LEN LEVASSEUR

William A. Johnson Opus 16, 1850

Its history and restoration

William A. Johnson Opus 16, 1850

Its history and restoration

A mile away, the explosive noise was deafening– louder than the loudest clap of thunder anyone had ever heard (ever heard a sonic boom?). An event that had been feared and worried over for nine years had finally happened. It was 7:45 on Saturday morning, May 16, 1874 when a young mother in Haydenville, Massachusetts was cleaning up after breakfast when a sudden deep rumbling caused her to look out the window. To the north the sky had turned the ominous color of night in broad daylight. There at the edge of town quickly advancing toward her was a churning wall of debris 20 to 40 feet high and 300 hundred feet wide– a frothing mass of trees, houses, rocks, cast iron cook stoves and cattle, surrounded by a mountainous cloud of dust. She was the only member of her family who lived to tell about it…

The weather had been wet all week, with several torrential downpours, but at last showed signs of improving. Shortly after six o'clock that morning, the George Cheney, tender of the Williamsburg reservoir dam had made an inspection, uneasy about the unusually soggy ground and the greater than usual number of small freshets about the base of the chronically-leaky earthworks dam. Satisfied it was business as usual, and mindful of the severe chastisement he had received over his spreading two previous false alarm warnings of impending failure a few months earlier that year, he sat down to breakfast. The meal was scarcely over when he looked out the window in time to see a forty-foot section of the embankment sliding away. It was shortly after 7:15. He set off to warn the village of Williamsburg three miles away, the river rising quickly beside him. It was just past 7:30 when a farmer a mile away heard the loudest noise of his life. The Williamsburg River Dam had just given way in one massive collapse and it would take an hour for the entire 600 million gallons of water behind it to convulse its way down the Mill River Valley towards the Connecticut River south of Florence– forever changing the landscape and way of life in this idyllic and bustling valley of 64 mills, farmers and merchants. Behind this wall of water lay unimaginable death and destruction– 139 souls had perished, some whose bodies were never recovered. Of those, 27 were from Haydenville. This was worst natural calamity in

the United States until the Johnstown, Pennsylvania flood May 31, 1889 which killed 2,209 innocents– also resulting from the collapse of a shoddy earthworks dam.

The business manager of the brass factory at first dismissed the warning of two heroic riders arriving must minutes ahead of the torrent, but the first wave of water in advance of the debris wall rose so fast, the mill workers were soon running for their lives. One of the riders called to the sexton of the Haydenville Church to ring the bell as a warning. Ignored, Jerome Hillman decided to ring the bell himself.

The Society of the Haydenville Church structure was an imposing colonnaded building across the street from the massive brick brass factory buildings. On that fateful Saturday, the exterior of the church was hung with black crepe and the interior filled with floral tributes from all over the state, all in readiness for the public memorial service for Joel Hayden Sr. (April 8, 1798– November 10, 1873), which was to take place the next afternoon. Running up to the gallery, Hillman found the bell rope behind where the original organ had only recently stood, (Wm. A. Johnson Op. 16, 1850), the outline of the organ's frame, removed just three months before, freshly visible on the floor– just as it still is today. Hillman scarcely had time to ring the bell a few times before the church was completely surrounded with water and the rapidly advancing debris wall slammed into the large brassworks factory across the street, instantly collapsing the 300 foot-long structure leaving only a 40-foot section in the middle left standing. The community and its five mills which had taken the elder Hayden a lifetime to construct, was gone in 8 minutes.

Joel Hayden Senior was the wealthiest, and the most powerful and respected man in the river valley which encompassed the towns of Williamsburg and Skinnerville to the north, and Nonotuck and Florence to the south. So prominent was his reputation he was elected the Commonwealth of Massachusetts's 26th Lieutenant Governor for three consecutive terms (1863-1866). He was also the largest shareholder in the Williamsburg Reservoir Dam.

In the decades prior to the flood, the valley was the prosperous center of silk weaving in the United States. The entrepreneurial Hayden was a pioneer in brass plumbing fittings, erecting one of the largest factories in the country for their manufacture in 1848, expanding it several times soon thereafter, and developing the community which bore his family name around it all. Earlier, he had first built up a derelict cotton weaving factory, also erecting a button factory which helped support the upriver silk-weaving mills, a foundry which produced steam radiators, a tobacco company, and a gas works which provided illumination along the town's few streets and lit the homes of its most prosperous citizens. By 1860, it was a utopian model mill community, and a beautiful one at that.

He was president of the local bank, on the board of the local railroad, and constructed neighborhoods of rental houses for his workers. The Hayden Brass Co. supplied water pumps for the blue color trade, indoor plumbing fittings and fixtures for the carriage trade, and industrial fittings for city water systems and industrial plants. The company had a major warehouse and store front on 13 Beekman Street on the fashionable eastside of lower Manhattan. This was managed by one of Hayden's sons and to which the elder Hayden made frequent trips. Prior to the war hostilities, Joel Hayden was one of the wealthiest men in western Massachusetts.

