The Building of the Pawtucket Canal
In preparing this historic outline of the building of the Pawtucket Canal, the chief
purpose was to tell a story, not produce an educational text. If the reader finds it
enjoyable and his interest is perked enough to want to examine a little more closely what
was accomplished with the construction of the Canal, then even the better. If the reader is
inquisitive enough to want to read the material that was consulted in more depth, the
bibliography at the end of the book will refer to what sources were used.

The Canal is unique that in its comparatively short life it served two major purposes and
achieved its objectives in both. Originally built as a transportation Canal, it functioned in
that capacity until the need for it ceased with the demise of Newburyport and the
completion of the Middlesex Canal. Reconstructed as a power Canal, it outlasted the
mills that it served. There were other canals built for transportation and other canals built
to provide power but none comes to mind that did both. There are several of examples
locally so we don’t have to examine the world. The Wamiset and Lawrence Canals both
provided waterpower for the industry of the day and the Middlesex Canal was certainly a
marvel in its time for the twenty-seven and one quarter miles and twenty locks that
moved vessels from the Merrimack Valley to Boston or equally made the reverse trip.
But neither was employed in both tasks. The Pawtucket Canal was.

Sometimes with the extent of the material read in the research for the book, some
material will inevitably be left out or repeated more than once. The author doesn’t
necessarily agree with everything he read just as you won’t agree with everything that he
wrote. But there is no fiction intended, just the history as it was offered in the writings of
two hundred years ago.

What can be read in an hour or two took many months of research to put together and
several people who went out of their way in their help are to be thanked. The order of the
listings takes away nothing for my appreciation to all.

The Center for Lowell History, UML, was a great source of information and Martha
Mayo put up with my many visits. Janet Pohl is certainly one of the main reasons why
this finished work even exists.

The National Park Library also contributed much material to the research and Jack
Herlihy did his best to help out. Dan Walsh was also more than willing whenever he
could add to the material.

Bud Paquin was instrumental in producing the finished product that you are reading and
his workmanship added greatly to the authors endeavor.

Thank you all.
Chapter One

Before The Beginning

It’s easy to discuss the canals as a transportation system or a power system but they didn’t spring full fledged from the ground as either. The veil covering the past can be difficult to pull aside for a glimpse of the true happenings and sometimes the records are contradictory. The people who wrote the history were human and each observed the every day activities with their own views and interests. But those are the only sources that we have to rely on.

Much of the contents of this work have been written about before. After all, the author had to rely on past records to reach his own conclusions. But the information contained in many of the studies is presented in bits and pieces with no effort to present the past events leading up to the completed canal system as one continuous history. As a story, the telling may be made more interesting.

Some of the material as it is presented can be open to interpretation. After all, we’re talking about history and have only the available records to go on. In writings of the past, words could have had a slightly different meaning. Their context in a sentence could project a different meaning than we attribute to what we’re reading. Sometimes spelling left a lot to be desired. Questions may be asked by the author to try to clarify the subject if it seems there could be a different view than the one held in current thought. The answers may not help at all in reaching a conclusion but who knows, we may just hit on the better interpretation.

Only a limited picture of the development of the Canal System can be derived from the text itself no matter how many words are written. In order to clarify the subject matter, maps, sketches and drawings produced around the time of the construction may be referred to. Even etchings and early photographs will be used if they serve to illustrate a point. All should help in following the descriptions given in the course of the book if consulted during the reading.

In order to avoid lengthy footnotes the source of information that is being offered will be stipulated at that time. If the document quoted from is too lengthy or is of exceptional interest to the reading, it will be followed by an endnote and described in the bibliography.

But what would really help the most in understanding the contents of this book for the reader is some knowledge of the canal system and its workings. Even a walk along the canal walls and a few minutes of examining a lock structure if you are not familiar with either. Even better if you can view the canal at different times, both when it is full and empty of water. When the water level is at its peak, all that is visible is a smooth flow of water coursing past occasional steel grates along side a mill to obstruct debris from entering the raceways and wheel pits under the mill. The view doesn’t present too much to be seen except for the canals themselves directing the water in its travel. When the canals are drained, all of the inner workings are exposed, warts and all. Now the entrances to the raceways that feed the wheels and the tailraces that allowed the water that had done its job of turning the water wheels that provided power to the individual.
mill to return to the Pawtucket Canal or the Merrimack River. It is difficult, almost
impossible to comprehend the workings of a canal sight unseen, to appreciate the
engineering and untold labor involved at every step of the way in the construction and to
serve as a monument to the men who had the vision

In order to render the understanding of the construction of the canal system easier to
grasp, each of the seven canals will be discussed separately. The order of the presentation
of the material will be dictated by the year the canal was built for want of a better reason.
A map of the completed canal system along with the mill complexes that were powered
by the individual canals is shown below (1) A little time spent scanning the map and
becoming even slightly familiar with the layout of the canal system will probably
enhance the overall appreciation for what was accomplished. Maybe lend itself for more
enjoyment in reading the book.

The Lower Merrimack River Valley 1976
Chapter two

The Merrimack River and its Part

In order to fully grasp the entire picture of the need to build the canal, it is probably best to spend some time examining the part that the Merrimack River played in moving the timber. The need for the Pawtucket Canal that was started in 1792 and saw the first barge complete the trip in 1797 will be come obvious. True, the opening of the Middlesex Canal in 1804 provided a more direct route to Boston and Boston was fast overtaking Newburyport as the prime seaport. But also the silting up of Newburyport harbor\(^1\) was the beginning of the end for that once great port and spelling doom for the ship building industry there. Did that mean the end of great amounts of logs being harvested from the forests of New Hampshire and floated on the Merrimack River? No way. Over the years Lowell had built up its own logging industry and that continued unabated for many more years.

The Merrimack River has its sources in the White Mountains but the waters are added to greatly by the tributaries adding their flow to the volume on the way to the sea. The river system covers 250 miles\(^2\) and drops 6000 feet\(^3\) throughout the journey and this is what accounts for the tremendous amount of power that the river generates. It was estimated that the total horsepower available at the Pawtucket Falls was between nine and ten thousand horsepower.\(^4\)

The Merrimack River by name actually has its beginning at the forks located just below Franklin, New Hampshire. Above this, the river is known as the Pemigewasset.\(^5\) The waters from the Pemigewasset River and the waters from Lake Winnepesaukee merge at the forks and combined they create the power of the Merrimack River. A map of the entire river basin is reproduced on page 8.\(^6\)

To enhance our understanding of the problems that were dealt with every day working the river and how the building of the Pawtucket Canal eliminated many of these problems, the retelling of the following two recollections may help. Each describes the industry on the Merrimack River in different time frames but together they serve to provide eyewitness accounts of the activities of day-to-day labor that necessitated the building of the Pawtucket Canal. Sort of a before and after picture.

The first entry was recorded by Silas Tyler\(^7\) who was born in 1794. His father and uncles toiled on both the Pawtucket and Middlesex Canals and he followed their footsteps. He remarks that the people that came down from ‘up country’ (New Hampshire) brought down a great deal of lumber on the river. He goes on to describe how before the Pawtucket Canal was built, lumber was brought around the Pawtucket Falls by team, was hauled down and into Pawtucket pond (a deep pool of quiet water below the falls) and rafted in cribs. That is they would bind the logs up again for the trip to Newburyport. He continues with a lively story of moving the ‘shots’ as he terms the cribs of logs, to below the rough water of Hunt’s Falls. There the shots would be gathered together to form the larger rafts for the trip down river.
The Merrimack River drainage basin as reproduced from Water Power, Vol. #1, 1979 by Louis C. Hunter. Shown is the Merrimack River from its beginnings at the fork just below Franklin, New Hampshire. In the journey to the sea, the river takes a drastic turn toward the east at Lowell and then follows a somewhat northerly direction toward the sea. It is agreed by geologists that at one time the river emptied into Boston Harbor along the route of the Middlesex Canal but the course was altered during the glacial period. (8)
In another tale, a gentleman by the name of Nicholas Norcross tells the story of his father who in 1841 was approached about the opportunities that existed in selling timber to the sawmills established in Lowell.(9) The market in Newburyport may have gone belly up but Lowell had developed a lumber industry itself over the years of all of the timber passing through its borders. Impressed by what his inquiries uncovered, he purchased extensive standings along the Merrimack River in New Hampshire. Up until this time all the harvested logs were rafted down the river and through the Pawtucket Canal. Norcross was from Maine where just as much timber was cut but they moved it along the rivers in drives. The difference in the two methods of moving the logs was, in rafting the logs are confined together by means of ropes and wooden pins. In driving the logs, the harvesting of the logs is exactly the same as rafting. The logs are cut in the winter and stacked beside the river. The difference is in driving, the logs are simply rolled into the river to ride the high water during the spring melting of the snows.

There were two booms in the river just above the falls to coral and hold the logs from the drive in the river until needed by the mills or to be rafted down river. One at Tyng Island was nearly ½ mile long. Another boom was located along the bank of the river in the area of the ice house (this would have been just above the entrance to the Pawtucket Canal) and it stretched for nearly a mile. As the sawmills were to be supplied, the logs were rafted or loose floated down the river to the canal and through the Guard Locks to the mill ponds at the sawmills and on hand for sawing.

Frequently the drives would be interrupted because of rock becoming exposed on the river bottom during times of low water. The width of the river would narrow greatly because of the reduced volume of the water creating log jams. Often it took several days to clear the jam and get the drive moving again. This condition left no choice but to free whatever amount of the logs as possible and raft them to the sawmills to keep the mills in operation. Any obstacles that hung up the drives were blasted in the summer when the water was very low.

Enough has been said about the part played by the Merrimack River in fostering the need for building the Pawtucket Canal. Transporting the timber to its destination was the prime reason for the canal in the first place. And now that the river had served its purpose, it was out of the picture? Not at all. The waters of the river were just beginning to be utilized. Now it was up to the swift flowing currents to power the great industrial mills that would raise the City of Lowell from the fields of East Chelmsford. Although only a brief summary of the part that the Merrimack River played in being the prime mover of the timber, the text should provide some background for the need to build the Pawtucket Canal. A more convincing argument of the obstacle that the Pawtucket Falls presented to any and all commerce on the river can be presented in just a few photographs of the rapids.

While these pictures were taken long after the construction of the Pawtucket Canal around the falls, the topography of that section of the Merrimack River remains unchanged to this day. That is excluding the section of the University Avenue bridge, which commands the upper portion of the photograph, of course, which is relatively modern.

In any case, a better illustration of the problem presented to the people rafting logs down the Merrimack to Newburyport couldn’t be made any clearer.
This is an excellent illustration of water flowing over the rapids of the Pawtucket Falls at its highest crest. The caption at lower left in the photograph gives the water height as 91.8 feet above sea level. Normal height is about 83 feet. At this date the water height is nine feet higher than normal completely covering the rapids.
In the photograph directly below, the caption describes the stone comprising the river bed as you are viewing them. A far different circumstance from the previous photo of the rapids buried in the onrush of water at the flood level. The caption states that photo was taken from two hundred feet upstream from the School Street Bridge. The dam across the Merrimack River at the site of the Pawtucket Falls is only indicated by the dark ridge across the photograph running from left to right at the top of the rocks that create the falls.

This picture was taken standing on the rock. In any case, the obstacle created to the lumber interests is quite evident. This same scene can still be viewed from the School Street Bridge although the effect won’t be as awesome because now you would be looking down on the stone.

In the next photograph the rocks present at the very end of the cataclysm that created the falls eons ago appear. The Merrimack River now turns to the right (would be to the left on a map projection) and meanders forty miles to where it empties into the sea at Newburyport.
- Photo of exposed rocks under Moody Street Bridge-

This view appears to have been taken from the Great Wall that separates the Northern Canal from the Merrimack River. All of the rapids in the river bed including these shown can be observed from the University Avenue bridge.

These three photographs should at least provide the reader with a panoramic view of the stone that existed on the river bed at the site of the Pawtucket Falls and were the cause of the rapids that made them impassible.

The photos were made available by the University of Massachusetts, Lowell Center for Lowell History from the Proprietors of the Locks and Canal collection.
Chapter Three

The Pawtucket Canal - Where it all began.

The place to start is at the beginning and the beginning is the Pawtucket Canal. The story of the construction of this canal will occupy the greatest part of the book for the simple reason that it was the first canal built and there would exist no others without it. The Pawtucket Canal was only built to provide a means to ferry the rafts of timber around the Pawtucket Falls on the Merrimack River from New Hampshire to the seaport and shipyards of Newburyport Massachusetts. It, and the six others that were to follow, ended up fostering an industrial revolution.

Newburyport, Massachusetts was the biggest market for the timber cut in the forests of New Hampshire and the supply seemed endless. From here, it was also transported along the coast to Boston and shipped to other markets where the demand was high. Newburyport was a major seaport and a hub of shipbuilding. Transporting the timber to Newburyport to be utilized for the ship building industry and overseas markets using the then existing roads would have presented a logistical nightmare. The Merrimack River flowing from the forests to the seaport offered the ultimate solution. So what was the problem. Just float the harvested logs down the river to the destination. The rapids and falls that occurred every so many miles were the problem. How to get over or around these obstacles was the only hindrance to floating the timber downstream.

During high water created by spring melting of the snows, freshets or heavy rains, the logs could simply be allowed to tumble over the rapids and smaller falls without any damage to the timber. This was exactly the way that the logs were moved in “drives”. But this wasn’t the complete answer either. It still left the enormous task of rounding the logs up after the wild trip in the turbulent and swift current and that presented more work. Even so, this method became unworkable during low water periods that persisted through much of the later summer months. Less water would reduce the width of the river and combined with any exposed rock created log jams.

The rapids and smaller falls could be cleared by removing the stones or by explosives when necessary to force a passage but what to do when they reached the Pawtucket Falls. That section of the Merrimack River flowed between Dracut and what was then East Chelmsford. The falls were located just above the bend in the river that was known as the Great Bunt at what was to become Lowell. The Pawtucket Falls were hundreds of feet of fast flowing water or no water at all depending on the season, jammed pack with glacial boulders. A local historian, Henry A. Miles best described the scene. “Here was a decent of thirty two feet, not perpendicular but over several rapids, and circuitous channels with a violent current and amid sharp pointed rocks.”

A second writer of the times wholly concurred with the treacherous passage of the Pawtucket Falls. Charles Cowley was a historian who wrote ‘History of Lowell’ in 1856. He described the difficulty of rafting the logs through the Falls. “The decent of
the River at the Pawtucket Falls was so precipitous, the current so violent and the channel so rocky, that great difficulty was experienced in passing rafts down the rapids.” These falls can still be observed from either of the two bridges that span the Merrimack River at that location or from the Pawtucket Boulevard that parallels the river.

