled plows, removed stumps and stones from fields, and hauled logs and other freight. They were of course strong, but also were controllable by an experienced handler, and intelligent enough to understand and obey commands for go, left, right, stop, and back up.

Sheep also did well in the New World and were kept primarily for wool clothing and blankets, and also for food. Sheep could graze in the field and meadows and live on hay and other stored plant materials in the winter. Linen made from flax, which was grown on some farms, was also made into cloth.

Pigs were also brought over from the Old World and did very well in New England. They were social and intelligent and were very good at finding their own food. Pigs needed plenty of water to thrive and there was plenty available. They were a low-maintenance source of protein and calories, could be slaughtered year-round, and the meat could be preserved by salting and smoking.

Old World chickens also did well in the New World. They provided meat, eggs, and feathers for bedding. Some farms also had domestic geese, which were brought from the Old World and provided meat, eggs, and down feathers. Wild geese were already present in the New World.

Goats and donkeys were also brought to the New World and were present on some farms. Mules became important after the Revolution, but mainly in the South. Oxen and horses remained the draft animals of choice in the North.

Overall the colonists were able to bring domesticated animals to the New World with which they were already familiar and these animals were already adapted to the climate. There was also plenty of food and water to support ever-increasing populations of these animals and the humans who needed them for survival.

Colonists grew, gathered, and ate New World food crops including maize, beans, blueberries, cranberries, pumpkins, squashes, strawberries, and tomatoes, and Old World food crops including apples, rye, barley, and oats. The key New World foods were maize, beans, and squashes including pumpkins. The key Old World foods were apples and rye.

Maize, or Indian corn, or simply corn was the most important crop in this area. In Crèvecoeur’s quote above it was the “most necessary” and “superlative.” It was usually dried and pounded or ground into cornmeal. In many early references to cornmeal was called
“indian.” Wheat from the Old World did not grow well in this area, but rye did. Colonists found that cornmeal combined with rye in a two-to-one ratio made an even better bread, so rye became an important grain.

Apples were brought to North America by colonists in the 17th century; the only apples native to North America are crab apples. Saplings and seeds were brought over by the earliest settlers from England. Johnny Appleseed (John Chapman) came much later. He was born in 1774 and established apple orchards in Pennsylvania, Ohio, Indiana, and Illinois. Individual farms often had apple trees and many orchards were established. Apples were used for eating and baking, but their most important use was as cider, which we now call hard cider as it was usually fermented before drinking. With a 10% alcohol content, hard cider could be stored for longer periods of time.

Throughout this period, hunger and starvation were not widespread problems in this area. In addition, there were few diet deficiency diseases such as scurvy after the first Pilgrim winter in 1620. When there were diet deficiency diseases they were present only for short periods before needed foods were available and victims recovered.

Energy

For wood there is no better in the world I think there being foure sorts of oke differing both in the leafe, timber, and colour, all excellent good. There is also good ash, elme, willow, birch, beech, saxafiras, juniper, cipres, cedar, spruce, pines, and firre that will yield abundance of turpentine, pitch, tarre, masts, and other materials for building both of ships and houses.

Reverend Francis Higginson, 1629

Wood, our common fuel, which within these hundred years might be had at every man’s door, must now be fetched near one hundred miles to some towns, and makes a very considerable article in the expense of families.

Benjamin Franklin, 1745

The second of the four elements of successful colonization is energy. There was abundant energy available in the forms of wood for heat, fuel, and cooking, water for fuel in the mills, and hay for oxen and horses. This does not mean that these forms of energy were easy to access and use, just that they were available in sufficient quantities. Also, the colonists already knew how to use them, and with hard work and adaptations, they did.
As mentioned above, oxen were the farm machinery of the day and hay was the gasoline. Horses were also energy and transportation; however, though much faster than oxen, horses were not as strong and could be more difficult to control. The number of horses in colonial America was small early on, but increased rapidly through the eighteenth century.

Water was the source of energy for the early mills in Chelmsford and East Chelmsford during this period. There were a number of sawmills, gristmills, mills related to textile production, and an iron works and trip hammer that played important roles in the inhabitants’ lives well before Lowell was Lowell. Water-powered mills are mentioned here because water was a significant source of energy in the development of the area in this period; however, the mills themselves will be discussed in more detail in Part 2 of this chapter.

For the first century after the arrival of the Pilgrims and Puritans there was plenty of trees and plenty of wood. The early immigrants came from a part of the world where wood was in short supply and coal was in widespread use. Because of the availability of wood and the locations of large coal deposits further inland, coal took a while to become the fuel of choice in America.

In addition to providing materials for houses, barns, and buildings, the trees of the New World supplied tannin for tanning leather hides, potash for making glass, soap, and bleaches for textiles, pitch, tar and resin for shipbuilding and maintenance (i.e., naval stores), and masts, sprits, yards, booms, and other parts of ships. These wood products were used in the New World and exported to other countries. These all could have been all good uses of a renewable resource; however, the use of wood for heating and cooking during this period was not sustainable.

According to Benjamin Franklin in 1745,

In these northern colonies the inhabitants keep fires to sit by generally seven months in the year; that is, from the beginning of October, to the end of April; and, in some winters, near eight months, by taking in part of September and May.

Wood, our common fuel, which within these hundred years might be had at every man’s door, must now be fetched near one hundred miles to some towns, and makes a very considerable article in the expense of families.
As therefore so much of the comfort and conveniency of our lives, for so great a part of the year, depends on the article of fire; since fuel is become so expensive, and (as the country is more cleared and settled) will of course grow scarcer and dearer . . .

Benjamin Franklin

The average family in New England burned 30 to 40 cords of wood per year, which is approximately the amount on one acre of forest. A cord is four feet high by four feet wide by eight feet long, so the amount needed by one family for one year would be a four-foot high and four-foot wide woodpile more or less the length of a football field.

In most of the Colonial era the wood was burned in fireplaces, where only 20% of the energy produced warmed the house while 80% went up the chimney. The “Pennsylvanian Fire-Place” now known as the Franklin Stove, once Franklin’s design was improved by David Rittenhouse, Count Rumford and others, improved the efficiency of burning wood, but the supply had already been greatly depleted. In Franklin’s words, which is an extension of the quote above,

. . . any new proposal for saving the wood, and for lessening the charge, and augmenting the benefit of fire, by some particular method of making and managing it, may at least be thought worth consideration. The new fireplaces are a late invention to that purpose . . .

Benjamin Franklin

It seems here that Franklin knew there was a big problem, designed a way to mitigate the problem, but knew his design was late coming and not a long-term solution. These stoves did save trees, however, because even though coal use was increasing, it was not until 1885 that the United States burned more coal than wood.

In terms of numbers of cords of wood and acres of woodland consumed for heating homes, Thomas L. Purvis in Colonial America To 1763 presented a table that estimated that in the decade 1700 to 1709 sixteen million cords of wood were consumed for heating families’ homes requiring over five hundred thousand acres of woodlands. By the decade 1760 to 1769 Colonists were consuming one hundred million cords of wood for heat in their homes.
The other heavy use of wood was in the furnaces of the growing number of iron works in the Colonies. Fire and water came together to fuel the iron works and trip hammers of Colonial America. Wood was first made into charcoal to heat the furnaces. Purvis estimated that in the decade 1720 to 1729 over twenty-seven million cords of wood were consumed for the production of iron. There were many iron works in the Colonies before this decade, but this is the first decade for which Purvis made estimates.

The wood used to fuel iron works increased to over sixty-seven million cords by the decade 1760 to 1769. Added to the one hundred million cords used for home heating means that an estimated five and a half million acres of woodlands was required in that decade for these purposes.

Water

“... and there is a very sweet brooke runnes vnder the hill side, and many delicate springs of as good water as can be drunke ...”

Mourt’s Relation

The third of the four elements of successful colonization is water, and there was plenty of good water for the people living in this area during this period. There were rivers, lakes, ponds, brooks, springs, rain, and snow. Water was an essential nutrient for people, and it sustained the domestic and wild animals, watered the crops, and was home to fish. Transportation was much easier by waterways than roads, and water was used as energy to power grist, saw, and other mills.

Some of my readings about water at this place and time made it sound like European inhabitants in the New World shunned water and drank nothing but alcoholic beverages regardless of age or time of day. Support for this belief is based on the idea that Europeans avoided water because in the Old World it was almost always fouled and polluted, and that drinking alcoholic beverages not only avoided illness, but also provided medicinal benefits.

Anecdotal evidence for the ubiquity of alcoholic beverages is mentioned to support this belief. As examples, in the 1700s there were more taverns per capita than any other business; the Puritans on the Arabella, (in some versions, it was the Pilgrims on the
Mayflower) brought with them three times as much beer as water; and Ben Franklin purportedly wrote that “In wine there is wisdom, in beer there is freedom, in water there is bacteria.” The recorded comments of visitors from foreign countries and tales of tavern life add to the legend. And as further proof, many writers cite average quantities of specific beverages consumed through history.