Prior to the War Between the States, the mills in the valley were all powered by water, as were the majority of mills in the United States in the day. The vagaries of nature were a constant and expensive concern– low water during summer droughts, ice dams in winter, and upriver mill owners hoarding water for their mills during shortages which impacted the owners downriver. As a consequence, the mill owners in the Mill River Valley formed a corporation to fund the construction of an earthworks dam high up the valley on the east branch of the Mill River in 1865, creating the Williamsburg Reservoir at a site personally selected by Joel Sr. The large amount of water contained behind the dam now ensured a constant and reliable supply of water power to all the mills along the river, in all seasons. In spite of sound engineering drawings, there was a lack of proper project oversight, and the actual construction was so shoddy

it amounted to blatant criminal negligence– a fact not known until the investigation into the cause of the failure, (and no one was ever brought to justice for the disaster). The dam and surrounding land was perennially soggy and leaked like a sieve from the beginning, and the elder Hayden was so concerned about the structure's condition it was said he used to ride up to the dam during periods of prolonged or heavy rain to reassure his nagging suspicions about the dam's soundness. The elder Hayden spent the next years of his life in a continual state of unease about the dam– a disquiet apparently not shared by his fellow investors. Surely, if Joel Hayden had not died of a heart attack in his Manhattan hotel on November, 10, 1873, witnessing the flood he had so long dreaded and the complete destruction of his business enterprises and beloved town would have. The 1850 Johnson organ Joel Hayden purchased for the Haydenville town church played for his funeral three days later. It is a supreme irony that the collapse of the dam that had helped make Hayden's businesses so successful exploded into the greatest disaster of its time just the day before his public memorial service, forcing its postponement– Hayden managing one last monumentally tragic "I told you so".

Joel Hayden was born in Williamsburg, Massachusetts into a family of farmers, but while he was a boy, both his father and his uncles opened textile mills in nearby towns. Interested in music from a young age, it was the young man's ambition to be a singing teacher[1]. However, with no future of prosperity in it, his father shipped him off to apprentice with a lock maker and gunsmith. In 1822, his apprenticeship completed, he bought his uncle's idle cotton mill in the town already bearing the family name and through hard work and perseverance made it not only operational but profitable. When the weaving business hit a slow period, he applied his training as a metal worker and opened a foundry which manufactured necessary household items. His business investments continued to grow and prosper, and by the 1840s he was a very wealthy man. As his fortunes increased, the town of Haydenville expanded with them.

A Methodist himself, Joel funded the construction of three churches in the valley, including the Haydenville Society.[2] However, the church records are sketchy on the matter. While the extant records are curiously silent on much of the early history of the congregation, a pamphlet published by the congregation's current pastor in 1901, Rev. Sanford Martyn, on the observance of 50th anniversary of the building's dedication fills in many of the gaps concerning the church's formative years.[3] The Haydenville church and Society was formed on March 4, 1849, and that name continued until 1855 when it was renamed the Society of the Haydenville Church. The first step taken by the new society was to consider the construction of a new building. The church history states that it was a union movement with a large number of Methodists. They first met in the schoolhouse, and when they outgrew that space, moved to Hayden's button factory (by some accounts at that time concerted into the first location of the brass works before the larger factory was built). The construction of the elegant white colonnaded meeting house began in 1850. The organ was purchased from William A. Johnson, Opus 16, only the fledgling builder's second instrument of that size and complexity, installed and functional before the year was out.

While direct proof is so far lacking, especially regarding a lack of building expenses in the treasurer records, or even mention of the erection of such an imposing building in the area newspapers, oral history has Joel Hayden Sr. being the benefactor of this building, although perhaps as a loan. The first ledger book of the church notes on March 7, 1850, the cashing of notes in payment for pews sold: $5,689.00, and on April 20th, 1850 "Expense of Building

1. Elizabeth Sharpe, *In the Shadow of the Dam,* The Free Press, New York; 2004. 11

2. *Ibid.* 15

3. Rev. Sanford Martyn, *The Historical Sermon* (Martyn: *A Half Century of Church Life: exercises held in observance of the fiftieth anniversary of the organization of the Congregational Church in Haydenville.* May 29, 1901) This pamphlet reprinted various reminiscences, and the text of the sermon preached on the March 10, 1901 commemorative Sunday service by Rev. Sanford S. Martyn, the church's then current pastor.

Meeting House as per contract with Joel Hayden: $6,700.00".[4] There is no other mention in the church records concerning the construction of the church, or payments thereof. There is only an additional notice in the published history the church, that early in 1851, "When the funds for completing the building of the church edifice were trembling in the balance, he purchased four pews at the appraisal suggested by himself, of $500 apiece, and agreed to assume all the indebtedness beyond the amount appraised on the pews which might be incurred".[5] Thereafter and until his death, Hayden annually made up any deficit in the church accounts.

The first mention of the church actually being in use, appears in a Springfield newspaper:

> Haydenville New church.– A very pleasant party assembled on the evening of the 16th inst. in the Lecture Room of the new Church, now nearly completed, in the very pretty village of Haydenville, for the purpose of assisting the Ladies' benevolent purpose of furnishing the Church. A large delegation were present from Williamsburgh, Northampton and other places. Interesting addresses were delivered by several gentlemen, some beautiful pieces were admirably performed by a glee club, and, altogether, a most agreeable time was spent by all present.– The party separated with the reciprocation of the best wishes for the future prosperity of the society. The edifice is one of great beauty–indeed it is a gem of a Church–a combination of usefulness and taste–and if we were to speak particularly of one part being more beautiful than another we should say that we know of no better proportioned, or more graceful spire, in New England. 6

The church records are also silent on when the first services may have been observed in the new building, but Rev. Martyn's sermonized history contains the following information:

> At a meeting to consider the propriety of forming a church in Haydenville, held in the Haydenville church, January 21, 1851, the meeting was called to order by Joel Hayden.[7]

Martyn further states the first Annual Meeting of the new society was held in the building on Saturday, March 1, 1851, and three days later, they adopted articles of Faith, covenant, and bylaws. On Sunday, March 9, 1851, the church celebrated the dedication of the church building free of debt, the recognition of the establishment of a formal church corporation, and the installation of their first minister, a Congregationalist. The Springfield newspaper took notice of the dedication event, but only mentions in passing the presence of "An elegant and richly toned organ".[8] However, the Rev. Martyn describes the music at the dedication service with no mention of the organ at all: "The choir gallery was crowded with a large choir, and reinforced by two bass viols, a large and small one, or a 'double bass' and a 'cello'… a violin also lent its strains."[9] The soloists are named, the robes described, and the rehearsals mentioned as great public events, but the organ is ignored.