No matter what the river men did to clear the problems created by the rapids above and below the Pawtucket Falls, it didn’t work here. Rafting or driving was the solution for floating the timber downstream until the Pawtucket Falls were encountered. At this point, the rafts had to be broken down and the logs hauled around the falls by teams of oxen or horses to be reassembled so the journey could be completed. It seems from the records that all of the logs were rafted below the falls.\(^{(14)}\) This is where the story of the Lowell canals really begins even though Lowell itself didn’t even yet exist.

The Beginning - Planning and Paperwork

The timber interests in New Hampshire and the ship builders in Newburyport were well aware where the bottleneck on the river was but; what was the answer? The most obvious solution was a canal around the Pawtucket Falls. In 1772 a group of Newbury-Port (sic) businessmen petitioned the Massachusetts Legislature in order to be granted the authorization to build a canal around the Pawtucket Falls. ‘The Patucket Canal Acts’ as the petition was officially titled is reproduced here in part from the records of The Proprietors of the Locks and Canals on the Merrimack.\(^{(15)}\)

“An ACT incorporating Dudley Atkins Tyng, Esq. And others, for the Purpose of rendering Merrimack River passable with Boats, Rafts, and Masts, from the divisional line of New Hampshire and Massachusetts, to the Tide-Waters of the Said River, by the Name of The proprietors of the Locks and Canals on Merrimack River.” The Act goes on to state that removing the obstructions to the passing of boats, rafts and masts upon the Merrimack River will be of great public utility. Dudley Atkins Tyng, William Coombs, Joseph Tyler, Nicholas Johnson and Joshua Carter were the original petitioners for the Act of Incorporation and it was passed by the Legislature June 27, 1792. The entire Act as granted was comprised of twelve sections covering six pages. This Act and several others pertaining to the operation of the Locks and Canals will be referred to many times in part as they represent the documents that governed the stipulations of the Massachusetts Legislature in granting the petition.\(^{(16)}\)

The building of the canal didn’t start the next day. In fact it would be over a year before the digging was to actually begin. There were still monies to be raised for the actual construction and just as is done today, stocks in the corporation were sold to interested parties to finance the work. Each stockholder would be a proprietor and share in the income from the tolls according to the amount of shares that he held. Likewise he would be accessed accordingly for the cost of the construction of the canal. The canal ended up costing over $50,000 before it was completed, more than double the projected cost at its inception. It is doubtful that the original investors even recouped their investments before the Middlesex Canal was completed in 1803 opening in 1804 and funneled off most of the traffic because of its direct route to Boston.
There wasn’t even a route decided on at this point. The only fact that was certain and agreed on by all was the necessity of building the canal. Whether it was to be built on the north side of the Merrimack River and through Dracut or on the south side through Chelmsford was yet to be considered. But that decision was made following an inspection of the land on both sides of the river. After viewing the land, a meeting of the Directors of the Locks and Canals was held at Newbury-Port on August 23, 1792. It was resolved “That a canal be cut at Patuckett (sic) Falls on the side of Chelmsford, beginning near the great landing place, thence running to Lily-pond, from thence by Speen’s-brook to Concord-River.” It was added that a committee take early measures to clear the bushes and have an accurate survey taken of the land through which it is proposed the canal shall pass.(17)

Now that an exact course for the canal had been decided on and the planning was proceeding to begin the work of the actual digging, a map has been reproduced on page 16 showing the path that the Pawtucket Canal was to follow. As the caption states, this is a copy of a plan that was submitted to the legislature with the request for incorporation by the Proprietors of the Locks and Canals on the Merrimack and permission to build the canal was granted. But let’s take a minute to study the map and compare it to a like map shown on page 17 that outlines the same course for the proposed canal. Both maps are reproduced from prior 1792 surveys and are in the archives of the Proprietors of the Locks and Canals.
This drawing shows the original plan of Speen’s Brook taken from the Papers of Act of June 25, 1792, which incorporated the Proprietors of Locks and Canals on Merrimack River. This was the name the corporation that built the canal was known by. Throughout this book it will be referred to as PL&C.
- Second Plan of Speen’s Brook-
Chapter Four

An Historical Question

‘An Act incorporating Dudley Atkins Tyng, Esq., and others for the Purpose of rendering Merrimack River passable with Boats, Rafts, and Masts, from the divisional line of New-Hampshire and Massachusetts, to the Tide-Waters of the said River, by the Name of The Proprietors of the Locks and Canals on Merrimack River.’ This was the opening sentence of the Patucket Canal Acts dated June 27, 1792 that granted the right to build the Pawtucket Canal and laid down the rules that would govern the undertaking, including the operation.

The map submitted with the original request for the incorporation of the Proprietors of the Locks and Canals, Merrimack River (and marked ‘copy of original plan’, 1792, reproduced on page 16) gives very definite measurements along the proposed route of the new canal including the dotted section connecting the pond with the Merrimack River. All of these distances taken together are added for a total of 580 rods or approximately 9700 feet. The calculations are shown upside down at the top of the page. This would certainly indicate that a survey was completed before ordered by a Directors meeting of August 23, 1792, no records were found of any survey before the incorporation was granted. Why was the dotted section included at all and why was it so accurately represented with these exact measurements even including the sharp turn to the left after it left the river? Was it possible that some sort of ditch or waterway existed connecting the pond with the river and that’s why it was included on the map? Let’s briefly examine this possibility.

While it is true that no written record of a survey prior to the one ordered at the Directors meeting in August, 1792 mentioned above was found, what did show up was a bill submitted by Dudley A. Tyng to the Directors. The bill is identified as Order No.1 and dated 1792, May, the very first entry on the bill states “To journey to Chelmsford to view & Survey Speen’s Brook”. Tyng was one of the original Newburyport businessmen seeking to build the canal. He not only drafted the Petition to the Massachusetts General Court to be granted the right over the Pawtucket Canal construction, he also wrote the Acts of Incorporation for the PL&C. Both of the costs for his work in preparation and presentation to the Legislature are also itemized on this bill.

The second map on page 17 shows roughly the same course for the canal but differs only in the dotted section tying the Merrimack River to Lily Pond. It is much straighter and the notation states that this was the cut made between the river and the pond. This point may seem academic but it may be more important than that historically. The original specifications for the dimensions of the new canal being dug stated that it would be able to accommodate rafts of logs 100 feet long and 25 feet wide. It is very unlikely that this size of a vessel could navigate the turn that the jug handle presented as a ninety degree turn shown in the original proposal for the canal that was presented to the Legislature. Also the dotted section was indicated as entering the pond at a right angle. The measurements on the original plan are given in rods. At 15 rods, that means a 100 foot long raft occupying the waterway would travel about 145 feet before reaching the
sharp left hand turn, and then 20 rods or about 230 feet before reaching the pond.\(^{(23)}\) (The distances quoted that the raft would have to travel in the waterways is after the length of the raft in deducted). No description of the pond or its size is known but this is a very large raft to be maneuvering in the confines of even a good sized body of water. Keep in mind that poling was the only means of steerage and locomotion. Towpaths would later be built along side the finished Pawtucket Canal so as to accommodate draft animals to tow the rafts or barges but that is only practical where the course of the canal is fairly straight.

So it is entirely possible that a small waterway always existed from the Merrimack River to Lily Pond and it was illustrated as a dotted line and surveyed for the original plan that was submitted to the legislature. Then the route was later changed to be more accommodating for the handling of the rafts. The new course would also be much more practical because of it being straighter.

One question that arises in all of the reading of the research material is the descriptive titles of Lily Pond (at least once referred to as Mud Pond)\(^{(24)}\) and Speen’s Brook. A pond would indicate a small enclosed body of water while a brook would not even be as large as a stream. The definition of a swamp is a piece of wet, spongy land, a marsh. The description of these waterways in no way would indicate any type of a heavy current. The drop in the water level between the Merrimack and Concord Rivers is thirty feet\(^{(25)}\) so why was there no rapid water flow in these waterways. Was it because there existed no connection to the Merrimack River until the canal was excavated? If that were the case, where did the water in the pond and brook originate. Or was there enough of a water flow in a small brook that existed between the Merrimack River and Lily Pond to provide sufficient water to keep the pond filled, the brook flowing and the swamp swampy. There had to be a continuous source of water from somewhere or there wouldn’t have been a pond or a brook or a swamp. With the difference in elevation between the two rivers, any accumulating water would have simply drained off into the Concord River.

The two plans offered are both from the records of the Proprietors of the Locks and Canals, the corporation that built the canal. They are both dated 1792. No explanation was noted as to why the dotted connection from the river to the pond differed. The question may be answered in the text of the minutes of the Directors meetings of the time that were recorded.

During one of the first meetings of the Board of Directors dated August 23, 1792, the exact location and route of the new canal was decided on. It was resolved “that a canal be cut at Pawtucket Falls on the Chelmsford side beginning near the great landing place thence running to Lily Pond and from there by Speen’s Brook to the Concord River.”\(^{(26)}\) This directive seems definite that a canal was to be dug to connect the river and pond. It does not rule out that a waterway already existed but probably was not suitable to their use. A committee was appointed consisting of Dudley A. Tyng, Joseph Tyler and Capt. John O’Brien\(^{(27)}\) to get the work rolling. They were directed to clear the bushes, take measurements and have an accurate survey taken of the land through which the proposed canal shall pass. Take notice that the Directors of the newly formed corporation still refer to the proposed canal. Did they have some doubts about the undertaking or just referring to the fact that the canal would exist at a future date?

The existence of the brook was certainly well known as far back as the earliest
settlement of the area, and the written records didn’t overlook the little brook that was to constitute the foundation of the Pawtucket Canal. An early deed of the transfer of land, now the heart of Lowell, and dated 1688 is also recorded in Kenngott’s Record of a City. It is a covenant between the Indians and the local settlers describing the land swap between them of the land comprising Wajmesit (sic). This was a neck of land bordering the Concord River abutting the Merrimack River that was to constitute the area of downtown Lowell. The southern boundary is set as “South by ye little Brooke called Speens Brook”(28)

Before we leave the subject of the origins of the Pawtucket Canal, a little more results of the research is offered in the map below and titled Study of the Danforth Plats. It is dated 1659-93(29) it will take a little studying to interpret especially because so few of the features that interest us are marked except the dotted line that the author was added to outline what we assume indicates Speen’s Brook on the map at the bottom center.

The land grants on the north side of the Merrimack River (now Dracut) are of no interest to us, only the area on the south side named Wajmesit on the map which was to become East Chelmsford and eventually Lowell. If one accepts that the straight square lines outlining the grants as the boundaries of the properties, then the wavy lines running into the river can be interpreted as brooks or streams. If this assumption is accepted and it certainly appears so, then the outline of Speen’s Brook is included at the bottom of the map running from the Merrimack River to the Concord River.
When this area was first settled as Chelmsford, it was already populated by native Indians. Many of the colonists had extensive contacts with them as described in the History of Chelmsford by Waters. The colonists were only allowed land grants from Massachusetts under English laws and with English permission. The rights of the Indians were at least partially respected by English courts. At least in dealing with land ownership. Even if the terms were a little one way, all of the boundaries of any transaction seemed to be dutifully recorded when known at all.

Waters in his History of Chelmsford describes the extensive contacts that the settlers had with the Indians. If any complete waterway around the Pawtucket Falls had existed, it should have been well known at the time and recorded. Even if the history had been sketchy, some record of its usage would have been noted and passed down but that doesn’t appear to be the case. The people would have utilized any waterway around the falls that existed long before the canal was built no matter how primitive.

Why was all of this effort spent on trying to prove that the Merrimack River was connected to the Concord River before the construction of the Pawtucket Canal. This book is about the building of the canal. It seems that the history as now presented in many writings portrays the canal as being dug, period, from Lily Pond to the Merrimack. There is only one source of information open to any party interested in the origin and building of the Pawtucket Canal. That is the Minutes from the Directors meetings, the Directors of the Proprietors of the Locks and Canals on Merrimack River. That is the corporation that built the canal. Who else would have kept a record, and if other records exist they have not been uncovered.

Before closing the chapter, one other point of interest should be covered. It entails a little history of Lily Pond and Speen’s Brook. They have been around since the first people settled the area, white or red. They both are drawn into even the earliest maps of the area. Lily Pond was probably just that, an almost standing pool of water overgrows with weeds at least once referred to as Mud Pond. Speen’s Brook has been used as boundary markers since the settlers discovered the neck of land on the Indian lands know as Wamasit. It was in actuality named for an Indian by the Christian name of James Speen. (30)

The entire length of the future canal had to be excavated to some degree to allow passage of the rafts and boats that it was being built to accommodate. The phrase in the contract that stipulated that the canal be dug from the Merrimack River to Lily Pond and thence by Speen’s Brook to the Concord River shouldn’t be taken out of context. It means just what it says. It does not stipulate that there was no waterway between the Merrimack River and Lily Pond. At best the inference is that is size was so insignificant that it never was accorded formal recognition. Also in the indenture made as a contract between the PL&C and Tyler, the man who oversaw the construction of the canal, stipulated that he would complete and finish the canal by the best and most convenient route to Lily Pond. (32) This clause in the contract appears to have given him the right to restructure any section of the existing waterway to suit the necessary needs of the navigation of the rafts, barges and masts. This also gives credence to the straightening of the dotted section of the proposed canal indicated in the difference between the two maps shown on pages 16 and 17. As the waterway had to be excavated to some extent anyway and this section would have been straightened as a matter of course to except the rafts.
Does this summary of the evidence (or lack of it) of the source of water from the Merrimack River to Lily Pond and thence Speen’s Brook even justify the question? Yes or no, it shouldn’t be overlooked as we move on to the actual construction of the Pawtucket Canal.
Chapter Five

Finally, a Step Forward

The Proprietors of the Locks and Canals on Merrimack River was to waste no time in getting organized. At a meeting held in the Newbury-Port courthouse on August 8, 1792 they commenced to elect the seven directors from amongst their numbers who would oversee the Pawtucket Canal construction and operation. They were certainly very productive at this meeting because they also managed to produce the bylaws that would govern the Incorporation throughout the project. (33)

At a meeting of the Directors on August 23 following, it was resolved “That a Canal be cut at Pawtucket Falls on the side of Chelmsford, beginning near the great landing place, thence running to Lily Pond, from thence by Speen’s Brook to Concord-River”. A committee of three Directors was selected “to clear the bushes and to have an accurate survey taken of the land through which it is proposed the Canal shall pass” (34) Whether or not any real survey was ever conducted at this time remains moot. One is certainly not mentioned as having been done in the records that were examined. Any proper survey if there was one carried out at any time during the construction of the Pawtucket Canal would have definitely helped avoid many of the problems that were to arise when the canal was nearing completion.

At any rate, the committee comprised of Dudley A. Tyng, Joseph Tyler and Capt. John O’Brien went about the business at hand probably at least clearing the bushes from around the pond and the brook. All seemed to be in readiness for the work ahead. One little detail appeared to be overlooked in all of the planning to date. Even though the Charter allowed for land taking to build the Canal (35), no move seems to have been made to assure the right of way. On September 13, Dudley Tyng was requested by the Committee to purchase the tract of land owned by James Parkhurst that adjoined the Merrimack River. (36) The terms must have been agreeable. The deed was signed, sealed and delivered on March 16, 1793 (37) for the princely sum of $333.33 (100 pounds). The parcel consisted of about 25 acres and through this land the headwaters of the Pawtucket Canal would pass.