Some writers state that colonists drank on average between five and six gallons of pure alcohol per year compared to 2.3 to 2.4 gallons today. Consumption increased during the time of the Revolution and reportedly peaked at seven gallons of pure alcohol in 1810 and 1830 then decreased after that. There is an oft-cited and never-sourced axiom available on the internet that “[i]n 1790, United States government figures showed that annual per-capita alcohol consumption for everybody over fifteen amounted to thirty-four gallons of beer and cider, five gallons of distilled spirits, and one gallon of wine.”

Looking first at these numbers, I wondered where they came from and what do they mean. In fact, there were no 1790 government figures for annual per-capita alcohol consumption. The very first census in 1790 asked very basic information, and nothing about alcohol consumption and production. So, government figures were used to estimate the 1790 population; however, others sources were needed to estimate alcohol consumption. The origins of these numbers were a dissertation, an article, and a book by W. J. Rorabaugh who used a variety of data sources including tavern ledgers and general store records, as well as interpolations, extrapolations, estimations, and assumptions to arrive at them.

According to Rorabaugh,

[l]ew estimates of pre-1850 American alcohol consumption have been attempted because of the scarcity and poor quality of the data. Before 1862 there was no federal alcohol tax, except for two haphazardly enforced laws covering 1791 - 1801 and 1814 - 1817. Early Censuses either failed to measure alcohol production (1790, 1800, 1830) or, when they did (1810, 1820, 1840), they were incomplete and inaccurate.

W. J. Rorabaugh, 1976

Rorabaugh discusses his methodology and its limitations in his 1979 book. According to Austin and Roizen,
The literature's reliance on both AEDS's [Alcohol Epidemiologic Data System's] and Rorabaugh's time-series tells a tale of benign indifference that is probably not entirely unusual in the history of official statistics . . . Surely neither author ever intended his time-series to become the standard reference; both warned that their numbers would not bear the weight of exacting statistical use. Yet both time-series drifted into common use and acquired no little authority by-and-by.

*Austin and Roizen, 1993*

Below are two tables that use and revise some of Rorabaugh’s statistics. I did not include all of the years in Rorabaugh’s tables in these tables, and in Table ##1 I combined cider and beer into one column. He did not make any estimates before 1710 or for the years between 1710 and 1770.
Table #1: Alcoholic beverage and absolute alcohol consumption per capita of population 15 years and older, based on Rorabaugh (1976, 1979)

<table>
<thead>
<tr>
<th>Year</th>
<th>Spirits</th>
<th>Wine</th>
<th>Cider and beer</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gallons of the beverage</td>
<td>Gallons of absolute alcohol</td>
<td>Gallons of the beverage</td>
<td>Gallons of absolute alcohol</td>
</tr>
<tr>
<td>1710</td>
<td>3.8</td>
<td>1.7</td>
<td>0.2</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>1770</td>
<td>7.0</td>
<td>3.2</td>
<td>0.2</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>1790</td>
<td>5.1</td>
<td>2.3</td>
<td>0.6</td>
<td>0.1</td>
</tr>
<tr>
<td>1800</td>
<td>7.2</td>
<td>3.3</td>
<td>0.6</td>
<td>0.1</td>
</tr>
<tr>
<td>1810</td>
<td>8.7</td>
<td>3.9</td>
<td>0.4</td>
<td>0.1</td>
</tr>
<tr>
<td>1820</td>
<td>8.7</td>
<td>3.9</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>1830</td>
<td>9.5</td>
<td>4.3</td>
<td>0.5</td>
<td>0.1</td>
</tr>
<tr>
<td>1840</td>
<td>5.5</td>
<td>2.5</td>
<td>0.5</td>
<td>0.1</td>
</tr>
<tr>
<td>1850</td>
<td>3.6</td>
<td>1.6</td>
<td>0.3</td>
<td>0.1</td>
</tr>
<tr>
<td>1975</td>
<td>2.4</td>
<td>1.1</td>
<td>2.2</td>
<td>0.3</td>
</tr>
</tbody>
</table>
Table ##2: Revisions of estimates of alcoholic beverages and absolute alcohol consumption per capita of the population 15 years and older, based on Rorabaugh (1976, 1979)

<table>
<thead>
<tr>
<th>Year</th>
<th>Gallons of absolute alcohol per year</th>
<th>Ounces of absolute alcohol per year</th>
<th>Ounces of absolute alcohol per day</th>
<th>Number of drinks per day*</th>
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<tbody>
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<td>652.8</td>
<td>1.8</td>
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<tr>
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<td>6.6</td>
<td>844.8</td>
<td>2.3</td>
<td>3.9</td>
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<tr>
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<td>5.8</td>
<td>742.4</td>
<td>2.0</td>
<td>3.4</td>
</tr>
<tr>
<td>1800</td>
<td>6.6</td>
<td>844.8</td>
<td>2.3</td>
<td>3.9</td>
</tr>
<tr>
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<td>908.8</td>
<td>2.5</td>
<td>4.1</td>
</tr>
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<td>870.4</td>
<td>2.4</td>
<td>4.0</td>
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<td>2.7</td>
<td>345.6</td>
<td>1.0</td>
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</table>

*0.6 fluid ounces of pure alcohol (one shot, one beer, one glass of wine)

Using Rorabaugh’s numbers, Americans were drinking about twice as much alcohol per capita in 1710 as today and about two and a half times as much as today between 1810
and 1830. If 1710 Colonial America were a country today, it would be the heaviest alcohol consuming country in the world. At 5.1 gallons or 19.3 liters of pure alcohol per capita per year, it would be followed by Belarus (17.5 liters), Moldova (16.8 liters), Lithuania (15.4 liters), Russia (15.1 liters), Romania (14.4 liters), Ukraine (13.9 liters), Andorra (13.8 liters), Hungary (13.3 liters), Czech Republic (13 liters), Slovakia (13 liters), and Portugal (12.9 liters). Portugal’s modern consumption is two-thirds of the 1710 American rate, Russia’s modern consumption is 78%, and Belarus’s consumption is 90%.

So what do the numbers, if they are close to being right, tell us? There is no doubt that alcohol consumption was heavier then than now. But were the numbers high enough to make 18th and early 19th century America “a nation of drunkards”?

Then there is the anecdotal “evidence” mentioned above. I chose four to address; taverns, the Puritans’ (and/or Pilgrims’) beer-to-water ratio, the Ben Franklin quote, and the reports of tavern life.

In the 18th century, there were more taverns per capita than any other business in the country. This might be true, and if it is, what does it mean? Taverns were not what we now would call bars, solely for the purpose of drinking alcohol. Taverns were today’s hotels, motels, restaurants (including fast food joints), coffee shops, bus stations, train stations, airports, rest areas, post offices, and often the only place for public meetings other than churches. And because the blacksmith shop was typically located near the tavern, it was also today’s car repair shop waiting room.

Next is the story that the Puritans on the Arabella (or was it the Pilgrims on the Mayflower?) brought with them three times as much beer as water to the New World. One conclusion could be that they were heavy drinkers before they got here. It is often used to state that beer was more important than water. Another interpretation could be that water in barrels spoiled while beer did not, and they knew that good water would be available soon at their destination while beer would not.

Third, there is the alleged Ben Franklin quote that “In wine there is wisdom, in beer there is freedom, in water there is bacteria.” Ben Franklin definitely did not say this as he died in 1790 and the word “bacteria” was introduced in 1838. The idea that bacteria caused illness would not arrive until after his death. He was ahead of his time, but could not time-travel.
Fourth, there are recorded comments of visitors from foreign countries and tales of tavern life that depict drunkenness and rowdiness. I am sure that there were raucous moments in colonial and early American taverns, just as there are in today’s clubs, frat houses, and other places where copious amounts of alcohol are consumed. There is plenty of evidence in that period in history drunkenness was looked down upon, and while a tavern in a city might provide some anonymity, those in towns and villages would attract the scrutiny of the town’s minister and others with authority. My assumption is that rowdy events were noted and reported, especially by outsiders, while quiet evenings were not.

A significant factor in why there is less alcohol consumption per capita now than then is that it was seen as a medicine when there were far fewer medicinal options. Even if its effects were often just palliative and not curative, alcohol played a role for these early Americans that thousands of over-the-counter and prescription medicines have today.

There were also far fewer options of potable beverages that do not contain alcohol. There was water, which will be discussed below, but milk spoiled quickly before refrigeration and pasteurization, and other beverage options were not available because of the absence of raw materials and production and preservation techniques that we take for granted today.

The societal reaction against the increasing consumption of alcohol at that time in history was temperance rather than prohibition. Consumption was becoming excessive and the availability of hard alcohol was increasing; however, these trends were being tempered by societal forces.