Another contribution to the anniversary record, were the reminiscences of Rev. John W. Lane, pastor of the Congregational Church in neighboring Whately (1860-1878), and frequent visitor to the pulpit of the Haydenville church.

> When I first exchanged here, July 8, 1860, this building was a compromise, having an altar-rail back on a step, for kneeling at the Lord's Supper, as in a Methodist Episcopal Church. Some of the Hayden family had this preference, and Josiah continued to attend his church at Williamsburg.

4. Haydenville Church Society account book, 1,2; 1849-1851

5. Martyn, 26

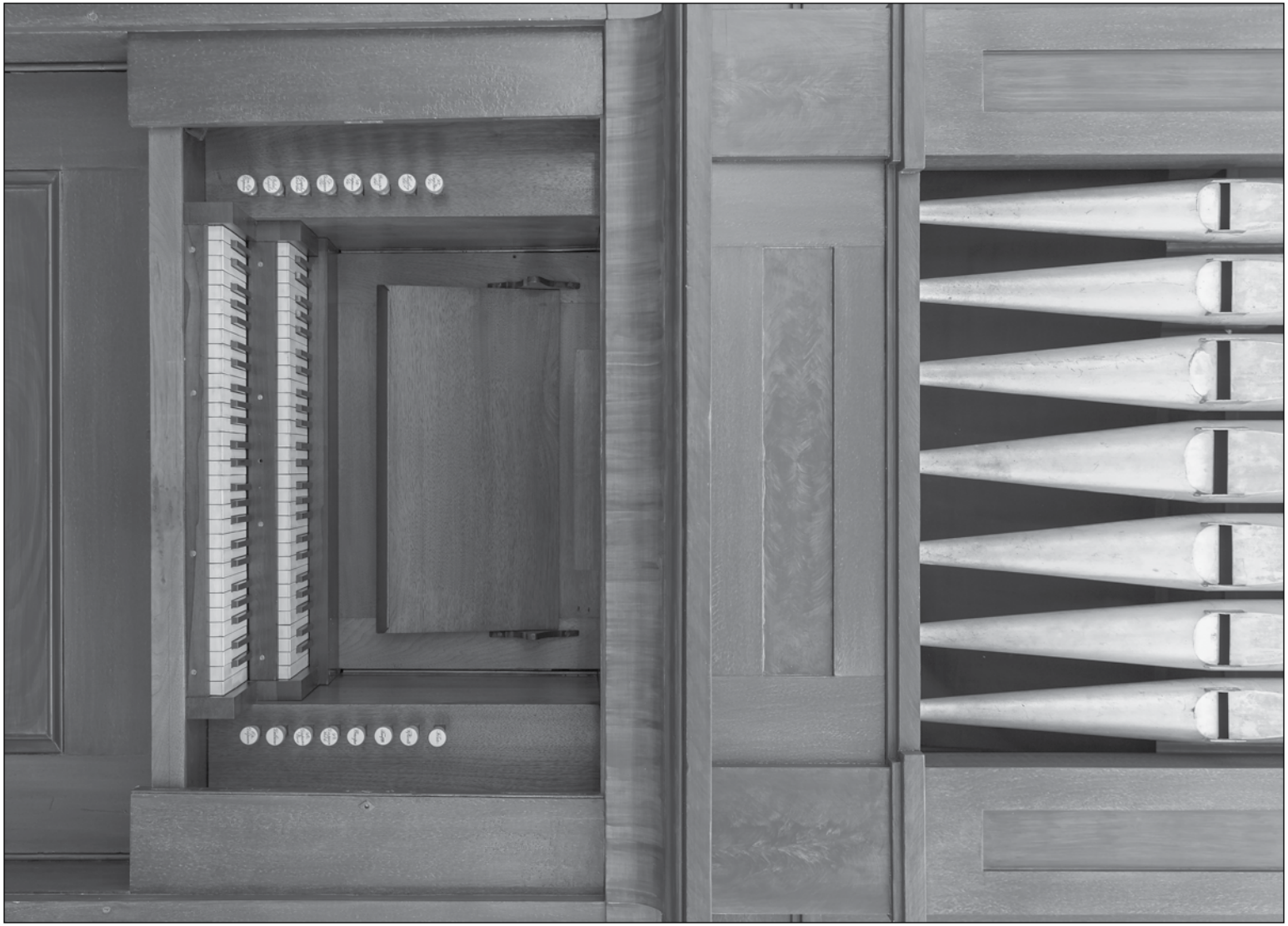
6. *Springfield Daily Republican,* January 18, 1851.