The map on the next page, page 24 (38), will go a long way rather than text to describe the section of land described in the Parkhurst deed. On this plan it is marked LXV37. It may be difficult to orient yourself as to where you are actually standing in Lowell just looking at the map but if the reader can locate the entrance to the Canal from the Merrimack River off Pawtucket Street, there is a walkway along side the canal that leads to the Francis Gate and the Guard Locks. Even if the description of the beginning of the canal system means nothing to the reader, if there is any real interest in examining the canals from beginning to end, simply follow any canal in the general direction of the river. You will arrive at the headwaters of the Pawtucket Canal.
Plan of Patucket Farms from 1821 by J.G. Hales. The plot of land identified as LXV/37 abutting the Merrimack River is the Parkhurst purchase through which the Pawtucket Canal would pass and where it originated.
By the time that the purchase of the Parkhurst land was finalized, some work on the Canal had already commenced. Stone was to be transported to those parts of the Canal over which bridges were to be placed and lumber had been ordered for the decking.\(^{(39)}\) At a meeting held in Newburyport January 10, 1793 the Directors voted the following notification to be put up at six Publick-Houses nearest to the Canal as soon as may be.\(^{(40)}\) It had been decided that the only practical way to complete the Canal on time and within budget was to build it under contract.

“Any Persons disposed to undertake the digging of the Canal round Patuckett Falls to a sufficient depth for receiving the Locks and of the width of forty-feet will be pleased to transmit Proposals to the Subscriber on or before the last day of January current. Sufficient security will be expected for the Performance of any Contracts entered into, and Payment will be made as the work shall proceed.”\(^{(41)}\)

What the response to this posting was is unknown but one of the Directors definitely threw his hat into the ring. Joseph Tyler had decided to consider the undertaking of the construction of the Canal. There must have been some back and forth dickering between the parties because at a meeting of the Directors on February 14, 1793 all were informed that the prospect of contracting with Mr. Tyler is at an end.\(^{(42)}\) The decision appears to be rather final as all present were also notified to attend the meeting of February 22 “to devise ways and means to carry the business into execution”. (that is carrying the building of the canal to completion).

What concessions were made by either party is unknown but by March 11 Tyler was granted the contract which was agreed to and signed by both parties on March 16, 1793.\(^{(43)}\) The only stipulation made by Tyler outside the wording of the contract was that if the PL&C ever entertained the idea of mills being built along side the Canal, that he be given first preference.

No records have been located by the author that actually gave an account of the building of the Pawtucket Canal when it was begun as a transportation canal. For example, who dug the Canal? This undertaking was in progress long before the Irish labor that worked on the later canals was available. The construction of the Middlesex Canal was performed for the most part by the farmers through whose land the Canal passed.\(^{(44)}\) It was built in more or less the same time frame so it is probably within reason to conclude that the work on the Pawtucket Canal was organized following the same methods. For the most part the existing waterway only had to be widened or deepened. For the locks, carpenters from the house or ship building trades were probably available. No one was experienced in lock building as there were no others around. These were the first as was the Canal. It was all learn as you go. There wasn’t even a surveyor mentioned until long after the completion of this Canal. The inexperience of Tyler and the builders of both the Canal and the locks would become evident as the work progressed toward completion.

Still, the Directors seemed to be more than pleased with the work of Tyler. At the annual meeting held at the Court House in Newburyport on September 11, 1793, a glowing report was offered as to Tyler’s accomplishments to date. Wickasick Falls were now navigable and the same would soon be true as to Hunt’s Falls as agreed to in the Acts of Incorporation. Also they lauded Tyler for his handsome progress in his undertaking and is in prospect of completing the Canal the ensuing spring.\(^{(45)}\) This prediction would prove to be somewhat far fetched down the road but something positive.
had to be stated to satisfy the PL&C and justify the assessments paid by the shareholders as the construction progressed. Now that the powers to be were enthralled by the impressive headway made in the Canal construction, it was hoped that they (PL&C) had trust in the candor and confidence of the Directors. Just before the closing of the meeting, one last thought was announced. “From this statement the Proprietors will at once perceive that the authority heretofore vested in their board to assess the sum of ten pounds on the share will not complete the undertaking already entered upon them”. At least the investors now knew where they stood and were made aware that the money pit still existed. In fact no profits were ever realized from the operation of the Pawtucket Canal from the tolls. The expenses of repairs and upkeep saw to that. The only gain money wise that the shareholders were to benefit from was the eventual sale of the excess land that PL&C had accumulated. That was long after the completion of the Pawtucket Canal as a transportation canal.

And if our assumption that the local farmers through whose land the canal passed did the work is correct, many things besides poor engineering would contribute to delays in the completion of the Canal. Winter would almost surely bring the work to a halt or at least slow it to a snails pace. Spring time meant planting the crops that all relied on. That couldn’t be done any other time, period. Likewise, the harvesting in the fall. The hours left available in the year for construction were narrowed considerably.

How much other manpower could have been available? The smiths, tailors, owners and workers of sawmills, gristmills, lumbermen and river men certainly wouldn’t enter the picture. All surely had to continue plying their trades. How much time could be left for mucking around in the mud to dig a canal? We must be overlooking some other source of labor because the Middlesex Canal was built in the same time frame and it was much more extensive. Still it is possible and even probable that an untapped labor pool did exist among those that were no more than on and off day laborers working at whatever tasks came along. Enough people appear to have been available for the work to induce the Proprietors of the Middlesex Canal to establish the grand fee of $10 per month paid to do the digging. It is probably unrealistic to throw women and children into the mix.

If only any daily logs, letters, any writings of Tyler could be uncovered, a tremendous understanding of the day to day workings of building the canal would be brought to light and all of the history pertaining to the construction of the canal would be enhanced. However, enhanced maybe the wrong word as no facts are known now to be enhanced. The best avenue to try to construct a picture of the early building of the canal is to see if any journals of the man who took over for Tyler can be found. But that part of the epic is best reserved for a later chapter.
The Pawtucket Canal was to pass through many other lands than the aforementioned Parkhurst property. How amicable the dealings with the landowners of record were and how much arm twisting by the PL&C was involved? Probably all of the negotiations were more or less civil because legally PL&C had a perfect right to certain amounts of any lands that the Canal was to pass through with a twenty foot buffer on either side. This concession was granted by the State Legislature in the Patucket Canal Acts that governed the do’s and don’ts of the building and operation of the canal. The Acts also called for remuneration to correct any land taking or damage to property. So all and all the bickering back and forth over boundaries and price per acre must have existed but it was most likely minor. PL&C held all the aces. Still, reading the results of the negotiations between the landowners and PL&C, all seemed to go well.

Why it took until the Directors Meeting of September 11, 1793 to appoint a committee to examine the issue of how much they owed to whom and for what is the strange part. To wait fourteen months to even assess the damages that were being incurred on those that would be their lifetime neighbors, willing or not, doesn’t make sense. These were businessmen, not used to major mistakes on their part so a reason has to be overlooked in the records. At any rate the meeting produced three of their own, “to estimate the Damages which will be due to the Proprietor of the Land through which the Canal in Chelmsford passes, and report.”

On May 1, 1794 the Committee answered the challenge. This was almost two years from the date that the Charter was granted for the Canal construction. The entire list of landowners who had claims against PL&C either for their property being taken or for damages due to the Canal construction wouldn’t serve much purpose to be reprinted here. A few select instances to illustrate the grievances that were settled by the Directors should suffice to show the problems that the landowners had encountered. Joel Spaulding was willing to accept an equal quantity of land that was taken from him...well maybe with one fifth more from the Parkhurst parcel thrown in. And five pounds for damages done. And then there was the stone wall on one side of the canal. PL&C ruled the claim reasonable and accepted it.

Spaulding’s claim and settlement wasn’t out of line, most followed the same track. Many accepted like amounts of land in exchange for what was taken and monies for damages. At least one party opted to put the estimate off to a later date. Several were questioned as to the validity of ownership of either the land or the claim. At least one lawsuit was threatened and the Directors paid up rather that face the added expense. Only one claim was recorded as having to be settled with the aid of referees. Even Joseph Tyler who supervised the canal construction submitted a claim for damage to land that he owned. The Committee abstained on this one. Still the Canal was to cover a length of almost 1 3/4 miles and that represented plenty of land to pass through.
The plan reproduced below outlines the entire Canal upon its completion but it was drawn at a later date. It will at least give some idea of the amount of land that the Canal traversed on its course for the Merrimack River to the Concord River.

Map of East Chelmsford, 1821, by John G. Hales
The Directors of the PL&C seemed more inclined to settle the land and damage claims forthwith than pondering any real consideration of the validity of the claim. It was almost lets get it done and get on with the job at hand. If all of the money that they paid out for damaged fences was justified, the land that was taken must have been awash with fences end to end. The Committee handling the compensation for the landowners even stated for the record at the Meeting of May 1, 1794, “that they are not able in the present stage of the business with precision the quantity of land belonging to the several persons that they had settled with and will be finally appropriated to the Canal.”

And this was only the land taking for now, just what was justified for the transportation canal. What was to come with the development of the system of power canals thirty years hence wasn’t even dreamed of. The PL&C was to end up in possession of much of what was to become the center of Lowell.

A little anecdote is offered here concerning the original ownership of much of the land that was swapping hands during the development of the Lowell Canal System. Of course the Indians were around for a good part of our knowledge of the history of the area. Our only interest is from when the white folk showed up.

This article appeared in a Lowell newspaper published prior to 1894 and is copied in its entirety. The title of the article was The Original Real Estate Owner of Lowell. May 13,1640, a grant of 3,000 acres of land was made to Mrs. Winthrop, the wife of Governor Winthrop (then deceased) for the use of herself and her children, they having the privilege of locating it where they desired providing it did not conflict with any former grant.

1641, October 7, Court granted Mrs. Winthrop leave to build a hog or goat pen by the lower part of the Concord River. Mrs. Winthrop chose her land by the lower part of the Concord River where it falls into the Merrimack; and subsequently we find that the Court granted her thirty acres of meadowland in addition to the former grant. The last lot being granted because some portions of the 3,000 acres were found to belong to the Indians.

The tract of land granted to Mrs. Winthrop lay on the east side of the Concord River and the south of the Merrimack River, and no doubt portions of this land are now covered by the busy marts of Lowell.

From the geographical location of the land that was described in the grant, it would have to be situated somewhere in lower Belvidere. By the compass, that would be east of the Concord River where it falls into the Merrimack. But if we refer to the plan in Chapter Four on page 20, the Winthrop grant is clearly identified as being north of the Merrimack in what was known as the Danforth Plats and is now Dracut. It is possible that this land is but one of the two grants given to Mrs. Winthrop and is infringing in Indian territory as there is no other landowner identified in the surrounding area as there is in the rest of the Plan. So much for one more little mystery in the retelling of history. If one has the patience, many of the old deeds to these properties can be researched at the National Park Library in Lowell.
Chapter Seven

PL&C Appraises the Progress of the Canal

The clock was ticking on the time that was allowed in the Charter granted to the PL&C by the Massachusetts Legislature to complete the Pawtucket Canal. The deadline was set at four years from the passing of the act. The anniversary of that date would be June 27, 1796. If the Canal wasn’t finished by then? The stipulation in the Patucket Canal Acts was pretty definite. “If the Proprietors shall neglect for the space of four years from the passing of this Act, to make and complete such dams, canals and locks, and to clear the passage of said river at Wickasick and Patucket Falls, so the same shall be passable in manner as aforesaid, then this Act, so far as the same relates to the said falls, or either of them, or to the receiving of toll for the passage thereof, Shall be void and of no effect.”

The Directors must have figured that a good look should be given to the overall progress of the Canal. There was only twenty one months left to pass the first barge, raft or mast if the terms of the Charter were to be satisfied. At a Directors Meeting held on September 10, 1794 the monies paid out to Mr. Tyler just since the last report for the construction were tallied up. Three Thousand, Eight Hundred and change. But all were in agreement the Tyler was ‘pretty generally engaged in pursuing his operations.’ He had given assurance to the Directors of his punctuality in the completion of his engagements,’ meaning that the Canal would be finished on schedule.

There was no reasons for the Directors to question Tyler’s report. He was one of them and he had been one of the first shareholders in the Corporation. They were all associated with Tyler as a merchant in Newburyport. His work on clearing the obstructions and rendering the Wickasick and Hunts Falls passable had been commended. Still, for some reason there must have been doubt about the complete reliability of the report. The only real knowledge that the Directors possessed first hand of the extent of the construction was the money assessments that they had incurred on the shareholders and paid out to Tyler for work done. All else probably amounted to the viewing of piles of dirt along the course of the Canal following Speen’s Brook.

Still they waited ten more months to satisfy themselves as to the progress of the undertaking before the Directors appointed a Committee by order at Newburyport on July 27, 1795 to fully inspect the Canal. “They were repair to the Canal in Chelmsford and there from a view of the operations already performed and from conversation with Mr. Tyler to estimate what part of the undertaking remains yet to be done, what will be the probable expense of completing it, and in what time it may probably be finished. They are further to observe how far the manner of the execution is conformable to the terms of the contract made with Mr. Tyler and to report.” Everyone must have had their fingers crossed hoping for only the best news as there were only eleven months left to meet the Charter’s deadline.
A Cause for Concern Arises

The Committee’s report left much to be desired in its conclusions. The fact that no surveyor was ever mentioned as being employed during the Canal construction would now become obvious in the mistakes that would unfold during the examination of the work done by Tyler. The question of a survey was broached previously as to what was meant by previous surveys. Evidently any walk through of the site was termed a survey with or without even the most rudimentary measurements of any type. There certainly was no surveyors transit\(^{(57)}\) ever in use to establish any grades or elevations and the inspection by the Committee would verify that by its observations.

On September 11, 1795 the Committee delivered its report on the situation of the progress of the Canal. The following text outlines the highlights of the findings and the results were not encouraging.\(^{(58)}\) They left the Merrimack River following the course of the new Canal and didn’t have to travel very far before encountering the first problem. Within four hundred feet(twenty five rods), the bottom of the Canal was twenty six inches higher than the surface of the river. Water doesn’t flow uphill so this was definitely a problem. The next stop was just about in the middle of the canal, which is a short distance below today’s School Street bridge. This area was referred to as the ledge and would always present a problem to the transportation canal. The ledge was solid granite and extended for about five hundred feet(thirty rods) and that was judged to be about one foot higher than the aforesaid surface. From there the Committee moved on to the location of the Locks. (At that time it was known as the Upper Locks, now as the Swamp Locks.) More bad news as this section of one hundred feet (six rods) had to be lowered two feet. At least the examination of the Upper Locks construction appears to satisfy the inspection as to length, width and materials so the party continued on to the Lower Locks. Again the Locks construction was not commented on so it must have passed inspection but the depth left a little to be desired. The floor of the lower end of the Lock was the same elevation as the Concord River, which meant that it too had to be lowered. The terms of Tyler’s contract were certainly not completed to anyone’s satisfaction.