One of the reasons for the use of alcohol was not the fact that drinkable water was not available in New England. There was clean water and it was a boon to settlement and success; it was embraced, not avoided. According to Mourt’s Relation,

In the morning so soone as we could see the trace, we proceeded on our journey, and had the tracke untill we had compassed the head of a long creake, and there they tooke into another wood, and we after them, supposing to finde some of their dwellings; but we marched thorow boughes and bushes, and under hills and vallies, which tore our very Armour in peeces, and yet could meeete with none of them, nor their houses, nor finde any fresh water, which we greatly desired, and stood in need off, for we brought neither Beere nor Water with us, and our victuals was onely Bisket and Holland cheese, and a little Bottle of aquavite, so as we were sore a
thirst. About ten a clocke we came into a deepe Valley, full of brush, wood-gaile, and long grasse, through which we found little paths or tracts, and there we saw a Deere, and found springs of fresh water, of which we were heartily glad, and sat us downe and drunke our first New-England water with as much delight as ever we drunke drinke in all our lives.  
_Mourt’s Relation, 1622_

After our landing and viewing of the places, so well as we could, we came to a conclusion, by most voyces, to set on the maine Land, on the first place, on an high ground, where there is a great deale of Land cleared, and hath beeene planted with Corne three or four yeares agoe, and there is a very sweet brooke runnes under the hill side, and many delicate springs of as good water as can be drunke, and where we may harbour our Shallops and Boates exceeding well, and in this brooke much good fish in their seasons: on the further side of the river also much Corne ground cleared . . .  
_Mourt’s Relation, 1622_

The Puritans moved to Boston from Charlestown in large part because of the freshwater spring called “The Great Spring.” Spring Lane and nearby Water Street both still exist with the same names. There is now a plaque on Spring Lane marking the location of the Great Spring.

A century and a half later, discussing his younger days, Ben Franklin wrote

My brother and the rest going from the printing house to their meals, I remained there alone, and dispatching presently my light repast (which was often no more than a biscuit, or a slice of bread, an handful of raisins, or a tart from the pastry cook’s, and a glass of water,) had the rest of the time, ‘till their return, for study: in which I made the greater progress from that greater clearness of head, and quicker apprehension, which generally attend temperance in eating and drinking.  
_Benjamin Franklin, 1791_

So, Ben did not seem to be concerned about bacteria, even preferring water to an alcoholic beverage. It is interesting that he mentioned the adverse effects of intemperance in both eating and drinking.
In summary, it seems that alcoholic beverages were prevalent and important in early America. Consumption was likely higher than today; however, there were reasons for this beyond just intoxication. In the early years of Colonial America the alcoholic beverages were hard cider and beer. The increasing availability of distilled spirits seems to have led to increased consumption; however, societal forces were able to temper the excesses and moderate use.

It seems that there should be more skepticism about the statistics of alcohol use that are regularly and unquestioningly cited and the anecdotes cited. Alcohol use has to be put in the context of the time. In addition, fresh water was recognized and readily consumed regularly consumed. The health and availability of water was a key element in the successful colonization of New England.

**Climate**

Of all the scenes which this climate offers, none has struck me with a greater degree of admiration than the ushering in of our winters, and the vehemence with which their first rigour seizes and covers the earth; a rigour which, when once descended, becomes one of the principal favours and blessings this climate has to boast of.

*J. Hector St. John de Crèvecœur, “A snow storm as it affects the American farmer,”* 1782

The fourth element of successful colonization is climate. And in New England there was a good, though often challenging, climate with wet springs, hot summers, cool falls, and cold winters. We associate warmer climates with health today, but things were different then. Colder New England was healthier than warmer southern areas because of the much lower risk of malaria and yellow fever spread by mosquitoes, and better water quality, which led to fewer water-borne diseases.

In the centuries before vaccinations, antibiotics, air conditioning, and efficient heating systems, hot weather was tougher on babies and young children, while cold weather was tougher on older people. Successful colonization needed babies to survive, and thinking only in the cold-hearted and practical terms of the survival of a colony, long lifespans were not necessary.
Today, babies and young children are not under the same risks in the hot weather because of advances in medicine, public health, sanitation, water quality, and HVAC systems. And, while the elderly are at less risk in cold weather than previously, warm weather offers them opportunities for less exposure to cold, more exercise, and more sunshine. Thinking about warmer climates in today’s world being healthier than cold ones, let us not forget air conditioning and refrigeration. People who head to warmer climes for the health benefits today rarely abstain from AC and ice. Add in ventilation systems, dehumidifiers, electric fans, and we effectively create cooler weather on demand.

There were smallpox cases during this period; however, smallpox only reached epidemic proportions in cities. Individuals with active cases of smallpox did bring the disease to towns, villages, and rural areas infecting individuals and families, but the uncrowded conditions limited the spread to the disease to larger numbers of people.

As a consequence of the American Revolutionary War (1775–1783) where the close quarters of military camps creating conditions similar to cities, soldiers sometimes brought smallpox with them on their journeys home. (We will see a local example of this later in this chapter.) George Washington was an early proponent of inoculation (later to be called vaccination) as he required the inoculation of his troops. Referring to smallpox, he wrote that “we should have more to dread from it, than from the Sword of the Enemy.” This decision was more important to the winning of the war than any military decision he made.

This period was a relatively a healthy time for this part of the earth. The next section will discuss the people and their uses of the food, energy, and water in this region. The elements affected the people and the people affected the elements.

**Part 2 - The people**

“a misapprehension of the facts”

There must have been a misapprehension of the facts in the minds of those who have written concerning the early days of East Chelmsford — its population and industries. It was more of a place than represented to have been.

*Z. E. Stone*
As mentioned in the Introduction to this chapter, in the *History of Chelmsford* by Reverend Wilson Waters (1917), there is a two-page “Map of Chelmsford in 1794.” All of the text on the map was handwritten in cursive except a small amount of block printing with capital letters on the lower left that read

**COPIED FROM THE ORIGINAL MAP**
**AT THE STATE HOUSE . BOSTON. MASS.**
**BY CHARLES E. PARK**
**FOR**
**HENRY S. PERHAM ESQ.**
**CHELMSFORD MASS**

The labeled features on the map included five “saw” mills, six “grist” mills, an “iron works” and “trip hammer,” a “clothiers mill,” the “Petucket Bridge” across the Merrimack, two bridges across the Concord River (drawn but not named), the Middlesex Canal, the [Pawtucket] Canal (marked but unnamed on map), the “Great Road to Boston 25 miles to the State House,” a “Road to Salem,” a “Road to Concord Court House 11 miles,” county roads, town roads, and the names of six surrounding towns (Tewksbury, Carlisle, Billerica, Westford, Dracut, and Tyngsborough). Many of these features were in what is today Lowell and other sources show that other mills, manufactories, and infrastructure was added between 1796 and 1821.

This conflicted with the narratives of Nathan Appleton in *Introduction of the Power Loom and Origin of Lowell* (1858) and Reverend Henry A. Miles in *Lowell, As It Was, And As It Is* (1845) that I had read earlier. The narratives of Appleton and Miles endure and will be discussed in this chapter as the familiar narratives; however, they are not accurate.

According to Appleton,

Our first visit to the spot was in the month of November, 1821, and a slight snow covered the ground. The party consisted of Patrick T. Jackson, Kirk Boott, Warren Dutton, Paul Moody, John W. Boott and myself. We perambulated the grounds, and scanned the capabilities of the place, and the remark was made that some of us might live to see the place contain twenty thousand inhabitants. At that time there were, I think, less than a dozen houses on what now constitutes the city of Lowell, or rather the thickly settled parts of it; that of Nathan Tyler, near the corner
of Merrimack and Bridge streets, that of Josiah Fletcher, near the Boott Mills, the house and store of Phineas Whiting, near Pawtucket Bridge, the house of Mrs. Warren, near what is now Warren street, the house of Judge Livermore, east of Concord river, then called Belvidere, and a few others.

_Nathan Appleton, 1858_

There was a thriving and growing population in the area before the day in November 1821 when Nathan Appleton, Patrick T. Jackson, Kirk Boott, Warren Dutton, Paul Moody, and John W. Boott “perambulated the grounds, and scanned the capabilities of the place.” These early commanding officers of the “Industrial Revolution” in America did not visit an area that contained “less than a dozen houses.” It was much more than that.

The account of Henry A. Miles was more detailed and accurate and even more condescending to the inhabitants of East Chelmsford. Miles mentioned the “First Canal” (Pawtucket Canal), which “was one mile and a half in length, and four locks accomplished the descent of thirty-two feet” and the “Middlesex Canal, connecting the Merrimack River, above the falls, with Boston Harbor.” He also wrote that

Some humble attempts at manufactures were here made, under the auspices of individual enterprise, and chiefly by the use of the waters of the Concord River; and these we must briefly notice, before we speak of the extensive operations of capitalists, acting with corporate powers.