7. Martyn, 18

8. *Springfield Daily Republican,* March 8, 1851

9. Martyn, 25

LEN LEVASSEUR



> The altar rail was removed when the chapel was built, and the new organ faced the congregation. The old organ from the gallery, built for Governor Hayden by Johnson of Westfield, when he was making his reputation, and with an interior finish of every wooden pipe to meet the approval of Mr. Hayden's critical eye, remodeled by Mr. Johnson, was bought by E.C. Allis, of Whately, who died on the day he had set to go for it, and I fulfilled my promise to collect subscriptions to pay for it. No organ has a sweeter tone for me, with memories of Haydenville and Whately.
>
> The flood came. The chapel before its dedication, was first used as a temporary shelter of the dead, for care before burial.[10]

This account is very instructive. First, it is the only written confirmation that Hayden, a disappointed teacher of song in his youth, purchased the organ and that he was keenly interested in its qualities, both technical and musical. Second, it also suggests that the newly renovated church with its new Johnson & Son organ (Op. 417), had not yet been dedicated at the time of the flood, which perhaps had been scheduled for the following day, which was also to be the site of Hayden's ceremonial memorial service that afternoon with dignitaries scheduled to arrive from all over the state. Third, it tells us that Elliot Clark Allis, a wealthy and prominent citizen of Whately, died the day he was to collect the organ [March 10, 1874].

Graffiti found inside the swell box, confirms the timeline further:

Tuned by HH Bartlett[11]
Apr 1st 1874
Assisted by JE Westcoat
Both of Westfield Mass

There is an ink shipping label: Micajah Howes Whatley Mass and in pencil:

MEL 1874.

On bass D of the Pedal Bourdon is written "Bought March 1874". On a piece of rear structure is painted a shipping label: "J.E. Westcoat Whately Mass. Canal R.R.", obviously the same Westcoat from Westfield who assisted Henry Bartlett with the April tuning.

The new organ for Haydenville was nearing completion in the factory at this time, and the March 4 issue of the *Western Hampden Times* mentions the organ nearing completion in the factory and due for delivery shortly, and the installation was nearing completion in April. Concurrently, the former organ, Op. 16, was being modified on site for installation in Whately. The organ was installed in an alcove at the right front of the sanctuary, and the stylistically old-fashioned Greek Revival case would not fit, necessitating a new case front and decoration treatment for the installation in Whately, with materials supplied by the factory. Much about the work was a bit hurried and slip-shod– in obvious contrast to the high-quality work exhibited by the original construction– and tools marks indicate the on-site modifications were done exclusively with hand tools. The completed, organ was exhibited in April, 1874, very likely shortly after the April 1st tuning. There is a photograph taken shortly after the organ's installation showing its 1874 decoration treatment.

Rev. Martyn in his historical narrative, states the organ and choir were moved from their old position opposite the pulpit to one behind it, and the new organ [Op. 417] was provided. The cost of the addition to the church, which included badly needed Sunday school rooms was

10. Rev. J.W. Lane, *Sketches of A.D. Sanders,* (Martyn: 1901) 34,35

11. David Fox, *A Guide to North American Organbuilders,* (Organ Historical Society, Richmond, 1981) 48-49. With Steer & Turner 1871, the with Johnson & Son, *ca.* 1880 flue voicer, later with Geo. S. Hutchings, Hutchings-Votey Organ Co., Hook & Hastings. Died. 1906.

$11,177.50. The cost of the new organ was $1,800 after an allowance on the old instrument of $500.[12] The cost to Whately for Op. 16 was $1,000.

The opus list published by Johnson twenty years after Op. 16 was built, assigns the year 1851 to the instrument, and the published accounts of the church dedication with organ installed, concur. However, the proud scrawlings of an enterprising, eleven-year old bellows pumper tell a different story, and create a mystery seemingly at odds with the printed narrative. The organ's internal narrative tells quite another story as well.

A flesh and blood person emerges from a simple signature and creates a mystery

Cyrus Burnett Smith II was born in North Hadley, Mass. on April 24, 1839, and possibly attended grammar school in Hartford, Conn. The 1850 census, (enumerated August 8), lists him as living in Chester, Mass., in a hotel run by this mother Julia (no father listed), with his three siblings[13]. However, he was in Haydenville pumping the organ by the end of the year, as recorded by a well-hidden signature, and continued to pump the organ and record his presence through 1854. The bellows handle is at the right rear of the organ, but the low C of Pedal Bourdon where he hid his presence, is around the corner, three pipes in. Partially hidden under the large pipe is its rectangular foot, with a sliding wind regulator of wood, something like an oversized popsicle stick. Rather than writing in a prominent or accessible place on the brand-new instrument, which might have found him in hot water with his elders, he made his presence known on the top and bottom sides of the wind regulator– a place surely never seen until now, and even we wouldn't have seen it if even the smallest parts of the organ weren't being disassembled and cleaned during the restoration. He had enough presence of mind to pick the biggest pipe in the organ (to a young boy perhaps also the most important), and surely thought no one but himself and God would ever know– but one wonders if this pipe ever spoke correctly with all his dithering with the regulator. In the practiced script of a young boy, he wrote the following on the top side:

C. Smith *Haydenville*
Cyrus *Mass*
Smith II 1850

And on the underside, obviously running out of room at the end:

Cyrus Burnett Smith 18
pumped this organ 1850 1851 54
1852 1853

In a third place, written on the body of the pipe itself, is the inscription: I blowed this organ from 1850 to 1854. Cyrus B. Smith.