The Committee had also been instructed to estimate the costs of finishing the work that remained in order to complete the Canal. The bill that was presented to the Directors and the PL&C was 1710 pounds.\(^{(59)}\) That raised another little problem. There was no money left. The total amount projected to complete the canal was spent. Even the monies withheld from Joseph Tyler to assure that his part in completing the Canal would be guaranteed was gone.\(^{(60)}\) The previous June, Tyler presented to the Directors that he had spent more than he had been advanced for the work done and he requested release of the five hundred pounds that had been withheld until the completion of the contract. The request was considered by the Directors and allowed in hopes that it would enable Tyler to complete the work on the canal.\(^{(61)}\) Alas, wrong again. Every excuse in the book was offered by him for the failings: shortcuts that he had taken to hasten the progress, scarcity of labor and rising costs and other circumstances. All may be valid but the problem that he left behind was still how to finish the canal in nine months in order to satisfy the requirements mandated in the Charter granted to the PL&C by the Legislature.

Any communications with Mr. Tyler would have to be put on hold as he had become seriously ill, which is understandable under the circumstances. Two options were open to
the Proprietors. “Relinquish all further attention to the Canal and resort to legal indemnity to reclaim the money advanced to Tyler with interest or to make such further advances for the promotion of the business either to Mr. Tyler or in any other manner that may seem fit.” In other words, stop the work and sue to reclaim the money already spent for poor work done and hope for the best, or press on to completion with either Tyler or some other in charge. The second option was selected still reserving the legal remedy against Tyler and those who assured the performance of his contract by backing his bonding.

The need for haste was quite evident with the closing in of the winter months. A meeting of the Directors held on September 14 immediately informed the Proprietors of an assessment of five dollars for each and every share. Then the Directors commenced to select three of their own to superintend and direct the operations to be performed on the Canal. They were also authorized “to employ and contract with such persons as Overseers under them and such a number of labourers (sic) as shall appear to them necessary.” Three thousand dollars was allotted to restart and correct the work done.

At this point it was fully realized by all involved that the completion date for the Canal construction would not be met. With winter weather fast closing in and the amount of work left to correct the problems with Tyler’s mistakes it just wasn’t feasible. At the Meeting of November 30, 1795, the Directors instructed Tyng (one of the original petitioners to the State Legislature for the Charter to build the Pawtucket Canal) to again petition the Legislature requesting more time to complete the Canal. This extension was passed by the General Court assembled on January 22, 1796 and three years were allowed after passing of the Act.

The Directors appeared to have reached the same verdict as to a committee’s ability to supervise the Canal construction as they did three years previous. At a meeting on January 27, 1796, Thomas March Clark was appointed superintendent of the operations to be performed at Patuckett Falls the ensuing Season. He was to be paid three dollars and thirty three and one third cents (one pound) per day plus board and travel expenses. He was also given the right to employ as many workers and purchase as many tools “as can be employed advantageously, and forward the completion of the Canal & Locks with as much haste as shall appear consistent with good economy.” In other words as fast as you can but on the cheap.
Chapter Eight

A Little About the Two Men Who Built the Canal

Historically there is probably no way to prevent Joseph Tyler from being held the scapegoat. He just didn’t handle the building of the Pawtucket Canal very well. His background was as a businessman so what was he doing supervising canal construction. He was given accolades for his work on clearing a passage through the Wicassick and Hunt’s Falls but what did that entail except removing a few boulders that were the obstructions to navigation. It certainly didn’t qualify him to take on the project of supervising the work of constructing a canal with the locks and bridges that went with it. His reason for even wanting the job is up for conjecture except maybe for his far sightedness of building a mill along side the Canal. Now that is a business mans thinking.

In a brief sketch of the original Proprietors of Locks & Canals on Merrimack River compiled by Thomas B. Larson, Joseph Tyler is simply described as a merchant from Newburyport. While most of the other incorporators were given more extensive backgrounds, this was all that was said about Tyler. A more thorough search into his background turns up the fact that he was born in Haverhill, Massachusetts on April 8, 1749 and married Abigail Spalding of Chelmsford, Massachusetts July 10, 1799. He died in Billerica, Massachusetts January 29, 1834 and is buried in a tomb in the old cemetery on School Street in Lowell. Four of his six children were born in Newburyport so he certainly was a resident in that town for a good part of his life.

All that this scrap of information about Tyler’s background provides us is that he was a person just like any other, having family and aspirations along with successes and failures. Research into the records of Newburyport, Haverhill and Billerica could shed no other light on his past. He had the foresight to see the Pawtucket Canal as a worthwhile investment and endeavored to bring it to completion. He was simply not able or qualified for the job that he took on to himself and he would pay dearly for his presumption that he could handle the task.

First, he lost his health certainly from the stress of trying to meet the deadline for the completion of the Canal. Then PL&C exercised their legal right as spelled out in their contract with Tyler to try to recover what monies they could to finish the work on the project that he had left undone. Three Newburyport businessmen had created the bonding backing Tyler’s contract but the record is silent as to what part they played in any recovery of money by the PL&C. So Tyler hung alone. He had owned a house, a saw mill and land adjoining the Canal, which as his assets, were possessed by the PL&C. These were of considerable value and gave promise of income in the future to the Corporation. Tyler didn’t have much left but just to be sure that he had nothing, his claim to damages for passing the Canal through his land was also nullified. Tyler’s contract with the PL&C was not to be formally cancelled until March 11, 1793.

When Thomas Clark assumed the position of superintendent over what was left of the work to complete the Pawtucket Canal, in all fairness it has to be realized that the bulk of the construction was finished by Tyler. Most of the problems appeared to be with grades of the bed of the Canal that any competent surveying engineer would have avoided if one had been employed. From the very beginning of the project, none was ever mentioned.
How could this most important aspect of the digging have been disregarded without a second thought?

Nevertheless Clark pushed on with the job at hand and over nine months had made a handsome progress toward the completion of the Canal. Enough so that the Directors were able to present a glowing report to the PL&C of great expectations that had been anticipated for four years. “By his (Clarks) unremitting attention and Faithful services, such Progress has been made that the Directors have been enabled to fix Tuesday the eighteenth Day of October current for the opening of the Canal.” They also added,” their anticipation of the expense was inadequate, notwithstanding every attention has been paid to strict economy as far as appeared consistent with the main object, the hastening the completion of the work”.(69) To put it bluntly, the work was behind schedule and the coffers were in the red, big time. Money wise, the cost would prove to be double the anticipated estimate of the original projected cost.

Even less is known about Thomas M. Clark than was uncovered about Joseph Tyler. What position he held in the PL&C organization is unknown. His name never appears as either a shareholder or a Director. He is a complete stranger until he is appointed as superintendent of construction over the Pawtucket Canal on October 15, 1795.(70) But he did become a shareholder at some previous date. At the Directors Meeting of January 6, 1801 he appears as Director for the first time.(71) He was to remain with PL&C for many years and his name will surface again in dealings for the Corporation.

As to his earlier life, the information is also scant. He was born in New Hampshire and died in Newburyport, March 31, 1850. That would have put him at about twenty five years old when he assumed the Canal responsibilities so he must have been well thought of by his superiors at the PL&C to be given the job at that age. Interestingly enough, in the Massachusetts Death Records he was still listed as a merchant at the time of his passing.(72)

Clark had one advantage over Tyler when he stepped into his shoes. When Tyler began his work on the project, the page was blank and if he ever received any help with the engineering, it has never been mentioned in the records. When the Committee appointed by the Directors surveyed Tyler’s work, they had to have an engineer who was experienced in establishing the construction grades with them. Otherwise how could they have determined the fact that the Canal bed was higher or even with the surface of the Merrimack River. And it’s probable that the engineer stayed on during Clark’s work to prevent the same mistake from happening again.

Even though the Canal was finally due to open only four months behind the date specified in the Charter, PL&C still had their hands full with remaining work to satisfy their obligations stipulated in the Patuucket Canal Acts. There were still bridges to be erected, towpaths to be cleared along side the Canal and several falls to be cleared below the Pawtucket Canal to remove the obstacles to navigation as the Acts stipulated.

Three days prior to the much anticipated opening of the Pawtucket Canal,(73) the same was announced at the Directors Meeting of December 15, 1796. Even though the amount of Ten Thousand dollars had been assessed to finish the work on the Canal, it would prove to not be enough for the job ahead. They now had reason to expect ‘that a further sum, probably not much short of twenty five hundred dollars will still be necessary to meet every demand for Labour and Materials’. Then the second shoe dropped on the shareholders: “To which must be added the sum of eight dollars on each share to
discharge the interest due to the individual Proprietors, under the fourteenth article of the
Bye Laws of the Corporation”. The moans can still be imagined over two hundred years
later from the shareholders at the added expenditures.
October 18, 1796 was the red letter day that had been awaited for four years. Four months behind the scheduled opening date and many dollars in the red but the Pawtucket Canal as a transportation canal around the Great Falls would be open for business. The first boat to traverse the Canal would be a landmark event and was to be witnessed by many with great pomp and ceremony.

The building of the Canal certainly had its share of set backs to delay completion of the project and even now bad luck haunted the operation right up until the first boat navigated it. And even though the episode had all the makings of a disaster, it wasn’t to be that bad and the Directors sort of mentioned it in passing at their meeting of December 16. The entry in the record reads in part only that “They (PL&C) were informed of a disagreeable (sic) incident on the day assigned for opening that Canal, prevented the passage for fourteen days.” Then it was added “Due attention was immediately paid to that subject, and the Lock which gave way was rebuilt in a manner which in the opinion of the Directors may quiet any apprehensions of a Repetition of a like failure” (74).

Between the cold that set in and the low water, the Canal was closed down and the hope of any revenue with it. The five hundred dollars spent to repair the damaged lock probably meant one more assessment on the hapless shareholders.

The disagreeable incident referred to above was the collapse of the Locks during the passage of the first boat to traverse it. (whether single or multiple chambers, all locks were plural in designation). There were conflicting interpretations for some reason of this simple statement in the Directors Record. The Record only says ‘the Lock gave way’ without identifying which lock but this much is clear; it was a Lock. No eyewitnesses have ever presented themselves with a different version of the incident but James Francis, the chief engineer for PL&C, in latter years identifies the troubled Lock as the Upper Locks. Only two Locks existed back then, the Swamp and the Lower Locks and the Swamp Locks would have been the Upper of the two Locks from their standpoint of location in the Canal so his conclusion is understandable and probably right.

Still, even Francis wasn’t an eyewitness to the ‘disagreeable incident’ so its worth the time to take a brief look at the other accounts of the occurrence. All were written years after the actual happening but, where did their information originate? Unless any of them had access to different sources, then they all had to rely on the notes of the Directors Meetings and some of the details that they describe show up nowhere else, at least that we know.

The accounts presented in these writings in most cases will only be segments of the full descriptions that the authors gave. They are worth reading in their entirety and the books are available at any library. But as each condensed version is given here, any part of them that seems to expand on the original brief description will be at least examined and commented on. Remember, most history is at least partially shrouded with a little darkness and any effort to peek through the veil is well worth the effort.

The first article that documented the event was in Wilkes Allen’s History of Chelmsford printed in 1820. (75) Why Chelmsford and not Lowell? At the time of the construction of
the Pawtucket Canal, there wasn’t any Lowell and the entire area that now comprises Lowell was known as East Chelmsford. At any rate it goes on to say ‘the occasion had called together a great concourse from the vicinity. Some hundreds of men, women and children were collected, and stood around and upon the Locks to witness the passing of a boat, in which were the Directors and other Gentlemen invited to take a trip through the Locks. Scarcely had they entered the first Locks, when the sides suddenly gave way. The water bursting upon the spectators with great violence, carried many down the stream.’

The narration goes on to describe the many people caught in the rushing waters, infants and children along with their parents, wives separated from their husbands, men and women thrashing around frantically amongst the timbers, planks and broken boards. ‘Some had their clothes partially, others almost entirely torn off from them.’ It must have been some sight but all that it was able to arouse in the hearts of the Directors of the PL&C was the one comment that it was a ‘disagreeable incident’ At least Allen gave it more ink than the Directors Records and he added that all got to land safely.

The Rev. Wilson Waters also wrote extensively about Lowell and the vicinity in his book History of Chelmsford but at a much later date. He was published in 1917 and quotes from much of Allen’s work including the complete account of the collapse of the Locks.

Another account of the ‘disagreeable incident’ is given by Charles Cowley. This excerpt is from the first edition of his History of Lowell published in 1856. The beginning paragraph describes the Directors and other gentlemen in the boat with the spectators on the banks of the Canal. He never mentions the Locks as Allen did even though he gives Allen credit for the narrative he is retelling. As Cowley continues on though, his version differs in one other respect. He states “The sides of the boat gave way; the water burst upon the people, and many were carried down the stream.” The remainder of the tale matches Allen’s telling of the incident including the mob of men, women and children thrashing around in the water.

In a second edition of his History of Lowell published twelve years later, Cowley’s rendition of the event is quite abbreviated while still giving credit to Allen for the account. He says “When the first boat passed down the canal in 1797, with the directors and other gentlemen on board, and hundreds of men, women and children as spectators on the banks, an incident occurred, of which Allen gives a lively account. One side of the canal gave way; the water burst upon the people, and the greatest confusion ensued”. The rest of the tale is the same as Allen’s, original including the sentence worded in Latin that shows up in every account of the incident. Nantes-rari apparent in gurgite vasto. If the translation is correct, loosely worded the author is admonishing the reader, ”Few swim in the rough waves” which seems appropriate for the incident.

It’s worth taking a minute to review each of the different narrations of the same epic. There are differences even though Allen is given credit in every account for the original description of the event. He published in 1820 which was only twenty three years after the happening so its entirely possible he was writing words repeated by someone who had a first hand knowledge if he didn’t himself.

James B. Francis’s offering of which Lock was involved in the incident was most likely taken from the report recorded in the notes from the Directors Meeting covering that date.
It seems odd that if Charles Cowley was going to paraphrase from Allen’s rendition that he would change some of the circumstances reported in the original text. He never mentions a Lock in either of his two books. In the first edition of History of Lowell he states that “the sides of the boat gave way”. This would not coincide with the rest of the original tale where the women and children were all floundering around in the water. They were not reported to be in any boat in the first place, only the Directors and other gentlemen.