These “humble attempts” included; “a wooden building for the manufacture of cotton [that] was but a humble parent of the substantial and spacious edifices that have succeeded it,” Thomas Hurd’s mill with sixteen looms that “turned out one hundred and twenty yards of satinet per day,” Moses Hale gunpowder factory where “eighty thousand pounds of powder were manufactured per year, and a sawmill and gristmill at Pawtucket Falls, “and another still on the canal of the Locks and Canals Company.”

He summed up that

Such was East Chelmsford in 1820. A few scattered farmhouses, standing, however, on good soil, and occupied by intelligent and substantial families, the store, the tavern, the humble wooden factory, the few small buildings for the powder-works, the two gristmills – this was nearly all that the place
possessed . . . Associated power took up the work which individual enterprise had feebly attempted, and in this was the origin of Lowell.

As stated above, I read a number of old and modern historical accounts of this period that imply that the inhabitants of this area were eking out a meager subsistence from the land when a few enterprising souls looked to mills as an easier way of life than farming. This is not how I came to see it. The farmers did not build mills because it was easier or more lucrative than farming. These mills were a technological part of the agricultural system at the time.

According to Wilkes Allen in 1820,

The advantages of the brooks and rivers above mentioned will best appear from the number of Mills, Machines and Manufactories, built upon them. There are six saw-mills; seven grist mills; one woolen manufactory; and iron works, where hoes and shovels are manufactur'd, and various kinds of curious work done, and irons for machinery cast; a fulling Mill and clothier's shop. Also a very curious loom for weaving boot-strings, moved entirely by water. This loom, constructed by Mr. John Golding is a great curiosity in these parts, and will, it is believed, bring a handsome income to the ingenious and indefatigable owner.

Wilkes Allen, 1820

The structures represented on that 1794 map and discussed by Wilkes Allen do not diminish the post-1820 achievements; however, it does show that those developments did not take place in a commercial and technological vacuum. The descendants of the early settlers to the area were joined by new immigrants from other countries and people from other parts of Massachusetts, New England, and North America who were beginning to feel more comfortable moving away from the coast to less settled areas. There was a thriving and growing population in the area who smoothed the path, both literally and metaphorically, for the expansive growth that came in the 1820s. In addition to establishing farms, early residents of this area were fighting wars, both with and against Great Britain, and building mills, roads, quarries, bridges, churches, courts, schools, and other infrastructure.

As mentioned above, I concluded that in this area and all over New England and mid-Atlantic colonies, the small mills in operation before the 1820s were not built because
milling was easier or more lucrative than farming. The farmers encouraged and incentivized others with the requisite knowledge and skills to build the sawmills, gristmills, iron works, and other technologies as shown in this passage by Wilkes Allen:

**First Weaver—1656.**
As early as 1656 at May Meeting, William How was admitted as an inhabitant, and granted twelve acres of meadow and eighteen of upland, provided he set up his trade of weaving and perform the town's work.

**First Saw Mill—July 3.**
The same year, was granted to Saml. Adams, in consideration of his setting up a saw-mill, 450 acres of land upon the south side of the meadow belonging to him, called brook meadow— provided he supply the town with boards at three shillings per hundred, or saw one log for the providing and bringing of another to be ready to work the next March.

**First Corn Mill.**
To this were added a hundred acres in consideration of his erecting a corn-mill, and to give him still farther encouragement, they passed an order, ‘that no other corn-mill shall be erected for this town, provided the said Adams keep a sufficient mill and miller.’ In 1661 he obtained liberty to set flood gates at Hart Pond ‘to himself and heirs forever.’

*Wilkes Allen*

The water-powered gristmill was so much more efficient than grinding grains by hand that the farmer preferred to give the miller a significant part of his yield in order to have it ground into flour for him. The social structure of the New England was based on towns and each town was a largely self-sufficient community. The farmers also could not make long trips to far away mills, so the mill had to be close as well. The residents of a newly formed town would offer a miller or sawyer land and other incentives to run a mill in the town. A millwright would often be brought in to design the mill and its power source. The mill building was made of wood and a blacksmith could make most or all of the needed parts for the machinery.

It was not an agricultural versus industrial dualism: Farmers needed the engineers and technicians of the day. In addition, while we often thinks of farming in those days as a lot of hard work, there was also a great of knowledge of plants and animals needed to be
successful. This dualism is reinforced in the history books when addressing the ideas of Thomas Jefferson and Alexander Hamilton. It is said that Jefferson believed that America’s future success was in agriculture while Hamilton believed it was in manufacturing and commerce. This was certainly true; however, it did not mean that Jefferson thought every American should be a farmer.

While we have land to labour then, let us never wish to see our citizens occupied at a work-bench, or twirling a distaff [a stick used to hold fiber while spinning it into thread or yarn]. Carpenters, masons, smiths, are wanting in husbandry: but, for the general operations of manufacture, let our work-shops remain in Europe.

*Thomas Jefferson, 1787, Notes on the State of Virginia*

It is also interesting to note Jefferson use of the word “husbandry” in this passage, and in another part of this section or “query” of his *Notes*, he wrote “we have an immensity of land courting the industry of the husbandman.” To me, the use of these words as well as other writings show Jefferson’s appreciation of this occupation. He clearly does not see it as unskilled and uneducated purely manual labor, but an applied science intelligently revised and updated.

I came to the conclusion that the term “Industrial Revolution” is misleading. I googled “Industrial Revolution” and “misnomer” and was both happy and sad. I was happy to see that others also thought that way, but a bit disappointed that I didn’t originate the concept. The real story of this period shows a Pre-Lowell infrastructure that set the groundwork for the “Revolution.” The difference between the period before the 1820s and the period after was the scope and speed of industrial development in the area, not the absence or the presence of it. Existing technologies were implemented here just as they were in the Old World. The difference was here it was being done from scratch.
<table>
<thead>
<tr>
<th>People and buildings</th>
<th><em>Appleton and Miles</em></th>
<th><em>Allen, Waters, Perham, Stone</em></th>
</tr>
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<tbody>
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<td>“less than a dozen” “A few scattered farm-houses”</td>
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<tr>
<td>Gristmills</td>
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<td>Four</td>
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<td>“Textile” mills</td>
<td>One cotton (then wool “satinet”), one flannel mill</td>
<td>One clothiers’, one woolen, one fulling, one boot-straps, one carding machine, one cotton (then wool “satinet”)</td>
</tr>
<tr>
<td>Iron works/trip hammer</td>
<td>None mentioned</td>
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<tr>
<td>Manufactories</td>
<td>One gunpowder</td>
<td>One glass works, one gunpowder</td>
</tr>
</tbody>
</table>

* My compilation of these sources
Part 3 - The health and medicine

“The doctor's fears were realized”

The soldiers who fought in the Revolution had to foot it home if they survived the British bullets and the diseases which killed many of them. They were a miserable lot. They had to beg food and sleep where they could. They dragged themselves home. Dr. Marshall, who lived in the present residence of Mr. C. W. Byam, came home one day in December, 1776, and said he did not like the smell in the house, and asked if any soldiers had been there. The answer was that one had stopped there. The doctor's fears were realized. His wife and two children died of the smallpox; the soldier also died of the same disease. Mrs. Marshall was a lovely woman, and the doctor was brokenhearted.

Wilson Waters, History of Chelmsford, 1917

As we have seen, East Chelmsford was a relatively healthy part of the earth for humans during this period. The presence of Indians in the area for centuries altered the environment in positive ways for human habitation, and the elements of successful colonization were present in the right quality and quantity. In addition, the people living in the area already had or quickly developed the knowledge, skills, motivation, and work ethic to not only survive, but thrive. This upbeat assessment would sound ridiculous using today’s standards of health and comfort, but in the context of the time it is accurate. Objective data from the period showed that residents of this area lived longer and grew taller than the cohort that stayed behind in the Old World.

There were also diseases that are rare or unknown today, high rates of devastating and fatal injuries, and untimely deaths including high rates of infant mortality and mothers dying in childbirth. The hot summers were most difficult for infants and children, while the cold winters were harder on older adults. Though the causes of diseases were not understood, there were treatments and some of them were effective. The treatment of injuries was far ahead of the treatment of disease. This was because the understandings of anatomy and physiology were advancing more quickly than understandings of disease. The word anatomy is from the Greek ana- “up” and tomía “cutting” and early on this meant what is now called gross anatomy; it was based on what the eye could see. With injuries they could see the problem, with diseases they could only see the symptoms.
The term biology was introduced by different scientists between 1799 and 1802; however, it was rarely used until it came into its modern use the 1840s and its use increased in the 1860s. The terms physics and chemistry were in use long before biology (see Graph 1) and the understandings and models of these sciences were used literally and figuratively to try to understand biological functions and structures.