12. Martyn, 26

13. 1850 Federal Census: Massachusetts; Hampden County; Chester; 1. 43A

LEN LEVASSEUR

From these simple signatures, and perhaps for the first time in the history of pumper graffiti, we are able to not only construct the life of a flesh and blood soul, but see a face as well, all made possible by the wonders of Internet data sources, Neither was Cyrus an ordinary mortal, his life path indicates someone of great intellect, one who distinguished himself through his accomplishments throughout his life and beginning at a young age, yet like something straight out of a Greek tragedy, meets a tragic, untimely, and unimaginable end.

Getting from Chester to Haydenville is, as they often say in New England– you cain't get theyah from heyah. It would have been about as easy by train back in the day, as it is by car now, there's upheaved topography in the way, and the route is circuitous. Times might have been hard in the Smith household, a single mother raising four children from the income of a modest hotel/boarding house in a rural hill town. Silas Warner (1778-1858), maternal grandfather to Cyrus, lived in the town of Williamsburgh, and was one of the 10 charter members of the Haydenville church. Cyrus writing the town name on his first signature suggests that's the place he was physically in when writing his name, and most likely he was living there and not simply a visitor. From the manner in which his dated statement on the flip side is written, it's hard to determine whether he was autographing the second statement all at once, as a departing record, or added to it chronologically one year at a time. Certainly the 1854 was squeezed in at the end. The pipe wall signature on the other hand, was definitely written all at once as a single declarative statement.

Practicing in Williamsburgh was Dr. Daniel Collins, a renowned physician and graduate of the Berkshire Medical School. He is well known to have prepped several promising youth for a career in medicine during his 53-year practice which ended with his death in November, 1857. Cyrus had begun his studies at the same medical school only a few short months before, where he was working with Profs. HH and T. Childs.[14] Might he have worked with Dr. Collins and encouraged to attend the same school, perhaps with some string pulling to facilitate his entrance as an atypically young student? He graduated in 1859, the youngest graduate in the history of the school. His graduation thesis was published in *The Medical and Surgical Reporter,* Vol. II No. 24 (September 10, 1859), titled *Treatment of the Asphyxia caused by Chloroform*– the textbook study for much of the nineteenth century on how to administer anesthesia without causing respiratory arrest and death in patients– hitherto a major risk with surgery. Immediately after graduation he established a practice in Indiana Orchard, Mass, is listed in the 1860 census as living in a large hotel in Springfield,[15] moving permanently to Granby, Mass. and establishing a practice there in 1862.

He served in the War Between the States with distinction, joining the 34th Massachusetts Volunteers as Assistant Surgeon almost immediately after moving to Granby. On March 15, 1865, he accepted a commission as Surgeon in the 11th Massachusetts Volunteer Infantry, stationed in Washington D.C. He spent most of the war in hospitals in Virginia and Maryland, and was discharged on July 31, 1865.[16] Earlier that year, on February 18, 1865, he married Mary Hurlburt (1838-1868) in Haydenville, who died suddenly less than three years later. He remarried in 1869 to Louisa Aldrich (d. 1923), having two children by this union, Cyrus Burnett III (1873-1893) and Mary (b. 1873). In an incident that almost defies imagination, after a life lived in distinction after humble beginnings, at 2 am on the morning of September 8, 1879, while Cyrus lay sick in bed with a fever, during a severe thunder storm a bolt of lightning shattered

14. Correspondence with Ralmon Black, curator of the Williamsburgh Historical Society, May 29, 2012.

15. 1860 Federal Census: Massachusetts; Hampden County; Springfield; 1. 124

16. The Woodsen Research Center, Fondren Library, Rice University, Houston, Texas, contains a file on the personal papers of Cyrus B. Smith II, MS 411, which contains among its artifacts, genealogy and obituary information, several personal letters and photographs, military records, Cilvil War uniform buttons, and a diary the doctor kept during the War.

through the roof, striking Cyrus in bed, killing him instantly and burning the house to the ground.

So what do we learn from this diversion? First, we see a living and breathing soul appear before our eyes from the handwritten signature of a boy, (bellows pumper signatures are rendered anonymous after even a short passage of time), and an extraordinary citizen at that. Second, and most importantly for our purposes, it creates questions without easy answers as to the dating of the instrument. The organ had no ordinary beginnings either, and the story it has to tell is buried in very subtle clues. As will be explored in more detail in the restoration report to follow, at least parts of the organ had their origins at least as early as 1849, if not even earlier. The dating of the bellows pumper contradicts what scanty written documentation exists concerning the instrument, some of it penned a generation after the fact, and there is no direct information other than the pumper's signature suggesting when the organ was installed and first playable. My organbuilder's instinct about the meaning of this information may contradict some scholars for whom written sources will invariably trump the instrument as a primary source. Without definitive information to the contrary, I can only present the facts and let the reader draw their own conclusions. Since the organ itself suggests it was installed and finished a year earlier than the builder is dating it (many decades after its installation), in an otherwise very accurate list, either the builder was wrong in the dating, or there is a circumstance surrounding the builder's date assignment unknown to us today.