In the second edition of the book, Cowley says that “one side of the Canal gave way” and then the story carries on to the same scenario as Allen’s tale. Cowley had a reputation for being a noted historian of the time. For him to create two different versions of the incident when he was well aware of Allen’s report seems way out of place for what was considered gospel, even by him. It is only a small deviation of the event but why is it different in the context at all. If one was to read only Cowley’s version they would have an entirely different version of the happenings but why does the story vary at all. The Directors Report has to be the accepted picture of the incident if for no other reason than that it was recorded at the time of the ‘disagreeable incident’ and that group was directly involved and no other first hand account has been offered. Presentations such as this are offered as the true facts in the history books and that’s the way history should be, the absolute facts. If several reports of the same circumstance vary, which should be considered right and which is wrong, or at the very least distorted.
Chapter Ten

The Pawtucket Canal now Open for Business

Despite all of the setbacks, the Canal was completely ready for the passage of boats, rafts and masts by early November 1796. As mentioned before, the setting in of winter with low water and the falling temperatures would delay the opening until the following spring. The closing down of Canal traffic was to be a reoccurring event every winter and was an accepted part of the business.

The most important item for the Directors to establish now was to create a cash flow. But first things first and that was the appointing of a toll collector. The person selected for that position was James Varnum of Dracut on the same day as the Canal opening. Even though Varnum was not a native of Newburyport as are most of the top echelon of the PL&C and is not listed as a Director in the minutes of the meetings, he appears to be well regarded and will hold several other important positions.

The toll rates were set by the Massachusetts Legislature in the articles set forth in the Patucket Canal Acts. The fee was not only determined by the type of goods and the quantity of same but also on the number of falls that were negotiated above and below the Pawtucket Falls. (There were six others and they are mentioned again on page 40). At a latter date, a petition brought before the Legislature by the users of the Canal was successful in getting the tolls reduced according to the number of the Locks that their goods passed through. This was mostly because of the moving of material to construct the later canals and the mills, and to bring the raw cotton in and the finished cloth out. Also a central market place had sprung up in Lowell (it had a landing along side the Lower Pawtucket Canal on Market Street) and it was supplied with produce via barges. Outside of cargo that would be shipped on a boat charged by tonnage conveyed, the entire list of the toll rates established by the original PL&C Charter was comprised of lumber products and masts were assessed according to the diameter.

Shortly after traffic was actually moving through the Canal, the PL&C petitioned the State Legislature for an increase in the toll fees. The cost of the Canal had been vastly underestimated and the upkeep of the waterway was now their responsibility and theirs alone. Tyler’s contract had specified that the maintenance of the Canal rested on his shoulders for ten years. This included not only the Locks but the towpaths and bridges as well. Tyler had been fired so now there was no scapegoat but he wasn’t to get off so easy as just walking away from the project as was told in Chapter Eight. At any rate, the rate increase was granted by the General Court of the Legislature June 17, 1797.

The PL&C certainly knew how to push a point when crying poor mouth. Part of their plea to recover money for their losses in the operation of the Canal was to also ask for more control over the quantity of merchandize passing the Canal and the Locks. “They have suffered much” they pleaded, “and have no sufficient means to prevent the evil.” In the same Act that allowed the increase in tolls, the Legislature gave the toll gatherer the right to conduct a survey of the vessel if there was any doubt as the declared amount of goods. From the wording in the Act, it appears that the rafts of logs were the prime suspect.
Canal Still had Problems

Even though the Canal was open for business, there was still plenty of work left to satisfy the terms of the Charter. Plus the maintenance of the waterway would prove to be unending. Supposedly the falls and obstructions at Wickasick and Hunt’s Falls had been removed to allow passage of rafts and boats and they had to be at least opened somewhat simply to enable any river traffic access to the Pawtucket Canal. To what extent is questionable as the Middlesex Canal Corporation had to clear the Wickasic Falls above the Pawtucket Falls themselves to gain access for the river traffic to enter their own Canal a short time later. The problem the rapids presented was severe enough so that it entailed the building of a lock to bypass the obstructions at the Falls and the Middlesex Canal Corporation built it.

Why these two Falls were instrumental to the operation of either or both Canals and the need to clear them or lock around them will be more understood if their location in relation to the two Canals is explained. The Wickasic/Wickasick Falls was opposite Tyng Island and that placed the Falls above the entrances to both the Middlesex and Pawtucket Canals and obstructed the River route to both. Hunt’s Falls was located just below the junction of the Concord and Merrimack Rivers. As the Pawtucket Canal flowed into the Concord a few hundred yards above this point, Hunt’s Falls hindered the passage of the river traffic to Newburyport. Location, location, location and both Falls had to be dealt with, now.

The Patucket Canal Acts specified “That the Merrimack River shall be passable with Boats, Rafts and Masts from the Divisional line of New Hampshire and Massachusetts to the Tide-Waters of the said River”. Even clearing Wickasic and Hunt’s Falls still left five falls remaining on the journey to the sea; Varnum’s, Parker’s, Peter’s, Bodwell’s and Mitchell’s. In October of 1794, the PL&C had caused a survey to be conducted to see if it were feasible to clear these obstructions in the River or to construct locks around them and decided that it wasn’t practical or in their best interests to pursue the mandate without financial relief from some other party.

And seek financial backing they did. Letters were sent to prominent people in towns that bordered on the Lower Merrimack River or who in any way were in a position to prosper from the results of clearing the waterway all the way to Newburyport. Just to be sure that all were aware of the necessity of completing this work as soon as possible, a paragraph was included with the reminder that another canal “is in actual execution, to the waters of Boston Harbor”. The Middlesex Canal did not have to be mentioned by name. Most likely every merchant and businessman was well aware of the impending competition and the ensuing possibility of lost revenue. The implied threat must have worked and money was raised through the subscription requested to render the remaining falls on the Merrimack River navigable. At the Directors meeting of August 4, 1795, the first hundred dollars was allotted from the fund that was contributed by the subscribers to begin at least forcing a passage through the remaining falls.

But that didn’t help solve the problems still remaining with the Pawtucket Canal itself. As long as the locks remained closed the waters in the Canal were more or less stilled but every time the gates opened to allow passage of the rafts or boats, the water flow increased greatly and the current would cause the soil of the Canal banks to erode into the water flow. The depth was only three or four feet to begin with and the Canal would
quickly begin to build up silt on the bottom of the waterway and reduce the draft available to the vessels. (The Canal wasn’t to be lined with granite stone for many years yet, some of the Pawtucket long after the conversion to a power canal for industry use.) Just to give an example of how persistent that the problem of the build up of the washed out dirt from the Canal banks was to become, only nine years after the opening of the Canal, the bottom had to be lowered for the entire length, from its head at the Merrimack River to the Warren Locks (another name for the Lower Locks). For this project, the PL&C contracted with Kimball, Kimball and Manser to the tune of $8,500. The profits to the shareholders from the collection of tolls certainly shrunk considerably with this outlay of money.

Without the construction of the Guard Locks (site of Francis Gate) between 1796-98, the erosion problem would have been multiplied many times over for it created a buffer and eased the swift currents into the rest of the Canal system. In the fall of 1797, “a freshet of such proportions collapsed the banks of the Canal between the Merrimack River and the Guard Locks. It was thereafter thought expedient by the Directors to line that section with timber for it was directly exposed to the swift moving River waters.” (88)

The fact that the locks were constructed with wooden timbers rather than granite stone would prove to be another continuous repair job. Only five years after the Canal opening, the Directors announced that the “middle lock of the lower set shall be rebuilt this season and that the sides shall be wharfed and the width of the Lock be twenty seven feet”. (89)

The Lower Locks was built with three Locks originally and was reduced to two chambers when it was rebuilt with granite stone around 1825. The note that the sides shall be wharfed describes the walls of the Locks being built out to reduce the internal width and lessen the necessary volume of water to transport the barges and boats on their way. The specifications in Tyler’s contract stated that the locks were to be wide enough to pass “rafts, Masts and Floats of Timber not exceeding thirty feet in width”. (90) When surveyed by the Directors, the width wall to wall inside was thirty two feet.

The plan on page 42 shows the original proposed layout for the location of the two sets of locks that were built during the digging of the Pawtucket Canal. It is very detailed and includes the estimated distance between the two locks and the names of the landowners that abutted the Canal. The Swamp Locks (Upper Locks) is drawn in at the top center and the Lower Locks (Warren Locks) at the lower center and indicates the three chambers that comprised the Lower Locks as they were built. The plan cannot be reduced any further or it would become unintelligible to the reader and take away the value of the information that exists in this old work. The plan may seem confusing at first glance, and it is, but a little time spent examining it will go a long way in the understanding of what was entailed in bringing the Canal into existence.

Still the problems persisted. The existence of the outcrop of ledge between the mouth of the Pawtucket Canal and the Swamp Locks remained a major headache. With all of the work that had been expanded to remove most of the ledge, it still ran for a considerable distance along the Canal bottom. No matter how much dredging was done to remove the silt and dirt, this would prove to be the greatest obstruction. It was deemed impractical to continue to try to reduce the ledge further with all of the time and money already expended on the project and very little progress to show for it. The only solution was to raise the water level to float the vessels and rafts over it. The answer would entail building another lock. So in 1801 the Minx Locks were built. (91)
The amount of the tolls being realized from the Canal operation was proving to be less than the cost of the upkeep. There was no other way to create an income for the PL&C except from the users. The Directors were of the opinion that a liberal increase of the toll
rate was necessary to keep the Canal functioning properly. It was granted by the Legislature on March 3, 1804.\(^{(92)}\)

One item that hasn’t been mentioned was traffic up the Merrimack River and thence the Pawtucket Canal. Everything appears to be geared for passage downstream. Even the tolls were assessed from passage through the upper most Wickasick Falls and the last being paid at Mitchell’s, the fee being reduced as the vessel or raft proceeded downstream. There was never any rules of the road issued to control the passing of craft in opposite directions on the Pawtucket Canal as there were on the Middlesex when that Canal opened. However the Acts that governed the operation of the Canal did make allowances for two way traffic in Section 10. “Boats not drawing more that three feet of water may pass securely up and down at all seasons of the year when the other parts of the said river are passable for the same.”\(^{(93)}\) In later years, when the mills and the City of Lowell came into being, a different type of product would use the waterway for local commerce and would never travel south of the Lower Locks on the Canal. However as long as a market existed for the timber from New Hampshire, the water way was still available for the rafts to make the journey to Newburyport.

Even after the opening of the Middlesex Canal in 1804 began drawing the bulk of the River commerce because of the more direct route to Boston, it did not sound the death knoll for the Pawtucket Canal over night. In fact they were to operate in parallel for many years and in many ways they would compliment each other. As mentioned before, much of the raw materials that would keep the mills running were barged and boated through the Middlesex from the ships in Boston and then the same vessels continued down the Merrimack River and through the Pawtucket to reach their destination. The return trip carrying the finished products from the mills followed the same course in reverse.

The machine shop owned first by the Merrimack Manufacturing Company and then the PL&C also had a large foundry. Here most of the machinery that was supplied to the mills was produced for the spinning of the cotton into cloth. The forgings and castings that were used in the construction of the looms would have consumed large quantities of iron and this too was most likely hauled on both Canals via the River. The irony of this cross Canal commerce also presents a scenario that was probably inevitable from the very beginning of the expansion of the railroads. The Boston and Lowell Railroad was completed in 1835 and the tracks paralleled the Middlesex Canal. In fact the tracks followed the first route contemplated for the canal. The granite sleepers that were to carry the tracks were actually hauled on the Canal to where they were to be used on the rail beds. And to magnify the hurt, the first steam engine for the railroad was shipped from England to Boston disassembled and barged by way of the Middlesex and Pawtucket Canals to Lowell where it was reassembled and served a long useful life doing its best to put the Middlesex Canal out of business.

Until the coming of the railroads, transporting goods and people by canal was by far the most proficient and economical method available. But the building costs of a canal were much higher than that entailed in a railroad. And once the canal was built, there it was. It went from point A to point B. If the reason for building the canal between those two destinations changed, the canal served no purpose anymore. In the case of the Middlesex Canal, it was competition from the railroad that was cheaper and faster. The Pawtucket Canal was faced with the advantage the Middlesex Canal had with a more direct route to the major business hub of Boston and more so, the collapse of the shipping industry in
Newburyport because of the silting over of the harbor. In both cases, point A was still there but point B had disappeared.

This was not to be a problem with the railroads. If a market dissolved or moved, just pick up your tracks and move them to where the action was. The train was sure to follow. Everyone knows what a steam engine looks like. If you have no recollection for some reason or other, reproduced below is a sketch of an engine working on the Boston and Lowell Railroad.
But this book isn’t about trains. They were injected only to illustrate the mode of transportation that was to spell doom for the canal systems. The Pawtucket Canal and the use of the waterway is our only interest so we have to be fair to the craft that plied their goods on the Canal and the River. The sketch below was produced in 1886 but there is no reason to believe that much had changed over the ensuing years.

A canal boat sailing the Merrimack. This sketch is reproduced from the original drawn by A.E. Herrick in 1886.

(University of Massachusetts, Lowell Center for Lowell History)
Maintaining the depth of the water in the Pawtucket Canal in order to float the rafts and boats over the bottom was a persistent problem that seemed to defy solutions. The Canal had been dug to a depth of four feet, which should have readily accommodated any vessel utilizing the waterway. And if there were four feet of water for the entire length of the canal there wouldn’t have been a problem. Everybody would simply have sailed down the 1 3/4 mile trip and gone on their merry way. But nothing is ever that simple.

First of all, the lack of engineering on the project compounded the problems, actually built the problems in because of it. Keep in mind that this was not just digging a ditch and keeping it level between the Merrimack and Concord Rivers. The water of the Merrimack River was to drop thirty feet over the distance that the Canal traversed and the Canal had to follow this same decline although not at a constant slope. Too steep and the water would flow from the River in a torrent. Too shallow and the water would pool in the low spots and leave the high spots dry. The later was the case in the Pawtucket Canal. Don’t blame Tyler for these mistakes when he was building the Canal. Pretty hard to do the job with the naked eyeball in the place of a surveyors instrument and the aid of someone who knew how to use it.

But there was a lot more engineering done than the records of the building of the Pawtucket Canal give credit for. If the bottom of the waterway had gradually sloped from the Merrimack to the Concord River to compensate for the thirty foot difference in elevation, because of the natural drainage from high to low there never would have been enough water depth to float a twig. This was the exact reason brought forth in chapter, An Historical Question, for the necessity of there always having had to be a connection between Lily Pond and the Merrimack River to maintain a source of water. To overcome this problem when digging the Canal, it was excavated more or less on a flat plane on two different levels and the Swamp and Lower Locks would manage the drop in the water level between the two Rivers. This would also assure enough of a depth to float any raft or boat using it.