Graph 1: Google Books Ngram Viewer for the terms biology, chemistry, and physics (not case sensitive) for the years 1800 to 2008.

Before “biology,” there were several terms used for the study of animals and plants such as natural philosophy, physiology, botany, and zoology. Graph 2 shows the usage of these terms over time from 1800 to 2008. The terms biology, chemistry, and physics from Graph 1 were included for reference.

Graph 2: Google Books Ngram Viewer for the terms biology, chemistry, physics, natural philosophy, physiology, botany, and zoology (not case sensitive) for the years 1800 to 2008.
People in this period did not know what we know today; however, this did not prevent them from having theories, developing practices, applying medical interventions, practicing self-care, and implementing public health measures. According to Wilson Waters, “The Minister, Doctor and Smith were the most important and useful persons in the Town, in the order named.”

Theories and Treatments

“The patient . . . sometimes gets well in spite of the medicine” Thomas Jefferson, 1807

Before and during this period, there was a move away from the supernatural to the rational, even though rational was based on the unscientific concepts of humors and miasmas. It was not until eighteenth century reason evolved into nineteenth century science that we see treatments based on the scientific method.

A mixture of theories was accepted and applied unquestioned, mainly humor theory, miasma theory, and contagion theory, though any one or more of the ten prescientific theories could be called upon. Humor theory presumed that diseases were caused by an imbalance of four bodily fluids or humors, which corresponded to the four elements: black bile (earth), and phlegm (water), blood (air), and yellow bile (fire). Miasma theory supposed that harmful vapors or miasma caused disease. Contagion theory asserted that something causing disease passes from human to human without being identified. (Contagion is from the Latin, "con-" meaning 'with' and "tangere" meaning "to be in
The idea of contagion existed before the discovery of specific germs causing specific diseases.

Benjamin Rush (1746 - 1813) was one of the leading physicians of his time. Consistent with his Enlightenment ideas, Rush eschewed empiricism and wanted to base all medical knowledge and practice on theories. Rush’s central theory was that illnesses were imbalances in the body, which were caused by malfunctions of the brain. While an advanced thinker in many ways including politically, socially, and scientifically, his reliance on “Heroic Medicine” including bleeding and purging based on unquestioned and untested theories contributed to holding back the progress of American medicine for decades.

Meanwhile during the French Revolution (1789 to 1799), doctors in hospitals using empirical methods were observing patterns among patients’ symptoms and illnesses. In America disease was seen as particular to the individual; doctors treated individuals separately and did not observe patterns and similarities. The rejection of empiricism in American medicine persisted for decades and halted the progress and discovery that was taking place in Europe. There were glimpses even harbingers of what was to come, but the orthodoxy held sway and prevented practices from advancing beyond the theories that had ruled for centuries.

In June 1807, Thomas Jefferson wrote a letter to Doctor Caspar Wistar (1761 - 1818) in Philadelphia about his fifteen-year old grandson in whose education he took “a lively interest.” While about the grandson’s education, the letter is also a prescient critique of medicine at that time.

I am not friend to placing young men in populous cities, because they acquire there habits and partialities which do not contribute to the happiness of their after life. But there are particular branches of science, which are not so advantageously taught anywhere else in the United States as in Philadelphia. The garden at the Woodlands for Botany, Mr. Peale's Museum for Natural History, your Medical school for Anatomy, and the able professors in all of them, give advantages not to be found elsewhere. We propose, therefore, to send him to Philadelphia to attend the schools of Botany, Natural History, Anatomy, and perhaps Surgery but not of Medicine. And why not of Medicine, you will ask? Being led to the subject, I will avail myself of the occasion to express my opinions on that science, and the extent of my medical creed.
Jefferson goes on to “tax your [Dr. Wistar’s] patience with unlearned views of medicine which, as in most cases, are, perhaps, the more confident in proportion as they are less enlightened.” Jefferson’s “unlearned views of medicine” reminded me of a quote from John F. Kennedy at a dinner honoring Nobel Prize winners in April, 1962: “I think that this is the most extraordinary collection of talent, of human knowledge, that has ever been gathered together at the White House, with the possible exception of when Thomas Jefferson dined alone.”

I have included the rest of the letter in its entirety. I added paragraph breaks that were not in the book where I got the text of the letter.

We know, from what we see and feel, that the animal body is in its organs and functions subject to derangement, inducing pain, and tending to its destruction. In this disordered state, we observe nature providing for the re-establishment of order, by exciting some salutary evacuation of the morbific matter, or by some other operation which escapes our imperfect senses and researches. She brings on crisis, by stools, vomiting, sweat, urine, expectoration, bleeding, &c., which, for the most part, ends in the restoration of healthy action.

Experience has taught us, also, that there are certain substances, by which, applied to the living body, internally or externally, we can at will produce these same evacuations, and thus do, in short time, what nature would do but slowly, and do effectually, what perhaps she would not have strength to accomplish. Where, then, we have seen disease, characterized by specific signs or phenomena, and relieved by certain natural evacuation or process, whenever that disease recurs under the same appearances, we may reasonably count on producing a solution of it, by the use of such substances as we have found produce the same evacuation or movement.

Thus, fulness of the stomach we can relieve by emetics; diseases of the bowels, by purgatives; inflammatory cases, by bleeding; intermittents, by the Peruvian bark; syphilis, by mercury; watchfulness, by opium &c. So far, I bow to the utility of medicine. It goes to the well-defined forms of disease, and happily, to those the most frequent.

But the disorders of the animal body, and the symptoms indicating them, are as various as the elements of which the body is composed. The combinations, too, of these symptoms are so infinitely diversified, that many associations of them appear too rarely to establish definite disease and to an unknown disease, there cannot be known remedy. Here then, the judicious, the moral, the humane physician should stop.
Having been so often witness to the salutary efforts which nature makes to re-establish the disordered functions, he should rather trust to their action, than hazard the interruption of that, and greater derangement of the system, by conjectural experiments on machine so complicated and so unknown as the human body, and subject so sacred as human life.

Or, if the appearance of doing something be necessary to keep alive the hope and spirits of the patient, it should be of the most innocent character. One of the most successful physicians I have ever known, has assured me, that he used more bread pills, drops of colored water, and powders of hickory ashes, than of all other medicines put together. It was certainly pious fraud.

But the adventurous physician goes on, and substitutes presumption for knowledge. From the scanty field of what is known, he launches into the boundless region of what is unknown. He establishes for his guide some fanciful theory of corpuscular attraction, of chemical agency, of mechanical powers, of stimuli, of irritability accumulated or exhausted, of depletion by the lancet and repletion by mercury, or some other ingenious dream, which lets him into all nature's secrets at short hand. On the principle which he thus assumes, he forms his table of nosology, arrays his diseases into families, and extends his curative treatment, by analogy, to all the cases he has thus arbitrarily marshalled together.

I have lived myself to see the disciples of Hoffman, Boerhaave, Stalh, Cullen, Brown, succeed one another like the shifting figures of magic lantern, and their fancies, like the dresses of the annual doll-babies from Paris, becoming, from their novelty, the vogue of the day, and yielding to the next novelty their ephemeral favor. The patient, treated on the fashionable theory, sometimes gets well in spite of the medicine. The medicine therefore restored him, and the young doctor receives new courage to proceed in his bold experiments on the lives of his fellow creatures.

I believe we may safely affirm, that the inexperienced and presumptuous band of medical tyros let loose upon the world, destroys more of human life in one year, than all the Robinhoods, Cartouches, and Macheaths do in century.

It is in this part of medicine that wish to see reform, an abandonment of hypothesis for sober facts, the first degree of value set on clinical observation, and the lowest on visionary theories.

I would wish the young practitioner, especially, to have deeply impressed on his mind, the real limits of his art, and that when the state of his patient gets
beyond these, his office is to be watchful, but quiet spectator of the operations of nature, giving them fair play by well-regulated regimen, and by all the aid they can derive from the excitement of good spirits and hope in the patient.

I have no doubt, that some diseases not yet understood may in time be transferred to the table of those known. But, were I a physician, I would rather leave the transfer to the slow hand of accident, than hasten it by guilty experiments on those who put their lives into my hands. The only sure foundations of medicine are, an intimate knowledge of the human body, and observation on the effects of medicinal substances on that.

The anatomical and clinical schools, therefore, are those in which the young physician should be formed. If he enters with innocence that of the theory of medicine, it is scarcely possible he should come out untainted with error. His mind must be strong indeed, if, rising above juvenile credulity, it can maintain wise infidelity against the authority of his instructors, and the bewitching delusions of their theories.

You see that I estimate justly that portion of instruction which our medical students derive from your labors and, associating with it one of the chairs which my old and able friend, Doctor Rush, so honorably fills, consider them as the two fundamental pillars of the edifice. Indeed, I have such an opinion of the talents of the professors in the other branches which constitute the school of medicine with you, as to hope and believe, that it is from this side of the Atlantic, that Europe, which has taught us so many other things, will at length be led into sound principles in this branch of science, the most important of all others, being that to which we commit the care of health and life.