The pumper's triple dating of 1850 certainly implies the organ was finished and playing. I will explain in greater detail later in this report, the clues inherent in the various layers of case decoration, suffice to say for this argument, the first layer of decoration was applied when the organ case was in pieces, the second layer of redecoration applied while the organ was still at Haydenville was done with the organ erected in-situ, and the third layer applied at Whately, was applied with the case in pieces. Because of the way the organ the organ is engineered, it could not be playable without at least the bottom portion of the case assembled, the upper case could not be assembled with pipes in place, and the cone-tuned organ could not be through-tuned without the case assembled. Therefore, even if the 1850 signature implies nothing more than an tuning following installation, the organ had to be completed and installed for that tuning to occur. We know little about Johnson's workshop facilities at the time, only that his first two-manual organ, somewhat of a twin to this instrument, had to be set up in a Springfield church in order to be exhibited in a playing condition. With orders coming in for new instruments in 1850, Johnson would certainly have wanted this organ out of the way, even if that meant installing it in a building not quite finished. There is a date of December 1850 written inside the case, with no other visible information.

While the church records record no meeting in the church prior to the official dedication, and only the newspaper makes note of a prior assembly in the undecorated church, we can only guess whether the congregation, tired of meeting in a factory, started meeting in the church as soon as it was sealed off from the weather outside or whether they waited until every last bit of painted decoration was dry. Even in a newspaper record of the festive dedication service, the organ is only mentioned in passing as being "fine toned". Was the congregation meeting in the unfinished room, using the organ? Was the organ installed in the unfinished room to get it out of the way in Westfield? Since the organ pipes were cut to pitch and cone tuned, Johnson wouldn't have been doing this on-site in an Arctic-cold room, so if the organ wasn't in place until late in 1850, the room either had to have had heat, or the organ was set up, voiced and tuned, somewhere in Westfield before being moved to Haydenville, and Cyrus in 1850 was either pumping for a cutting-to pitch tuning in temperate weather, or was pumping for either a tuning or some routine and functional instrument usage in a heated room (i.e. a service or rehearsal).

No builder would install an organ in a room still under heavy construction with plaster and saw dust flying around everywhere. Nor would a plasterer be applying fresh plaster in a

below-freezing room. However in a room largely completed in large strokes and undergoing the final small-stroke finishing touches of door hanging, installing kerosene lamps, painting or oiling the floor, etc., the room would already be clean, small wood cutting chores would be done outside, just as we do today, and Johnson could have installed an organ largely in peace. It was only two weeks after Christmas people were having an assembly in the room to assist the Ladies Aid Society in deciding on the decoration treatments, and it was two more months before the church was dedicated. Certainly Johnson wouldn't want to be installing an organ with workman underfoot, hammering and sawing away. This organ spread out in pieces, will cover the entire floor of the average church, for a period of at least a week, probably two. If the organ was installed in a room finished except for decoration, Johnson could have been working in a room relatively devoid of people, and perhaps the January assembly occurred immediately after he was done with his installation ministrations. These therefore are the facts from which we can draw our own conclusions: 1) the organ had to have been completed and in place in order to need bellows pumping in 1850, even if that was only for a final tuning, 2) the first published account of a church service was the dedication in March, 1851 where the organ is mentioned, 3) the room was habitable except for final decoration when an assembly was held in January 1851, 4) the Johnson list of 1894 dates the organ to 1851 but with only two small chamber organs credited to 1850, and 5) the organ was significantly along in its construction in 1849/early 1850 as a G-compass organ, that it required rebuilding to convert it to C-compass prior to its installation. Whatever Cyrus may be reaching across 165 years to tell us, creates a mystery rather than solving one.

The main church originally had benches until ca. 1858 when new pews were installed on the main floor. These pews still retain their original faux-grained decoration, and are built in a different style than what appears to be older pews upstairs in the gallery. At this time, the sanctuary decoration scheme was updated, and the organ case repainted to match. At some point prior to the move to Whately and perhaps even when it was new, an unenclosed *St. Diapason Bass* was added to the Swell, using the only available stop knob and without re-engraving a new label- the *Bellows Signal*– and this original label was found under the organ floor frame in Heath during disassembly.

When the organ was moved to Whately, it received a new three-part façade, largely identical to the rebuilt organ Johnson provided to Warehouse Point later that year (Op. 424). The same molding cutter was used, and the design and measurements of the façade cross rails are identical. The new 1874 casework was walnut, the façade pipes were rather cheaply made zinc dummies– all obviously provided by the factory for modification work completed on-site– and the existing front casework was slathered less than carefully with multiple coats of darkly-tinted varnish to match the new walnut woodwork, (apparently due to its chamber installation, the sides were left as they were decorated when the organ left Haydenville). The original gilded façade pipes were moved inside the organ, crudely crammed wherever they would fit, the workers hurriedly cutting up pieces of the original skyrack and façade toeboards on-site with hand tools to secure them, and cobbling bits and pieces of the original common-metal conductor to wind them. The treble of the original Great *St. Diapason* was replaced with a new *Melodia*, these pipes also crudely cut to pitch in place, with a lot of hacking and gouging of the pipe tops. A new scab was nailed over the original rackboard to secure the narrow wooden pipe feet in the large holes of the original metal chimney flute pipes. This was obviously a rushed and budget job, to be accomplished as quickly and cheaply as possible. The remainder of the instrument was as built in 1850.