The statement in the paragraph above that the two Locks would serve to compensate for the thirty foot water drop requires some clarification. The Canal and its operation are easily understood. The water flows between the banks of the Canal and the vessels float on it to the destination that it is headed. The actual function of the Locks may not be as self evident. When the Pawtucket Canal was excavated following the course of Speen’s brook, a likely location to begin to drop the water from one level to the next lower one was where the brook flowed into the swampy area, hence the Swamp Locks. Utilizing the two chambered Swamp Lock, the water level was dropped thirteen feet from the Upper Pawtecket in two stages into the Lower Pawtucket Canal until it reached the Lower Locks where the water dropped seventeen feet through its three chambered Locks and entered the Concord River. Each chamber would serve to lower the water level approximately six feet. Any boat or raft would simply be carried along on the surface of the water. Again, viewing the Lower Locks would go a long way to simplify the understanding of the concept of lowering the water level within the multiple chambers and at different levels.
The simple sketch shown below as a schematic and the text may serve to illustrate how the thirty foot drop in the water level was accomplished.

The river levels and water drop captioned in the sketch should explain themselves. The stepped horizontal line running from left to right indicates the water level in the Canal as it as it travels along the two different elevations as a result of the Locks.

Note #1 points out where the Swamp Locks would be located. The water would enter the Locks from the upper Pawtucket Canal fed from the Merrimack River on the left and drop thirteen feet through two chambers before exiting into the lower Pawtucket Canal.

Note #2 points out the location of the Lower Locks. The water would enter the Locks from the lower Pawtucket Canal and drop seventeen feet through three chambers before discharging into the Concord River.

Now you’ll have to use your imagination and superimpose the sketch of a lock shown below onto the steps in the schematic drawing above and the picture is complete.
The PL&C dredged continuously, it seems, to try to eliminate the high spots and the silt building up because of the Canal banks eroding and with enough success to at least keep the traffic flowing. Enough success that is except for the obstacle created by that granite ledge that existed smack in the middle, just above the Swamp Locks (described in Chapter Seven). There was no dynamite available to help remove the stone from the ledge and they probably hacked away at it for a couple of years until frustration set in and they gave in to the inevitable. Build a Lock to float the vessels over it. At the Directors meeting of August 22, 1800, they requested Thomas Clark, the supervisor who took over and finished the Canal construction ‘to cause a dike to be erected over the low grounds above the Middle Locks.’ (After the Guard Locks were built at the head of the Canal, the Swamp Locks would be referred to as the Middle Locks). Even though the term ‘dike’ was used in the records, it most likely referred to the construction of a Lock to float any craft over the ledge as mentioned above and the Minx Locks was built in 1801.

Now there were four Locks on the Pawtucket Canal instead of the original two. In order from the head of the Canal, were the Guard, Minx, Swamp and Lower Locks. The only purpose of the Guard Locks was to protect the Canal down stream from the effects of the heavy river currents. But when its gates were closed to lock a boat or raft through, it would cut off the flow of water in the rest of the Canal. This problem would persist with every lock until the rebuilding of the Canal as a power Canal. At that time, dams were added to the Locks to regulate the water flow around them. The Minx Locks was constructed to float the vessels over the obstacle of the stone ledge that couldn’t be accomplished by any other means. And of course the Swamp and Lower Locks controlled the water levels between the two rivers.

All of the Locks were built of timbers instead of granite stone at that time, which would effectively double the necessary work to keep them in operation. Just trying to maneuver the rafts of logs into and out of the Locks without constant collisions with the wooden walls and gates seems a Herculean task. When the rafts were within the confines of the Locks and the water swirling and sloshing around as water drained out to lower the rafts to the next level of the Canal, there had to be much bumping around. There’s no way that just in the normal intercourse of every day commerce that the Locks could avoid some sort of damage on a continuous basis.

Even with all of the problems that the PL&C had to overcome within the Canal structure itself in order to remain operational, the Merrimack River could pose another over which there was no control. Extremely high water such as in freshets, heavy rains or melting snows that could cause an almost flooding condition or low water that occurred just as often for the want of water during the dry summer months for example. It was the old story of turkey or feathers. When the river was running high, such as in the spring when the melting snows filled it to capacity and then some, torrents of water must have poured into the Canal. And this condition is what justified the building of the Guard Locks, to give some protection to the dirt banks of the Canal and to keep them from washing away and depositing the dirt onto the bottom of the Canal.

The best time to move the logs from their cutting in New Hampshire was in the spring when the loggers were assured of high water. With the River at crest, the Canal could even be bypassed and the drives of timber simply run over the Pawtucket Falls as was done before the Canal existed. At low water in the River, such as occurred especially in the mid summer months, the logs had to be rafted through the Canal for the trip down
river. There were booms along the side of the River above the Pawtucket Falls to corral
the logs for use in the local sawmills, but they served no purpose in the journey of the
timber to Newburyport.

A Dam Above the Pawtucket Falls

What was the solution to either or both conditions, neither of which was any good for
the PL&C. The answer seemed to be a dam at the Pawtucket Falls. That would allow the
water in the River to back up and create a pool for a great distance behind it, which
would act as not only a reservoir but serve to absorb the high water periods and it could
be drawn off as necessary during the low water. A happy medium more or less. So it was
Enoch Pitcomb that was selected to present the petition from the PL&C to the General
Court of Massachusetts at their earliest session in 1801. This was not just a request but
almost a necessity if the Canal was to operate with any reliability during the seasons
specified in the Charter granted in 1792. The petition reads in part, “that a dam might be
thrown across the head of Patucket Falls at a comparatively small expense which would
greatly improve the passage of said Canal”. They went on to add that it would not
exceed two feet in height and that there had been a dam there before for many years
before their Charter was granted.

For their purposes, the PL&C wanted to dam the entire width of the River. The example
that they offered to the Legislature of the preexisting dams across the River were only of
wing dams that they never bothered to differentiate between. A wing dam was only a
comparatively small structure that would jut out from the river bank for a short distance
into the River to direct the flow of water for whatever means it was wanted for. To
operate a saw mill for example. None ever spanned the entire River. The Charter granted
to the PL&C explicitly forbid the construction of a dam across the Merrimack River with
the stipulation, “That nothing herein contained shall be construed to authorize the said
Proprietors to obstruct the main passage of said river by erecting any dam or dams across
the same.”

The State Legislature held the PL&C to the letter of the grant. Ten years later they were
still pushing for permission to build the dam across the River. At their meeting of
October 9, 1811, the Directors appointed a committee from their esteemed members “to
confer with any agent or committee which has been or may be appointed by the
Proprietors of the Middlesex Canal and with the mill owners in the vicinity of Patucket
Falls, on the expediency of making a dam, at the head of said Falls, and that they be
authorized to make such agreement with said agent or committee and with the mill
owners aforesaid or they may think for the interest of this Corporation, and (if they think
it expedient) conceive with them in petitioning the Legislature.” The PL&C was
seeking any help that they could muster to convince the Legislature that the dam was of
paramount importance to the successful operation of the Canal and any other interested
parties that had a reason to benefit from its construction.

This petition didn’t work either. The dam across the Merrimack River wasn’t to become
a reality until after 1821 when the Boston Manufacturing Company purchased the PL&C
and rebuilt the Pawtucket Canal as a feeder canal. This also entailed rewriting the Charter
and absorbing the PL&C at least for the present. The governing body of the State wasn’t
trying to place any obstacles in the path of the successful operation of the Pawtucket Canal. The Legislature was simply following the letter of the law. The only parties that had a right to the use of the riparian waters in a river or stream were the people who owned the land abutting it. To build a dam across the entire width of the Merrimack River would entail the ownership of both river banks.

Most of the maintenance work on the Canal after 1810 was reduced to a minimum. The investors were in no financial shape to introduce any new capital what with the collapse of Newburyport as a shipping hub. Consequently the ship building industry followed down the tubes and the trade in timber from New Hampshire was affected likewise.\(^{100}\)

But there had to be some traffic to produce even a small amount of revenue no matter how sparing. The Canal remained open.

The PL&C seemed blind to any other opportunities that the waters of the Canal could offer except for its use as a transportation canal.\(^{101}\) Even when the solution to the Canal woes was presented to them, they didn’t recognize what could have been the light at the end of the tunnel. And this came from a gentleman who had no knowledge or interest about shipping on the Canal. His name was John Goulding and his interests lie in manufacturing. In 1815 he requested “the liberty to erect a building on the margin of the Canal for the purpose of preparing a carding machine, and to draw the necessary water from the canal”.\(^{102}\) The Directors consented that the building could be erected only if it were temporary, an experiment, and that it would be removed at their pleasure. They also added that no water be removed from the Canal if it were found to be injurious (to the Canal operation presumably).

The PL&C were certainly aware of the potential availability of the mill powers created by the thirty foot drop from the beginning to the end of the Canal. Joseph Tyler had made use of it to run his sawmill in 1793 and Nathan Tyler was utilizing the water fall at least in the early 1800’s to power a grist mill. The sketch reproduced on page 51 indicates the location of both Goulding’s and Tyler’s operations that were in existence prior to 1820. Take notice of the small waterway that’s indicated as flowing from just above first chamber of the Lower Locks and into the Concord River. The location of the two mills is ideal in order to utilize the full seventeen foot drop in the water level of the Pawtucket Canal at the Lower Locks and the power that it created. There were at least two other small mill operations benefiting from the rushing waters of the Pawtucket Falls themselves, another testimony to the fact that there was a market for any power that could be produced by falling water.
In the reproduction below, there is much more pertinent information than suits our immediate need but it will be referred to again in this book and probably more than once. The two arrows marked five and six are the objects of our interest. 

#5 indicates the location of John Goulding’s machine shop.

#6 indicates the location of Nathan Tyler’s grist mill.

Just as a point of interest, the arrow designated as #4 indicates a mill owned by Thomas Hurd. It has no connection whatsoever with the Pawtucket Canal but at a later date the mill will receive water from just above the upper chamber of the Lower Locks approximately opposite Goulding’s mill.

The Lower Locks area in 1821 by J.G. Hales. (Proprietors of Locks and Canals)
Chapter Twelve

The Changing Face of the Pawtucket Canal

Between the market for timber in Newburyport shutting down and competition from the Middlesex Canal which was really only a secondary imposition as far as the Merrimack River trade went, the Pawtucket Canal was struggling. The inevitable dredging of the Canal bottom was carried on with regularity and constant repair was necessary to the Locks. There was no avoiding the work if the Canal was to remain operational and it’s supposed that the expenses incurred were simply treated as the cost of doing business.

At least the money wasn’t flowing out of the shareholders pockets with the same regularity as during the times of the Canal construction. From the first dividend paid in 1798 it appears that the payments on the shares were averaging about three dollars per year at least until 1807.\textsuperscript{103} From then, on payments were made somewhat until 1819 but not with any constience. The last toll increase was granted in 1804, but it certainly couldn’t overcome the loss in revenue due to the decrease in the traffic of transporting the timber between New Hampshire and Newburyport. More than once the money to cover the dividend payments as mandated in the Corporation Bylaws had to be borrowed by the Directors.

One can’t help but wonder what was going through the collective heads of the PL&C during these dire times. Navigation on the Canal had all but dried up and it is doubtful that they ever entertained the idea of simply walking away from the enterprise. It is ironic that at one time the Pawtucket Canal was actually referred to as the Navigation Canal\textsuperscript{104} by J.W. Meader, a historian who wrote in 1869. And that wasn’t the only case of the Canal being mislabeled. In a talk given by the Secretary of the United States Treasury, Albert Gallatin in 1808, he referred to the Pawtucket Canal as the Essex Canal.\textsuperscript{105} But a rose by any name......

It is impossible to control ones destiny, good or bad, and the PL&C even though a corporation was no exception, but on any given day, things can get better. On November 14, 1821 a communication was presented to the Directors from a Kirk Boott professing “to be an agent of a Company who proposes to establish large mill works in a manufactory-expressing a desire to purchase of the Proprietors of Locks and Canals on Merrimack river, all the mill power they own at Chelmsford.”\textsuperscript{106} To suppose that the PL&C was open to all suggestions would probably be an understatement. Thomas Clark (the person who finished the Canal and now a shareholder and Director) was appointed to confer with Boott and report back to the Directors.

Kirk Boott had visited the Pawtucket Canal earlier in the company of the interested businessmen. Nathan Appleton, one of the party and a future investor himself in Lowell gives an account in his Introduction of the Power Loom and Origin of Lowell. of how he and Mr. Jackson, on the suggestion of Ezra Worthen after consulting Thomas Clark, inspected the vicinity of Pawtucket Falls with a view of purchasing the Canal.

Boott is given much credit throughout the records as being one of the driving forces in the very beginning of the establishing of the revamped PL&C and as an organizer of the Pawtucket Canal as a power canal. The reader will come across his name mentioned many times throughout the text. Yet not all accounts tell the same story as to his involvement or at least to what extent. John A. Lowell claimed that Ezra Worthen was
the first to recognize the value of the Pawtucket Falls for commercial use, and that the
purchase of the land was made before Kirk Boott set foot upon it. He adds “that the
accounts are conflicting” (107) and it may start one wondering about the reliability of other
accounts.

Events appeared to be moving at a rapid pace and the PL&C most likely had no
intention of allowing this golden opportunity slip through their fingers. But even though
the offer from Boott seemed genuine enough, all may not have agreed that it was the way
to go, or were at least hesitant to rush to a decision. A meeting of the Proprietors was
called for December 26, 1821 (108) and would outline a proposal to replace any Directors
who would ‘see cause to resign their said trust’. A little falling out amongst the one time
close business associates maybe? It went on to add that new bylaws could be enacted or
changes made to those in force presently. If there was any doubt that Proprietors meant to
capitalize on Boott’s offer, it was erased in the final proposal of the meeting: “to act on
the proposal of a company for the purchase of the mill power which the water of the
Canal by Patucket falls may furnish, and to do and transact such other business as may
then and there lawfully come before them, -to authorize any repairs of the Locks and
Canal at Chelmsford.” It seemed that nobody was going to leave that room without a
done deal in hand.

It’s hard to believe that one Proprietors meeting could have all of these goings on. It’s
also hard to believe that much of the proceedings weren’t predetermined ahead of time,
maybe behind the scenes, for now comes forth Thomas Clark with his report on his
communication with Kirk Boott that he received two days before. And for the first time
the name of the manufactory that has been nothing but a whisper in the shadows was
brought out as the Merrimack Manufacturing Company.

Clark presented to the assembled Directors Kirk Boott’s proposal as offered by the
Merrimack Manufacturing Company. (The following is a somewhat condensed version).
As the Company Agent, he would either lease or outright purchase all of the land and
mill power that the PL&C deemed was not necessary for the use of the Canal. The
condition of this offer being accepted was “that the Canal shall be so enlarged by the
Proprietors (new owners) that we may at all times have sufficient water and that the locks
be rebuilt of stone in such a manner that they will not require frequent repairs.” And
Boott had an alternative option for guaranteeing the quantity of water necessary for the
operation of the Company. They would at their own expense raise the height of the dam
at the Swamp Locks. This would cause the water to pool behind the Dam and render the
Minx Locks unnecessary because of the increase in the water level in the Canal. (This is
the first mention of a dam existing at the site of the Swamp Locks.) The Company was
even willing to enlarge the Canal above the Swamp Locks and keep it in repair. The offer
must have seemed unbelievable to the Proprietors.