I dare say, that by this time, you are sufficiently sensible that old heads as well as young, may sometimes be charged with ignorance and presumption. The natural course of the human mind is certainly from credulity to scepticism and this is perhaps the most favorable apology can make for venturing so far out of my depth, and to one too, to whom the strong as well as the weak points of this science are so familiar. But having stumbled on the subject in my way, I wished to give confession of my faith to friend and the rather, as had perhaps, at times, to him as well as others, expressed my scepticism in medicine, without defining its extent or foundation.

At any rate, it has permitted me, for moment, to abstract myself from the dry and dreary waste of politics, into which I have been impressed by the times on which happened, and to indulge in the rich fields of nature, where alone I should have served as volunteer, if left to my natural inclinations and partialities. I salute you at all times with affection and respect.

*Thomas Jefferson, 1807*
In this letter, Jefferson’s discusses the important point that the body tries to and often does heal itself. Some, even many, diseases are self-limiting; they either resolve on their own or have no long-term harmful effect on their victims. Others before him had made this point; however, Jefferson uses this to state that the “heroic” medicine at the time was taking credit where it was not due.

Jefferson goes on to state that some substances mimic and therefore may help or speed up the body’s own self-healing processes, even substituting for them when the body is too weak to rally its own response. Jefferson mentions emetics, purgatives, bleeding, Peruvian bark (cinocha), mercury, opium, and “&c.” [etc.]. It is important to note that Jefferson mentions a specific affliction with each intervention, implying that these are used for other afflictions where they are not helpful. He goes on to state that many medical practitioners go too far and over-prescribe and misuse these substances, assuming that if it worked for one patient’s illness/symptom, it will work for all forms of the illnesses/symptoms. Jefferson later mentions one doctor’s liberal use of “bread pills, drops of colored water, and powders of hickory ashes,” acknowledging that worthless benign substances can have a placebo effect and are preferable to ineffective ones that might actually cause harm.

An example of this type of overuse and misuse were Dr. Rush’s Bilious Pills, invented by Jefferson’s friend, Dr. Benjamin Rush. These pills were powerful laxatives containing more than 50% mercury and were nicknamed “thunderclappers.” Lewis and Clark’s Corps of Discovery, on Dr. Rush’s advice, brought fifty dozen of Dr. Rush’s Bilious Pills, with them on the expedition.

It is interesting that Jefferson did not criticize Rush in the 1807 letter, and even praises him. However, in 1814, the year after Rush’s death, Jefferson wrote “. . . in his theory of bleeding, and mercury, I was ever opposed to my friend Rush, whom I greatly loved; but who has done much harm, in the sincerest persuasion that he was preserving life and happiness to all around him.”

Jefferson’s predominant and most visionary idea in the letter is that science and empiricism must be used to drive medical practice, and not an unquestioning acceptance of an unproven theory. It took a long time for Jefferson’s ideas to be adopted by the medical
orthodoxy, and when they were, medical science moved forward more quickly years and decades than it had in centuries and millennia.

Practitioners

The story of medicine in America is not just about the physician, it is also about families and communities. In Colonial America, treatment by physicians was for the wealthiest colonists or those in the cities. In other areas, colonists were seldom seen by a doctor with the family and community meeting most medical needs. During first decades of the new nation, we start to see more physicians in the towns and more rural areas.

In the time span covered in this chapter there were basically six types of medical practitioners; immigrants from Europe, Americans who studied abroad, Americans who served an apprenticeship here, trained folk healers, quacks, and minister-physicians. We could also add the family, the community, and the individual to this list.

There was no formal medical education in America and when there was it was for-profit, unregulated, and open to any male who could pay the tuition. This practice went on for decades.

Medicines and procedures

Throw out opium, which the Creator himself seems to prescribe, for we often see the scarlet poppy growing in the cornfields, as if it were foreseen that wherever there is hunger to be fed there must also be a pain to be soothed; throw out a few specifics which our art did not discover, and it is hardly needed to apply; throw out wine, which is a food, and the vapors which produce the miracle of anaesthesia, and I firmly believe that if the whole materia medica, as now used, could be sunk to the bottom of the sea, it would be all the better for mankind,—and all the worse for the fishes.

*Oliver Wendall Holmes Sr., 1860*

As discussed above, some medicines used in this periods did work on some diseases and symptoms. Holmes, like Jefferson, mentions some that work including a category of “a few specifics which our art did not discover.” Holmes also mentioned “anaesthesia,” which had not been discovered at the time of the Jefferson quote. It is also important to note Holmes's use of the phrase “as now used,” not ruling out future discoveries.
There is no doubt that opium produced relief of pain, diarrhea, and nervousness. However, morphine first isolated from the opium poppy in Germany in 1804. Morphine was first marketed to the public in 1817 and commercial production began in Germany in 1827. So morphine was used, often effectively, but dosages were not controlled until morphine was produced. Use was also unregulated and it was often given to children and babies. Some users became addicted. Opium and morphine would be unregulated for decades, first by individual cities and states, then in 1890 by the Federal government.

Cincha bark from Peru was effective against malaria because it contained quinine. The active ingredient was isolated from cinchona bark in France in 1820. While only effective for malaria, it was used by many as a treatment for any fever.

Emetics such as ipecac, from the dried root of the ipecacuanha, plant were used to induce vomiting, and a variety of purgatives including Calomel (mercury chloride) were used to stimulate bowel movements. These were effective if the problem could be cured with an emetic or laxative, but were also used when the patient would do better having the vomiting or diarrhea slowed or stopped. These patients’ conditions would have been made worse by the “treatments.”

Alcohol was used in the forms of “medicinal wine” and distilled spirits. Again, however, dosages and uses uncontrolled and unregulated. Babies, children, and pregnant and nursing women were administered alcohol and preparations containing alcohol.

One very affective preventative procedure was variolation, then, after 1800, vaccination for smallpox. Variolation involved inserting powdered scabs or pustular fluid from a person with smallpox into scratches in the skin of a healthy person. This would produce a milder, less lethal form of the disease. After recovery, the person would be immune from the more serious and lethal naturally-acquired smallpox.

In 1796, the British physician Edward Jenner discovered that an innoculation of a pustular fluid taken from a milkmaid who contracted the less virulent disease of cowpox from a cow to a healthy person bestowed the same immunity as variolation with much less serious effects and much lower mortality. He called the procedure vaccination based on the Latin vacca meaning cow.

While variolation did save lives, there was a risk and an estimated 1% to 3% mortality rate. This contrasts with the estimated 30% mortality rate from naturally-acquired
smallpox. As disease, especially smallpox, killed more American soldiers that all the British weapons combined, many credit George Washington’s decision to inoculate his troops using the variolation method as a decision that ultimately led to winning the Revolutionary War.

Vaccination had a sharply lower mortality rate as vaccinated patients were never exposed to the actual smallpox virus. Smallpox was completely eradicated from earth with the last case in 1979. The only smallpox virus that exists today is in laboratories.

There were also, in Holmes’s words “a few specifics which our art did not discover” that were used with some positive effects these would be plants, herbs, and other preparations brought over from Europe or learned from the Indians.

The practice of bleeding was also used by practitioners of the day. This practice continued to be widely used although there was no benefit for the patient and in many cases the patient’s conditioned worsened.

The methods of bloodletting included venesection, leeches, scarification, and cupping. Venesection was the opening of a vein for bloodletting. Leeches were really used on people to remove blood, sometimes dozens at a time. Scarification was the cutting of multiple more shallow incisions. Cupping was used to bring more blood to the surface for lancing or to keep bleeding going after the cut was made.

Blistering was also used to remove pus from patients Irritants were applied to the skin causing a blister, which was lanced to release the pus.

While it is difficult to believe that bloodletting was used at all, never mind so often and for so long. One of the reasons was that the practice fit with humor theory; if the problem was too much blood causing the imbalance and resulting problem, you had to get rid of some blood.

The other part of this procedure is that the patient would often receive various tonics that were supposed to replace the blood build the patient up again. So the blood was supposedly being replaced, not just depleted. This might have made some intuitive sense to doctor and patient contributing to the continuation of the procedure.

Another reason was that some patients got better, not from the bleeding, but because of the self-limiting nature of many illnesses. If the patient recovered from the last illness after being bled, why not try it again?
In addition, many feverish patients actually looked better after the bleeding. A red-faced, hot, patient looked paler, cooler, and more relaxed after losing some blood.

Finally, there might have even been placebo effects in some cases, though a less invasive placebo might have worked as well and done less damage. The authority and perceived expertise of the doctor might have added to the placebo effect.