The organ was replaced in Whately by a tubular-pneumatic instrument built by the Estey Organ Co., Op. 1263 in1914. It was not Estey practice to take organs in trade at this time, and the church sold the organ for $100 to the Union Evangelical Church in Heath, Massachusetts, where it was installed by George Ryder and Thomas Quinlain without any changes except for the case being painted beige or white with a row of zinc pipe cans on the side of the case facing

the congregation to hide the visible portion of the Swell box. Tacked to the front-most Pedal Bourdon pipe, is a listing of the stopknobs in order from top to bottom, signed Thos. J. Quinlain, 1914,[17] obviously involved in some capacity with dismantling the organ in Whately and moving it to Heath. This is an interesting piece of stationary, the reverse side titled "Office of the Mayor, Boston, Massachusetts", with the signature George H. Ryder. Inscriptions inside the Swell box indicate the organ was tuned by H.G. Earle on August 11, 1931, by Elroy E. Hewitt (head voicer for the Estey Organ Co.) on May 27, 1936, and again tuned and repaired by "EE Hewitt and Ginger"on May 27, 1948 (his wife?). John Wessel of Brattleboro, Vermont, a Dutchman who worked with Estey in the 1950s and was a partner with Elroy Hewitt for a period after the Estey firm closed, cleaned and adjusted the instrument, signing the Swell box on July 7, 1976. At some point in the organ's more recent history, the pressure was lowered to try and conserve wind as a result of the inability of the old blower to keep the organ winded due to the leaky and deteriorated condition of the reservoir, the old bellows bricks being piled under the organ.

William F. Czelusniak, enlisted by the organ committee to offer guidance, assisted this author in preparing a condition report for the church in 2008, jointly outlining the historic importance of the instrument and recommending a conservative restoration according to the newly published, *Revised O.H.S. Guidelines for Conservation and Preservation (2008).* It was during this evaluation that it was discovered the gilded Diapason basses strewn about the organ interior were in fact the original façade pipes, which planted the seed of an idea– seemingly radical at first– that perhaps a reconstruction of the original case should be considered to replace the incongruous 1874 pipe fence, and the original speaking façade pipes restored to their rightful position. After soliciting several proposals, the church awarded the restoration contract to S.L. Huntington & Co. of Stonington, Connecticut in 2009, with removal schedule to take place the following year. The church organ committee, headed by long-time member Ruth Johnson, mounted an optimistic fund-raising campaign, with contributions coming from the Heath Agricultural Fair, supporters from communities as far as 30 miles away who read of the effort in the newspaper, and a matching grant from an especially generous citizen who had retired to the Heath area. The organ committee felt strongly that the restoration was to be respectful and conservative, reflecting conservation protocols being practiced at Colonial Williamsburg and as outlined in the O.H.S. Guidelines. In addition to the usual restorative treatments necessitated by a century and a half-old instrument still functioning in largely original condition, a reconstruction of the original case was planned, to a design that was still only a very vague conception. As the organ company Czelusniak et Dugal, Inc. of Northampton had been curators of the organ for a number of years, and would continue in that capacity following the restoration, the builder enlisted their willing assistance in the dismantling and re-erection phase of the project.

The organ was installed on a platform at the front of the church which had not been designed to support the weight of a pipe organ, and consequently the organ structure had started to sag in the middle, distorting the case and causing chronic action problems. The organ had been installed sideways, speaking across the chancel platform to allow room for a small choir. Since the present choir was smaller than when the organ was installed, the church was persuaded to allow the organ to be turned 90° so it spoke toward the audience room, with the platform carpeting removed and new wood floor installed around the organ to improve the acoustics, and new support structure underneath the instrument (the new floor is dead level, and would support not only this organ, but two more like it!).

The restoration project was begun with the idea the organ would suggest the kind of case it wanted in the fullness of time. A final case design slowly emerged after a considerable number of sleepless nights puzzling over subtle clues, with several theories considered and then abandoned. A later chapter in this report will document the forensic evolution of the case

17. Fox,148. Seeming never to stay in any one place too long, Quinlain worked with Hook & Hastings before becoming a partner in the A. B. DeCourcy company of Boston, *ca.*1908-1916.

reconstruction. Marylou Davis of Woodstock, Connecticut, an expert in historical decoration who has already earned an industry-wide reputation for her spectacular façade pipe stenciling, was engaged to consult and assist in the recreation of the faux finish suggested by the surviving fragments of the original decoration.

The restored instrument was dedicated on a spectacular New England summer day, July 21, 2013, by Nathan Laube. The church was standing room only, with the overflow crowd sitting on chairs in the narthex and outside on the lawn. The setting is spectacular, a two-mile climb up a winding mountain road, the town of Heath with its quintessential white clapboard New England church nestled on a ridge high in the Berkshire mountain range, huddled tight against the Vermont border.

The project was a triumphal act of faith for this small rural congregation. The organ had previously existed in relative obscurity due to its remote location and marginal condition–known only to a handful of organ historians, and often more by reputation than personal experience. The organ was featured in the 1987 recording project undertaken by Johnson enthusiast Dr. Susan Armstrong, recording as many of the extant Johnson organs in New England as possible. For many, this was their first awareness of the organ's existence. However, it remained to the present day, for the historical significance of this landmark organ to become fully understood and appreciated.

Restoration Report Wm. A. Johnson Opus 16

General construction and compass conversion

A substantial amount of internal evidence suggests this instrument, like Op. 13, 1849 before it, was built on speculation. Johnson's built his first two-manual organ to show what he was capable of producing. The fledgling builder had previously built only small one-manual church instruments and chamber organs, and Johnson wanted to tap into the lucrative church-organ market by building larger and more expensive instruments. His first organ of size, costing $1,500 and having 20 registers, was well received at exhibition and sold to First Congregational Church in Westfield. This instrument offered the perfect showcase for prospective purchasers. Surely encouraged by that organ's success, and perhaps with the cash its sale generated, he immediately began another.