But Boott had just stopped for a breath. The other shoe was yet to drop. When he
continued on he added, ‘if the proprietors will give us liberty to take another canal out
above the Swamp Locks for our own use’ and the Company agreed ‘not to draw water
without leaving sufficient for the use of the Canal’. Even though the records don’t give a
precise reaction of the PL&C to this proposal by the Merrimack Manufacturing Company
(known from hereon as MMCo.), there was certainly no delay in answering the challenge.
Three weeks later, by January 8, 1822, an entire new board of Directors were in charge of
the operations of the PL&C. All were interested parties of the MMCo. Even the Directors
meetings were now moved from Newburyport or Chelmsford to the counting house of P.T. Jackson in Boston. They, like the PL&C shareholders before them, wanted to deal with their own.

One other point of interest should be brought out and this is as good a place as any. In discussing the newly organized PL&C and its Board of Directors that were appointed, they were identified as interested parties of the MMCo. While that is true, the question of where they originated and where did the knowledge that they exhibited come from. They certainly handled themselves with the utmost proficiency in all of their decisions as to what steps were necessary to properly rebuild the Pawtucket Canal. It was to turn out that they were the shakers and makers behind the incorporation of the Boston Manufacturing Company of Waltham in 1814. They knew exactly what they were looking for when they viewed the Pawtucket Falls and the Canal. The mill complex fueled by waterpower that together they would build would lead the country into the industrial era. But enough of this background material. Let’s return to building the Lowell Canal System.

Boott immediately took charge of all planning that affected the Canal. A complex reorganization of the PL&C had taken place and it culminated with the investors from Boston now occupying the positions of the Directors. At the Meeting of January 17, 1822, the new Directors authorized the MMCo. to undertake the Canal reconstruction proposed by Kirk Boott in December.¹⁰⁹

The Proprietors meeting of December 26 was to mark the turning point, the transfiguration it might be said, of the Pawtucket Canal from a transportation canal to a feeder canal. It also assured that a viable corporation would emerge as a healthier and more proficient entity, and profitable for many years yet instead of a broken figment of a once great dream.
Chapter Thirteen

New Blood, New Management, New Goals for the Canal

The men who first visited the site of the Pawtucket Falls in November of 1821 knew what they were looking for. Power. It may have just been water rushing over the rapids and falling thirty two feet in the course of a few hundred feet but it was fuel to them, fuel to turn the waterwheels that would turn the gears and belts that would run the looms that would spin the cotton into cloth. They were young successful businessmen in the emerging textile industry with a mill site in Waltham but the Charles River where the mills were located only had a drop in the water level of eleven feet and could not support any expansion. Hence the search for a greater source of water power and they had discovered the solution at the Pawtucket Falls. The name of their corporation was the Boston Manufacturing Company and they were to take over the PL&C and the Pawtucket Canal lock stock and barrel.

In 1822 the shares of the original company having been acquired by the Boston Manufacturing Company under the incorporation of the Merrimack Manufacturing Company in fact transferred all rights and privileges of the old company to the new owners. The MMCo. for two years operated both concerns as one company but at the end of the two year span it appeared better to reestablish the PL&C giving over to it jurisdiction over all the lands and water power and retaining only the textile manufacturing operation. The Legislature sanctioned this reorganization in 1825 allowing the PL&C to exist under the Charter of 1792. In 1822 the shares of the original company having been acquired by the Boston Manufacturing Company under the incorporation of the Merrimack Manufacturing Company in fact transferred all rights and privileges of the old company to the new owners. The MMCo. for two years operated both concerns as one company but at the end of the two year span it appeared better to reestablish the PL&C giving over to it jurisdiction over all the lands and water power and retaining only the textile manufacturing operation. The Legislature sanctioned this reorganization in 1825 allowing the PL&C to exist under the Charter of 1792.\(^{(110)}\)

One thing that the new investors were trying to avoid at all costs was the word getting out to the local landholders of their plans for a new manufacturing complex, at least not before they had acquired all the land that they would need at the cheapest possible price. Control of the PL&C was all theirs and Thomas Clark went with it evidently for it was to him that they assigned the task of buying up the land and the outstanding shares of stock in his own name. The shares of the old PL&C were selling at rock bottom price by this time so Clark probably had no trouble cornering the market for short cash but dealing with the locals to buy the land would prove a little more difficult. They were shrewd and that was the word in dealing with them.

The following tales may be abbreviated or altered somewhat but the core remains to get the meaning of the stories across to the reader and they could be the same happening told by two different writers of the time.

The following is from Old Paths and Legends of N.E. by Abbott. The story is told of how a couple of the land prospectors were watched by a farmer as they were apparently casting flies for salmon from the river bank. He doubled the asking price for his farm overnight. By way of explanation for his action he said, ’I钙lated su’thin was in the wind when I saw two strangers across the river sitting on a rock and talk, then one feller go up and the other daown, an talk ag’in,’ They bought four farms containing about four hundred acres paying from one to two hundred dollars an acre. When they wanted more land, the farmers fixed their own prices.\(^{(112)}\)

In ‘Kirkland’s Anecdotes’ will be found the following amusing story of Mr. B______ in his land buying quest. (there is not much doubt that this abbreviation was a reference to Kirk Boott) He went to the area around the Merrimack River to view the water privileges
carefully and to make inquiry as to the price of land in the vicinity. He went with his dog, gun and fishing tackle and obtained board in a farmer’s house. (a Mr. F ________ is how the name is given.) He spent his time in viewing the falls, the canal, the river and the grounds with occasional fowling and fishing. After spending some time there, he told the farmer that he liked the place very well and he would be pleased to come and live there and Mr. B ______ asked the price of the farm. The farmer told him he wouldn’t sell unless he got twice what it was worth as he liked it there and didn’t want to move. When Mr. F ______ was asked what he thought it was worth, he replied “Why, its worth fifteen hundred dollars and I can’t sell it for less than three thousand dollars.” Mr. B ______ answered that the price was too much and he couldn’t pay that. He conferred with the MMCo. and in a few days revisited Mr. F ________. “I have made up my mind that I should like to live here and though you ask so much, I will take up with your offer and give you three thousand dollars.” The farmer replied that he was not willing now to sell it for less than six thousand dollars and he wouldn’t continue his offer for more that twenty four hours. Boott finding that he was determined went off for instructions and the next day told Mr. F ______ he would give him six thousand dollars. The purchase was made, deed passed and money paid.(113)

And Waters, in his History of Chelmsford, notes that much of this land was low, interspersed with swamps, muddy ponds and clumps of bushes. But irregardless of the observation of Waters on the condition of the somewhat rough terrain, thus began purchases by Boston investors of the land upon which the City of Lowell has been erected.

The representatives of the PL&C/MMCo. went on a buying binge. Every piece of farmland that became available they bought. Now all of the farmers in the area of the Canal had to be aware that top dollar was being paid and they were most likely perfectly willing to sell and laugh up their sleeve as they moved down the road and probably bought better land at a fraction of the price. But the new Proprietors had no choice in where they bought the land. It had to be in the immediate vicinity of the Canal to support their planned canal and mill for the Merrimack Manufacturing Company and there were plans for future canals and mills. The location of the Pawtucket Canal dictated their every move. And in many cases, other people’s moves too.

The future construction of a dam across the Merrimack River also had to be in the forefront of their minds. They not only were buying up all of the land on the East Chelmsford side of the River but on the Dracut side as well. This was to gain the riparian rights to the water usage that would be only granted to them if they owned the land abutting both sides of the River. With all of this land buying, for sure it was well known everywhere what was up. The whispering was long over with and now it was a shout. All of the businessmen involved in the new venture with the Pawtucket Canal and the Merrimack Manufacturing Company were from Boston. Evidently one Thomas Hurd who owned a woolen mill in Chelmsford knew where to go for information. Says Gilman: ‘Thomas Hurd, reputed to be a shrewd operator being in Boston about the time these lands were bought, overheard a conversation that led him to hasten back to Chelmsford, secure a refusal (sic) of the Bowers sawmill near Pawtucket Falls, and of land in that vicinity. The Land and mill that he now owned included a wing dam built out into the Merrimack River to direct the water to his own wheel that ran the sawmill operation.
Whenever there’s two conflicting stories of the same event in history, the only way to be fair is to tell them both. The reader can decide which is the more plausible. You’ve read about Thomas Hurd above and his escapades scamming the MMCo. Well here’s another version of the same episode from a collection of newspaper articles that were put together in book form in 1894 and titled Lowell, Historical and General.\textsuperscript{(114)} It goes on to say that Thomas Hurd, got ‘a corner’ (sic) on them on the Dracut side, by buying a lot of land of Col. Prescott Varnum, having watched their (MMCo.) movements and foreseen their designs. After completing the guard-locks the company commenced plans to throw a dam across the river at the head of the falls to turn the water into the canal. Mr. Hurd’s land extended from the Pawtucket Bridge at the head of the Falls to the foot of the Falls; and he had a frame and water wheel ready to set up. This was brought forward and set up and this it is said frustrated the company’s plans as they could not change the natural course of the river (To get around Hurds property on the Dracut side of the Merrimack River.) The MMCo. was really left with no choice except to buy Hurd out and at any price that he set. Somehow Hurd also managed to finagle future water rights from a canal that wasn’t even built yet and supposedly not well known about (Hamilton Canal). But this was not to be the last that the PL&C was to hear from Hurd. He had been around the area for some time, operating a woolen mill with waterpower from the Concord River since 1818. The text and sketch on page 51 includes both of Hurd’s Mills (arrows #2 and #4) and the canal (arrow #3) that he dug to power them from above the Wamiset Falls. In the near future, his mill (arrow #4) would be operated by waters from the Hamilton and Pawtucket Canals at different times.

But back to the rebuilding of the Pawtucket Canal. First of all, now owning the land on both sides of the Merrimack River at the Pawtucket Falls gave the MMCo. the right to extend the wing dam built in the River by the PL&C that had directed the waters of the River into the Canal, the entire width of the River. This first step was the most necessary to assure enough water to operate both the transportation Canal and the new Merrimack Canal that would be built to provide power to the mill complex that was planned and to be the Merrimack Manufacturing Company.

The reason for the Boston Manufacturing Company buying the Pawtucket Canal, the future cotton mills, the people involved in making everything work, and all of the background really doesn’t have anything to do with the construction of the Canal, does it. Of course it does. The Canal, before 1822 when it was bought, was for all practical purposes a dead duck at that time. Now new blood, new money and a dedicated purpose had been reintroduced into the Canal. They knew what they wanted and what had to be done to achieve the desired results. From here on we’re back to the reason for this book, to tell the rest of the story about the construction of the Pawtucket Canal. To satisfy the terms of the Charter, the transportation canal still had to serve its original intent, to pass all vessels that wanted to circumnavigate the Pawtucket Falls. But the Legislature had sanctioned the reorganization of the PL&C in 1825 with new investors, and an amended goal. From here, we’ll continue on with our tale.
Chapter Fourteen

The Rebuilding of a Revitalized Pawtucket Canal

The place to start is at the Dam in the Merrimack River just above the Pawtucket Falls and work our way down the Canal examining the improvements that were made under the new management. All that the Pawtucket Canal as a transportation canal was comprised of was a ditch with several wooden locks. At best the construction could only be defined as no better than temporary, a haphazard affair that was only designed to serve the purpose of moving the cut logs from New Hampshire around the Pawtucket Falls and down river to Newburyport. It had outlived its purpose of moving the timber from the forests of New Hampshire with the demise of Newburyport as a major port and a ship building hub, and would now be rebuilt as a feeder canal serving the needs of the future power canal system pretty much as you see today.

The first crude dam to cross the entire Merrimack River was constructed in 1824. Whether this structure was just to test the tenacity of the landowners on the northern bank of the River is conjecture. Much of that land was owned by the Varnum family and as mentioned in Chapter Thirteen, Thomas Hurd also had a claim by right of ownership. Who was the more active in contesting the presence of the PL&C homesteading on their rights to use the water to the middle of the river (and guaranteed by Law) will remain a mystery. This is one more thread in the fabric of history that should be told because it was a factual happening of the times. Varnum openly challenged the right of PL&C to control and divert the water. Hurd was easier. He just wanted to hold a gun to the head of the PL&C and make a buck when they were forced to buy him out to gain control of the River Bank. Whoever the culprits were, it seems that some damage was done to the dam by way of protest. The following notice was posted in the Merrimack Journal on September 30, 1825.

Copy of notice for $100 Reward for Culprits
That notice was to be printed for almost two years, probably more, as a warning to others than of any hope of apprehending anyone. It’s a pretty good bet that there was more sympathy for the perpetrators than there was for the PL&C. The locales maybe still held a grudge against the Proprietors if they felt that they were cajoled out of a higher price for their land. Long memories, and it certainly bred lousy neighbors.

By 1826, the land owned by the Varnums on the north side of the Merrimack River was acquired by the PL&C. Hurd was tougher in his demands and besides the buyout he was interested in obtaining water rights for his mills located toward the end of the Lower Locks. PL&C appears to have threatened a suit to force him to sell but all seemed to be settled agreeably and both parties got what they wanted. Seemingly, Hurd came out on top of the deal, received his price and access to the waterpower he strived for.\(^{(117)}\) Now being in possession of the land on both sides of the river, the last obstacle to the construction of a permanent Dam was removed and the structure was completed in 1830.\(^{(118)}\)

The Dam that spanned the River was comprised of no more than wooden cribs filled with stone that were erected between the natural boulders comprising the head of the Falls. It worked somewhat, at least restricting the natural flow of water in the river and causing it to back up beyond the mouth of the Pawtucket Canal and allowing the increased volume to flow into the Canal. The height of this first dam is unknown but when the original Directors of the PL&C petitioned the Legislature to erect a dam in 1801, it was not to exceed two feet \(^{(119)}\) but they were refused. Again in 1811 another effort was made to secure permission to build a dam and again refusal. This time there was a protest offered as it was claimed that it would result in flooding of the lowland areas along the river and the prediction proved to be right. When the Dam was finally built it resulted in the rendering of the locks at the Wiscasset Falls useless because of the higher water level in the river. That would result in a lawsuit brought by the Middlesex Canal Company. They built the locks and they were paid damages by the PL&C for the resulting flooding of the area as predicted. Whatever the finished height of the dam, it caused damage to enough property above the falls that by 1825 there were already claims against the PL&C for compensation.\(^{(120)}\) At a later date, flashboards were added to the top of the granite structure to raise the water level in the river even higher. Presumably those that sued for damages had collected and relocated elsewhere.