**New theories**

There was increasing skepticism and ambivalence about heroic procedures through the 18th and into the 19th Century. A number of factors might have caused this trend. One is that the heroic methods were uncomfortable and often painful. As practitioners began offered less invasive and uncomfortable treatments, patients began to choose those.

A second reason might have been that, while medical science was not advancing rapidly, there were advancements in the other sciences such as chemistry and physics. These sciences offered new conceptual models that were applied to medicine. Advances in anatomy, physiology, zoology, and botany were also contributing to new understandings. In addition, there were increasing numbers of immigrants from Europe who studied medicine there and Americans who studied medicine in Europe and returned with new ideas and practices.

Thirdly, many folk healers were adding to their Old World remedies, plants, minerals, etc. found in the New World. Many or most of these were being learned from the Indians, and a number of them were effective.

New theories of medicine were both fueling the skepticism and were being fueled by it. Four that will be briefly discussed here are Thomsonism, homeopathy, eclectic medicine, and Mesmerism.

Samuel Thomson’s (1769 – 1843) system called Thomsonism was practiced in the United States in the early to middle 19th Century. Thomson learned some herbalism as a boy from a local woman folk healer. He also did his own exploration and experimentation. When he was frustrated by conventional doctors’ inability to help him and some family members over the years he tried his own methods and those of other herbalists and found
that his cures worked when theirs’ did not. By about 1860, many of his methods had been
drafted by the “eclectics” and Thomsonism was no longer widely practiced.

“Eclectic medicine” was a branch of American medicine which used botanicals and
other substances along with what we today would call “physical therapy”. The term eclectic
is from the Greek word *eklego*, meaning “to choose from.” Constantine Samuel
Rafinesque (1784 - 1841) was the first to use this word to describe practitioners who
borrowed from different systems and used what they thought worked. Eclectics did not
adopt Rafinesque’s system and practices *in toto*, but borrowed from Thomsonism,
herbalism, botanical medicine, American Indian medicine, and other systems.

Homeopathy was created in 1796 by Samuel Hahnemann (1755 – 1843) based on
the doctrine of “like cures like.” This means that a substance that causes the symptom of a
disease in healthy people will cure a similar symptom in a sick person if given in a highly
diluted state. Homeopathy was practiced through the 19th and 20th Centuries and is still
practiced today as an “alternative” or “complementary” medicine.

Franz Anton Mesmer (1734 – 1815) was a German physician, who theorized that a
natural energy takes place between all animate and inanimate objects, which he called
“animal magnetism” later called “mesmerism.” Animal magnetism generated a great deal of
popular interest attracted a wide following from about 1780 to 1850, and continued to
generate interest until the end of the 19th Century. Hypnotism grew out of mesmerism,
dropping the pseudoscience of animal magnetism, and focusing on the psychological and
physiological responses.

*Hospitals*

During this period of history, hospitalization was not an option for the vast majority
of Americans. At the beginning of the 19th Century, the United States had two general
hospitals, the Pennsylvania Hospital, founded in 1756, and the New York Hospital,
founded in 1791. In New England, there was a marine hospital, “Naval Hospital at
Charlestown” in Massachusetts, which was operated by the United States Department of
Treasury for mariners. Massachusetts General Hospital was established in 1811 as the first
general hospital in New England.
The closest institution to a hospital was the almshouses, which only cared for those who were very sick and poor. Those who could afford it were cared for in their homes, the wealthiest being seen by doctors while others were cared for by family and possibly another type of healer.

Victims of contagious diseases, such as smallpox, were isolated in their homes or placed in *ad hoc* “pest houses” from the French word plague *peste*. An example of the isolation techniques used were quoted in Waters’s History of Chelmsford:

> “April the 23, 1722 it is Ordered by the Select-men That in as-much as the small-pox is in John Bates his family and it is to be feared the infection will spread if some due Care be not rather speedily [taken] to prevent the same: That the Country Road be stopt with fencing across by sd Bates Cider-mill and by Ebenezer Spauldings Orchard and that notifications be sett on the sd fence at each stopage to inform passengers of the occasion that thereby they may be prevented from taking any infection . . . . . .”
>
> “Smallpox in Chelmsford” in Wilson Waters (1917)

*Area practitioners*

In this section, some brief biographies of practicing physicians and other practitioners of this period will be used to provide an idea of the medical practices available in this area. Medical interventions during this period depended completely on what was available nearby. It seems that Chelmsford and East Chelmsford had people who were willing to offer treatments for the numerous afflictions of that time and place. This might have been a “country doctor,” a midwife to assist with childbirth, a folk healer, family members, or community members. It was also in many cases the person himself or herself.

*Samuel Adams and Rev. John Fiske*

Looking back for a moment to the seventeenth century, two names are mentioned as persons who cared for the sick and injured, along with other duties. According to Wilson Waters,

> In the early days, Samuel Adams and the Rev. John Fiske employed their knowledge of the therapeutic art in the relief of their neighbors, but for nearly a century there is no record of a regular physician practicing in Chelmsford.
Samuel Adams (1616 - 1688) was mentioned in the previous section of this chapter as the person who built and operated the town’s first sawmill in 1656 and later its first corn mill. He was born in England, immigrated to New England in 1638 and lived in Charlestown before moving to Chelmsford. Waters wrote that

Mr. Adams was a person of somewhat varied accomplishments. Rev. Wilkes Allen, in some notes made by him after his history of Chelmsford was published, states, upon the authority of some old deeds and other papers in the Adams family, that he was a millwright. “He was also somewhat skilled in medicine & exercised his skill to ye advantage & benefit of this infant settlement while they were destitute of a physician better informed.”

He was a Captain in the military, Clerk of the Writs, and for twenty years town clerk. The records in his handwriting are still mostly quite legible.

Medical education like medical practice at that time was a miscellany of effective, ineffective, and harmful theories and practices. While Samuel Adams was not a trained physician, he had two credentials that could qualify him for medical practice. First, he was literate, and literacy was a or, sometimes, the qualification for practicing medicine. Secondly, he had mechanical skills that may often have been more helpful than the medical knowledge of the era.

Adams is one of the significant though lesser-known New Englanders in the 17th century. There are interesting though often conflicting accounts of his life on the internet, which are beyond the scope of this very brief biography to reconcile. There is no doubt that he contributed greatly to the success of the colonization the area and helped meet the medical needs of others. Adams is buried in the Phipps Street Burying Ground in Charlestown, Massachusetts.

The Reverend John Fiske (circa 1601 - 1677) was born in England where he studied medicine and theology. He came to New England in 1637, first living in Salem, then Wenham where in 1644 “he gathered a church.” This phrase is from his cenotaph in Chelmsford’s Forefathers' Burying Ground. The idea of gathering a church comes from Matthew 18:20 “For where two or three are gathered together in my name, there am I in the midst of them.”

While he might be buried in the Forefathers' Burying Ground, the earliest dated
grave there is that of Grace Livermore, a midwife, who died in 1690. Earlier burial sites had wooden markers that did not survive the centuries. So the cenotaph that stands today is probably in the right cemetery, but does not mark Reverend Fiske’s exact burial site.

Rev. Fiske moved to Chelmsford in 1655 “with the greater part of his church” where he “ministered both as a pastor and physician.” Cotton Mather wrote about the minister physician in general and Rev. Fiske in particular. Dr. Mather referred to the merging of these roles as the “Angelical Conjunction.”

Ever since the Days of Luke the Evangelist, Skill in Physick has been frequently professed and practised by Persons whose more declared Business was the Study of Divinity . . . our English Nation has commonly afforded Eminent physicians, who were also Ministers of the Gospel.

But I suppose the Greatest Frequency of the Angelical Conjunction has been seen in these Parts of America, where they are mostly the Poor to whom the Gospel is preached, by Pastors whose Compassion to them in their Poverty invites them to supply the Want of Able Physicians among them . . .

Cotton Mather, 1702, Magnalia Christi Americana, Book III, Chapter xxvi, pg. 151

After the title of the chapter, “The LIFE of Mr. JOHN FISK, “ Mather included a line from the Iliad without English translation or a reference to where it came from:

This can be translated as “A physician is worth more than several other men put together” or “A physician is worth many common men.” That line together with the next line in the Iliad (11:514 and 515) is “A physician is worth more than several other men put together, for he can cut out arrows and spread healing herbs.” The first word in the phase is iatros (ἰατρός), the Greek word for physician or healer. Iatros is in use today in words like iatrogenic and pediatrics.

Later practitioners
The following list of area practitioners was compiled from the writings of Wilkes Allen (1820), Wilson Waters and Henry S. Perham (1917; often Waters is the only author mentioned), and David Patterson (1899). The year that the physician began practice in the area is listed first after the name, and the years of birth and death, if available, are in parentheses.