The initial object of the damming was to raise the water in the Canal by utilizing the backup behind the Dam. Later, to render the Dam more stable, blocks of granite were used to replace the flimsy crib contraptions that frequently washed away. This worked much better but when the granite blocks were stacked on top of each other to raise the water level, as heavy as they were, even they couldn’t stand up before the might of the rushing waters of the Merrimack River. The only feasible method to hold the blocks of stone in place was to anchor them to each other and to the boulders in the river bottom with the use of iron or steel pins. There were still isolated washouts but the PL&C was able to live with the sporadic inconvenience as long as the mills were kept operating and producing cloth.

It isn’t possible for any photographs of the Dam to exist that far back and if a sketch were produced it would only be a product of somebody else’s imagination. The Dam was rebuilt several times over before reaching the final configuration that we see today. To
the reader who has never viewed the Pawtucket Dam across the Merrimack River, even the photograph reproduced below will be of some help.

Photograph of the Pawtucket Dam

Photograph from the National Park Collection www.museum.nps.gov'

The Guard Locks was constructed between 1796 and 1798.\(^{(121)}\) The sole purpose of the Guard Locks was to protect the banks of the Pawtucket Canal. The swift current and high water of the Merrimack River that existed at times, especially in the
spring with the melting of the winter snow or heavy rains anytime, tended to undermine and wash the dirt from the sides of the Canal and leave deposits of silt on the bottom. Neither condition was a desired result. As there was a minimal difference in the level of the water on either side of the locks, a single chambered lock was all that was required.

When the locks at the Guard Gate were closed, to pass a raft or boat for example, the water flow to the rest of the Canal was cut off. This didn’t present a problem when the function was only as a transportation canal because the other locks downstream also being closed would sustain enough water between them to allow enough depth to carry the vessel to the next locks.

It was a different story when the Canal was also to be used as a power source to turn the waterwheels in the newly built mills. Now, a continuous water flow was paramount to the Canal’s operation. The remedy was to construct a dam around the Guard Locks and this was to be done at every lock site. By regulating the amount of water allowed to flow through the gates of the dam, a constant supply was assured into the Canal and the locking of the rafts and boats caused no interference to the necessary volume that was required to power the mills.

When Kirk Boott more or less assumed command over the rebuilding of the Pawtucket Canal under the new regime December 26, 1821, the Guard Locks was the first major renovation. The Locks were reconstructed and the Dam added using granite stone and in the same location where they can be viewed today although none of the materials from the early phases of construction still exist.

Because the Guard Locks were built hundreds of yards downstream from the mouth of the Canal on the River, the banks of that section had to be reinforced with timber for the erosion problem was that great. Common sense would question why the Guard Locks weren’t placed right at the location where the Canal left the River and solve both problems, the locking and the erosion. As there are no records from this stage of the undertaking of the building of the Canal, a little reasoning will have to suffice. If the locks had been constructed directly on the bank of the Merrimack River at the entrance to the Canal, how possibly could a raft of logs one hundred feet long and twenty five feet wide even have gained access. Remember this craft is already fighting the current just to make the turn from the River into the Canal. It’s almost as wide as the allowable width of the Locks and it predicts disaster. At least by having the Locks set back on the waterway, it provided a bit of maneuvering room to make the turn into the Canal and an opportunity to square away before the passage through the Guard Locks. The section of the map of 1821 shown on page 24 will serve to show the location of the Guard Locks in relation to the Canal entrance from the Merrimack River. The sketch below looking upstream and the photograph on page 62 brings out the gracefulness of the structure as it spans the Pawtucket Canal in its duties watching over the Canal’s well being.

Cultural Resources Inventory  Section Drawing of the Francis Gate Complex
James B. Francis was not one to leave things only half finished. He had taken the time to research the past history of the most severe of the freshets (extreme high water) in the river and realized that the Pawtucket Canal could serve as a conduit to funnel any rushing flood waters between its banks and undulate the City of Lowell. In 1850 he extended the height of the Guard Locks to equal the highest recorded flood and added a huge gate that could be dropped and hold back the waters from the river. He received a few snide remarks for his efforts, probably was labeled a worrywart and the same people called the gate “Francis’ Folly.” Two years later nobody was laughing. The gate was dropped in 1852 and did the job of holding back the floodwaters that nobody thought would ever come. It was not needed again for eighty four years, until 1936 when it did its job again. Some folly.

The Minx Locks was constructed in 1801 and the only reason for this single Lock to be built in the first place was to raise the water level in the Canal to allow passage of the rafts and boats over the stone ledge. Enough time and money was spent trying to remove or at least lower the ledge to convince the PL&C that it was a futile effort. When the dam was constructed at the Swamp Locks, it created enough of a build up of the water behind it to raise the level in the Canal back beyond the Minx Locks and rendered that locks unnecessary and so it was removed. The only map that even shows the approximate location of the Minx Locks is the map of 1821 reproduced on page 24.
The Swamp Locks was to become by far the most important of all the Locks sites on the Pawtucket Canal when it was reconstructed by the Merrimack Manufacturing Company and was always to remain as the key to the success of the Canal as a power Canal. From the basin behind the Swamp Locks, three of the main canals were to originate, the Merrimack, Hamilton and Western. Also, the Merrimack Canal would feed the Lowell Canal and the Western would supply the Lawrence Canal. The Hamilton would be the source for the Hurd Canal until that Canal was discontinued and Hurd’s mills were then furnished with water power by way of a penstock leaving the Lower Pawtucket Canal just above the Lower Locks. The first drop in the thirty foot fall of the water level between the Merrimack and Concord Rivers also occurred here controlled by the adjacent Dam. The water fell thirteen feet from the Upper to the Lower Pawtucket Canal.

The single lock constructed of timber appeared to be able to handle no more than a six foot drop when passing a vessel through so this necessitated two chambers at the Swamp Locks. Adhering to the motto that one picture is worth a thousand words, a little time spent examining the sketch below and photograph on page 64 should go a long way in describing the vital part that the Swamp Locks played in the power canal system.

A little time should be taken here to fully describe what this drop in the water level at the Swamp Locks means in the production of the water power necessary to run the mills. There was no development of the land along the Canal up until this point is reached. As long as the water flows along at the same elevation and never varies, there is no power produced. The Merrimack, Hamilton and Western Canals left the Swamp Locks Basin above the Dam and so had the same thirty foot head that the Upper Pawtucket Canal had. The Lower Pawtucket Canal below the Swamp Locks was thirteen feet lower than the Merrimack or Hamilton Canals which paralleled it. That meant that any mill built on land between either of these two Canals and the Lower Pawtucket Canal could utilize the fall of the water by constructing a waterway between them and installing their waterwheels in the flow that was created.
The Lower Locks was the last great Lock System in the Pawtucket Canal. The last major power Canal to be built, the Eastern Canal was to originate in the basin above the Lower Locks Dam. From here the Pawtucket Canal was to fall seventeen feet to enter the Concord River dictating a three chambered Locks when first constructed. This Locks was rebuilt from the original timber structure with granite stone in 1825 following the guidelines set by the MMCo. for rebuilding the Swamp Locks, and reduced from three chambers to two. Where the timbered locks appeared to dictate a maximum water drop of six feet to pass the raft or boat through, now with the much stronger stone construction, this locks was capable of withstanding a water surge of almost nine feet in each chamber. The sketch and the photograph on page 65 do not do justice to the power that was unleashed by this waterway on its journey from the Merrimack River as it empties into the Concord River.
The photograph is a recent picture taken in 1979 for use in the LNHP inventory. It roughly parallels the sketch shown above at least in the fact that it was probably taken from the foot bridge that crosses the Pawtucket Canal where it enters the Concord River. The sketch indicates the Locks to the left of the Dam and in the photo the Locks is behind the stone wall to the left. The concrete spillway in the right center of the photo was added about 1952 to aid in the control of the water level in the Canal.
The author has described the Swamp Locks as consisting of two locks chambers and the Lower Locks having three chambers. These descriptions were correct according to the records from at least 1802 until the rebuilding with granite stone about 1825. During these years the Swamp and Lower Locks were depicted in every sketch of either Locks as having exactly that configuration as shown in the illustration on page 42. Unfortunately it isn’t dated. Some researchers have interpreted the report that was made by the Committee who surveyed the Canal progress in 1795 as stating that the Lower Locks was originally constructed with only two chambers and the Upper Locks (Swamp) with a single chamber. And the lengths that the Committee recorded for the two locks would justify that conclusion. The Upper Locks was surveyed as being one hundred and fifty feet long and the Lower Locks at three hundred feet long. Each Lock had to be able to accommodate rafts of one hundred feet long so chambers of one hundred and fifty feet are in order.

The conclusion by the ranks of researchers that the Canal was opened to traffic with the Upper and Lower Locks having one and two chambers respectively may be correct or may not be. On opening day of the Pawtucket Canal in October, 1796, the ceremonial boat is only mentioned as entering the first Lock which promptly collapsed. Even though the record of the Directors Meeting of December 16, 1796 states that it only took fourteen days to repair, nothing else moved through the Canal until the spring of 1797. It could have been that the weight of the water being handled by the one Locks constructed out of timbers was too much for the structure and that is the reason that it collapsed. Possibly it was rebuilt with two chambers before any traffic actually succeeded in passing through it.

To carry this line of reasoning one step further, to avoid another near disaster as faced the Upper Locks, the Lower Locks could have been rebuilt with the three chambers as it did in fact consist of in the illustrations that exist between 1802 and 1825. There is one good indication in the records of the Directors Meeting of July 21, 1802 that supports this conclusion. It states in part “That the middle Lock of the lower set shall be rebuilt this season”. The fact that the middle Lock is referred too certainly indicates that there were three locks or chambers then existing at the lower set (Lower Locks) and had to exist for several years previous to this date to be in such poor condition as to need rebuilding. The canal had only been open for five years.

Why is this question broached at all? Why was the possible mistake in the number of chambers in the two Locks reported as such over and over again right up to and including the most recent reporting? Maybe the author’s conclusions are wrong and everybody else is right, or maybe a wrong interpretation of the records was made in the past and it was simply carried through other writings to be included in current history because of many repetitions.

It takes many small accounts of connected happenings strung together to weave a factual history and one must be included here in discussing the rebuilding of the Lower Locks of stone about 1825. The story of Rand mining the stone and constructing the Locks is told in its entirety in the later chapter, ‘Use of Granite in the Lowell Canal System’. He came down from Vermont with all the necessary men and tools and produced an exceptional piece of work and much of the details of the original structure...
can still be viewed today. Even James Francis who commented on Rand’s work in his Day Book #15 noting that there was no other way except the one employed to have completed the Locks.

So because of all of the improvements by the MMCo. in the infrastructure of the Pawtucket Canal and of the waterway itself, the Canal was reborn into a new life. It would now serve as a feeder Canal supplying the six future canals with the waterpower necessary to sustain the mill operations in spinning the cotton into cloth. The original course of the Canal was no more than a stagnant pond and a sluggish brook that had been dredged and widened to flow into a swamp. That was all that was required to pass the rafts of logs and boats around the Pawtucket Falls and enable the craft to continue the trip to Newburyport. Now being a part of a grandiose scheme to build an industrial empire based entirely on the water flow of the Pawtucket Canal, the Canal too would be pulled up by its bootstraps.

The section of the Pawtucket Canal that left the Merrimack River and followed the course of Speen’s Brook had been excavated pretty much in a uniform manor. It was a circuitous route dictated by the lay of the land until it reached the swamp lands and then continued on to the Concord River as shown in the map at the beginning of the book. The sketch reproduced below illustrates the meandering path of the swamp between the Swamp Locks and the Lower Locks. The two straight lines superimposed over the irregular borders of the swamp between the Swamp and Lower Locks indicate the straighter route of the Canal established by the construction work performed under the direction of the MMCo. This didn’t happen instantly as the tailings to fill in the swamp and create solid ground were to be mostly provided from excavated materials created during the digging of the Western Canal.

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Sketch showing Swamp and Straightened Rebuilt Canal
Chelmsford, 1824
All of the development alongside of the Canal was to occur after the Canal fell thirteen feet at the Swamp Locks Dam and seventeen feet at the Lower Locks. It was this drop in the water level that would provide the energy to produce the mill powers. This was a quotient that was established to determine the amount of water allotted to a given mill that powered the mill machinery. A collapse in the walls of the waterway at this point couldn’t be tolerated and the more friction that could be eliminated in the flow of water because of irregularities in the walls of the Canal justified the expense of lining the walls with granite stone, and sometimes the bottoms with a combination of stones and wood.

There was no rush to treat the Pawtucket Canal above the Swamp Locks to the same treatment as far as the granite as long as the water flow was sustained into the rest of the system. Little by little though the stone was added up to the Guard Locks but for some reason, never beyond. The section of the Canal between the Guard Locks and the Merrimack River has never been stoned even to this day as shown in the photograph below.

From the National Park Collection   www.museum.nps.gov/
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Map of the Lowell, Massachusetts Power Canal System 1821-1847

Chapter Two

The Merrimack River and its Part

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7. Reminiscence of the Early History of Lowell by Silas Tyler
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11. An article titled ‘Wing Dam’ from the Lowell Telegraph by Fredrick Colburn, September 5, 1948
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15. The Patucket (sic) Canal Acts pp. 1
Chapter Four

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20. Minutes of Directors Meetings, PL&C, August 23, 1792, vol.1 pp. 1
21. ibid. pp. 1
22. Patucket (sic) Canal Acts, Sec. 10 pp. 16
23. All dimensions are converted at the rate of one rod = 16 1/2 ft. When referring to distances that raft would travel in dotted Section of waterway length of raft (100 ft.) is deducted from length of waterway.
27. ibid. pp. 5
28. Record of a City by Kennngott pp. 2
29. This map copied from file folder, LFL 9508, Old Maps of Lowell, Center of Lowell History, UML
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Finally, a Step Forward

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37. ibid. pp. 35
38. Center for Lowell History, Folder LFL9508
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Chapter Six

Now, The Land Grab

54. Patucket Canal Acts Sect. 12 June 27, 1792 pp. 5
55. Minutes of Directors Meetings, Vol. 1 pp. 64
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Chapter Seven

PL&C appraises the Progress of the Canal

57. The surveyor’s transit of today hadn’t been developed at that time. The instrument used to establish grades back then was an english tool known as a Weston Wye-Level.
58. Minutes of Directors Meetings, Vol. 1 pp. 88
59. ibid. pp. 88
60. Minutes of Directors Meetings, Vol. 1 pp. 33
   The total contract to build and complete the Canal was 4344 Pounds with 500 pounds withheld until all work finished (Using Parkhurst land cost figures, one pound would equal $3.33 1/3).
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Still, The Search for Water

A Dam above the Pawtucket Falls

Chapter Twelve

The Changing Face of the Pawtucket Canal

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Chapter Fourteen

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   Bottom - Cultural Resources Inventory
   View of Lower Locks and Dam
   Locks extreme left behind cobbled wall
   Sluiceway at left  Concrete siphon on right
   Step dam configuration at center64.

67. Cultural Resources Inventory
    opposite pp.58
    Plan of land south side of Patucket Canal belonging to
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