- Anthony Emery 1740
- Samuel King 1748
- [?] Rice 1762
- Jonas Marshall 1765
- Nehemiah Abbott 1770
- Walter Hastings 1776
- Timothy Harrington 1782
- Amos Bradley c. 1785 (1762 - 1817)
- John Betty 1792 (died in 1827 at age 75)
- Ichabod Gibson 1792 (died in 1810 at age 43)
- Calvin Thomas c. 1793 (1765 - 1851)
- Matthias Spaulding 1802
- Oliver Scripture 1807
- Peleg Bradley 1813 (1792 - 1848)
- Rufus Wyman 1814 (1778 - 1842)
- Israel Hildreth 1815 (1791 - 1859)
- Zadok Howe c. 1816 (1777 - 1851)
- John C. Dalton c. 1818 (1795 - 1864)

In his diary, Ebenezer Bridge mentioned a Dr. Rice, who came to Chelmsford as a practitioner in 1762. Bridge also mentioned a Dr. Hurd without any other information.

The timeline below shows the year of each physician’s arrival in the area. The color coding indicates which source or sources contained the information. Waters and Perham used Allen as their source, so the information is the same in both of these sources.
Amos Bradley (1762 - 1817), was born in Dracut, His father was Deacon Amos Bradley, for whom “Bradley's Ferry” was named. It is not known where he got his training or with whom he studied medicine. He began his practice in or around 1785. Bradley was “the perfect type of the country doctor of olden time” mentioned in the extended quote at the beginning of this chapter. We can only make an educated guess as to what his “curious medley of well-filled phials of medicines, various instruments, and other paraphernalia of his profession” mentioned in the quote were.
Patterson tells us that Bradley travelled on horseback and travelled a great deal throughout the area:

On leaving his house in the morning, and after having made his calls in the immediate vicinity, he would cross over the river at “Bradley's Ferry,” into that part of Chelmsford which is now Lowell, and continue on through Middlesex, North Chelmsford and Tyngsborough, where he would re-cross the river by “Tyng's Ferry,” thence he would proceed through the northwestern portion of Dracut to Pelham, N.H., returning to his home by the turnpike road through that section of Dracut known as “Black North.”

Calvin Thomas (1765 - 1851) was born in Chesterfield, New Hampshire. He first learned the carpentry but could not continue in it because of health problems. At age 24, he began his medical studies with Dr. Josiah Goodhue of Putney, Vermont, staying with him for four years. He then settled in Tyngsborough and started a practice there in or around 1793 which he continued for the rest of his life. In addition to Tyngsborough, he practiced in Dunstable, Groton, Westford, Chelmsford, Dracut, and Pelham, New Hampshire.

We learn from Patterson that

[one peculiarity in the practice of physicians in those early times, was that they not only kept all their medicines, but prepared or compounded them for use. This involved a great amount of labor and skill. As an illustration of Dr. Thomas' skill in this direction, he compounded a certain cathartic pill, which, from its excellence, obtained quite a notoriety in his day, being used by many physicians, and is still used and known as "Thomas' Pill."]

Dr. Peleg Bradley (1792 - 1848), the son of Amos Bradley, was born in Dracut, May 26, 1792. He studied medicine with his father, attended medical lectures in Boston, and received a license from Massachusetts Medical Society. In 1813 he began practice with his father in Dracut, and worked with him until his father's death in 1817. He travelled over the same circuit as his father (Chelmsford, North Chelmsford Tyngsborough, Dracut, and Pelham, N.H). Then extended his travels to include towns of Methuen, Andover, Billerica, Tewksbury, and Lowell, both as a town and city, presumably because roads and bridges were constantly being improved and extended during this time.,

Patterson gives us an indication of some of the changes taking place in medical
practice in the following passage:

> It was natural that his method of practice, at first, should conform somewhat to that of his father, though it was afterwards modified to meet the demands of modern thought and experience. During the first years of his practice he obtained all of his medicines from Boston, and at his house he kept a small apartment where he compounded his mixtures, made his pills, and prepared his ointments and plasters.

He was a careful physician, and gave attention to methods of obtaining knowledge from experience. He kept an accurate record of his most important cases, giving careful thought to the details of aetiology, pathology, diagnosis and treatment. He was thus enabled to classify and arrange under their appropriate heads the different diseases, and to arrive at better methods of treatment than an absence of such a method could have given.

Rufus Wyman (1778 - 1842), was born in Woburn. At the age of 22, he entered Harvard University, graduating in 1799. In 1810, he began his medical studies with Dr. Brown of Boston, at the same time receiving clinical instruction at an almshouse. Due to Dr. Brown’s illness he began studies with Dr. Jeffries of Boston, and received his degree in 1813. He worked in partnership with Dr. Jeffries for nearly a year, then, “owing to a pulmonary difficulty, Dr. Wyman thought it best to seek a location farther inland” and settled in the town of Chelmsford in 1814.

When the McLean Asylum at Charlestown (now Somerville) opened, Dr. Wyman became its first Superintendent. It was the first position of its kind in the United States, and he held the position for nearly 20 years.

Israel Hildreth (1791 - 1859) was born in Dracut, He began his studies with Dr. Thomas of Tyngsborough, then studied with Dr. Wyman of Chelmsford, both discussed above. He also attended a full course of medical lectures at Boston, and received a license from the Massachusetts Medical Society to practice medicine and surgery. In 1815, he began practice in Dracut, later extending his practice into surrounding towns.

Patterson relates that

> being a diligent student and a close observer of the phenomena of disease, he became acquainted with the principles and methods of treatment which are still considered of recent date. He did not fall into the prevailing custom
of those days in the use of drugs, which were given more frequently and in larger doses than is the practice of later years. He sought rather to ascertain if the cause of any prevailing sickness was not due to the neglect of proper sanitary conditions of the house and its surroundings, and by their removal to bring about a return of health through a proper regard of the laws of hygiene.

This, together with the use of simple remedies, he considered of more importance than the increase of medicines, either in kind or quantity. In this respect he was certainly in advance of his time. In the sick room, he was ever kind, thoughtful and considerate. Nothing was allowed to escape his notice which could in any way be made subservient to the comfort and improvement of his patients, while anything which he observed that he thought detrimental to their best interests, he was prompt and fearless in stating. He was ever ready, however, to give the reason which justified his action.

Zadok Howe (1777 - 1851) is believed to have been born in Bolton, Connecticut in 1777. The Howe School at 390 Boston Road in Billerica is named after him. The building is not used as a school but still standing. Dr. Howe donated the land and building for use as a school. He began medical studies later in life, first under the direction of Dr. Miller of Franklin, Massachusetts. He began practice in Concord, New Hampshire, where he remained a few years. But for some reason he became dissatisfied, and in 1811 he entered into partnership with his former preceptor, Dr. Miller, and for two years they ran an infirmary for the cure of cancers. This not proving lucrative, “the partnership affairs were adjusted and divided.” When he was next heard of he was located in Boston. He remained there but a few weeks, when, one day after dark, he took in his sign, and again “embarked on the troubled waters of uncertainty.” The next place he settled was the town of Billerica around 1816.

Dr. Howe was also known for his writing and speaking on various topics. An address titled “Fear in Connection with Medicine” was delivered before the Middlesex Medical Association in 1831, and was published at that time. His address titled “Quackery” (1835) was delivered before the State Medical Society as an attack on quackery. Seeming to equate quackery with empiricism, he declared that quackery still survived “not only in
England, but, what is of more importance to us, the demon of Empiricism still hovers over the land of the Pilgrims.” He also discusses practices that we equate more with quackery today.

According to Patterson, he was careful and conscientious in his methods of procedure, and “he never performed an operation when he thought he could do no good.” This seems to imply that sometimes this did happen. His consultation practice was very large, in the adjoining towns and in more distant parts of the state.

John C. Dalton (1795 - 1864) was born in Boston, 1795 and entered Harvard in 1810. In 1815 Dr. Dalton began as a student of medicine in the office of Dr. Josiah Bartlett of Charlestown. He attended two full courses of medical lectures in Boston, one in the University in Philadelphia, and received his degree from Cambridge in 1818.

That same year Dr. Rufus Wyman, discussed above, then practicing in Chelmsford received the appointment of superintendent at the McLean Asylum at Charlestown. A public meeting of the citizens of Chelmsford asked him to appoint a successor. He selected the 23-year-old Dr. Dalton, who was then in his twenty-third year, and had just received his degree.

In 1831, Dr. Dalton moved to Lowell and practiced there for 28 years. He moved to Boston in 1859 and died in 1864 at age 68 as a result of an unfortunate accident. According to Patterson, while returning home from an errand, he slipped on some ice by his door and fell “upon a piece of iron, the model of a cannon, about six inches long and one inch in diameter, which he had in his pocket, and which was forcibly driven against his left side.” In a few hours after the accident he developed the symptoms of pneumonia that rapidly increased resulting in his death. Dr. Dalton is buried in the Lowell Cemetery.