Two newspaper shims were found inside stoppers of the Op. 16 Swell *St. Diapason,* one mentioned the arrival of a cargo ship in Boston harbor, which can be traced to June 1849, and a second clipping noting the remaining term of office of the senators in the U.S. Congress, including the famous orator Stephen A. Douglas, first elected senator in 1846. The clipping noted there were three years remaining in his term, which would date the clipping to 1849. The organ was begun as a G-compass instrument and converted to C-compass during its construction.

The introduction of C-compass to the United States is generally credited to Wm. B.D. Simmons in 1848, already a decade beyond its introduction and increasing acceptance in England. This conversion from G-compass to C-compass sweeps the United States seemingly overnight between 1849 and 1850, and happens concurrently with the conversion from the older well-tempered tuning system, sometimes referred to in this period as "meantone", to equal temperament. Certain details of construction suggest the organ was in progress but not fully completed prior to the conversion alterations.

Case: At the top of the case sides are skyracks for the tallest pipes in the organ, the pedal Double Diapason commencing at 10 2/3' GGG. The mortises for the pipe cleats match the original layout of the pedal chests below, and appear to never have been used.

LEN LEVASSEUR

Pedal chests: The original pipe foot borings match the previously mentioned skyrack, the tallest pipes at the back of the organ getting progressively shorter towards the front. These borings were plugged and the chest layout re-ordered, with the existing note channels now winding different notes than as originally constructed. In addition, the attached offset chests for the three treble pipes were rebuilt. The longest pipe, GGG, was too tall to stand on the chest, (it would have stuck up over the top of the case), and fits exactly into a now-unused cut-out made into the floor frame. In keeping with the layout of G-compass organs, the GGG=CC pipes were on the right side of the organ, and the AAA=CC# was on the left– backwards of typical C/C# layout.

Pedal rollerboard: Altered with relocated roller arms.

Pedal pipes: Originally constructed as open pipes of 10 2/3' length, shortened in the conversion to eight-foot length and 16-foot pitch, fitted with stoppers. The pipes are still labeled with their original G-compass note names. As the layout of the pipes on the chest channels had changed, so too the original pipe foot borings were plugged and moved on the bottom of the pipe bodies. A new skyrack attached lower down the case sides holds these pipes in place.

Great chest: The grid was originally laid out for 58 notes, and after the conversion there were four blind channels, and the pallet openings were plugged with sponsels. The borings on the chest indicate the toeboards, sliders, and table were not assembled and drilled until after the conversion. Details of pipe construction suggest the open wood basses of the Great *Open Diapason* were built at the same time as the Pedal pipes. However chest layout and the construction of the stop action, sliders, and toeboards is all of a piece with the C-compass condition, indicating either only the grid had been constructed prior to the conversion, or the changes required by the conversion were so extensive it required the retabling of the chest with all new sliders and toeboards. Considering how this same problem was handled with the conversion of the Warehouse Point organ, Op. 424, without a dramatic rebuilding of the chest, the last scenario seems highly unlikely. The present layout of the Great chest is normal for a C/C# type of layout, with C on the left side, C$ on the right– backwards of the Pedal and Swell chest layout, however the layout of the original grid as a G-compass chest, would have matched the G-compass layouts of the other two divisions.

Swell chests: The construction of the chest is identical in every way with the Great and Pedal chests, and apparently by the same workman. The layout of the chest and rollerboard conforms to that of a G-compass organ with the longest pipe on the right side of the organ, the same as the Pedal chest, but backwards to the Great chest. The Swell bass chest on the other hand, added either during construction or at some point early in the organ's life, is laid out like the Great, with the lowest C on the left side, also backwards of the Swell treble chest.

Stop action: The stop action to the Great chest is more sophisticated in its construction and execution than the Swell, especially regarding the connection between action and slider. The Swell stop action on the other hand is naively crude, the connection between slider and stop action being a screw through the slider into end-grain– an amateur mistake and one sure to fail, and it did– repeatedly. By the construction of the two-manual at Stoddard, Op. 24, in 1853, an organ of similar resources with identical layout, this mistake had been redesigned in a manner consistent with the sophistication of design and execution already present here in the Great stop action.

Why all this trouble to convert an organ begun on speculation and already partially built? Why make all this extra work to finish an organ which could have more economically been finished as is? Was Haydenville already so cosmopolitan in 1850 that anyone would have known

the difference between G and C compass? Possibly. Perhaps Johnson was eager to make demonstrate that he was as up to date as the city builders just embracing the change. However, it is also tempting to speculate the Joel Hayden may have had something to do with it. We know that his having a great interest in singing also suggests by default he was equally fond of music. With his new warehouse and showrooms on Beekman Street in Manhattan, contemplating a new organ for Haydenville, might he have visited the shops of Ferris & Stuart, and Henry Erben– then having the largest organ manufactory in the world, and arguably America's premier organbuilder? If so, he would have seen city-class organbuilding at its finest, and learned of the latest trends in American organbuilding. The 50th-anniversary reminiscence of Rev. Lane suggests Hayden had taken a keen interest in the mechanical workings and quality of the new instrument. Could Hayden have been the guiding force behind the conversion? Might Johnson eager to move the organ out of his shop and to recoup his investment, offered to make the conversion at no added expense to sweeten and seal the deal with such a prominent local citizen and location? Certainly having an organ at least partially constructed would have given Johnson an edge, allowing him to make a quicker delivery than he could have with a custom commission built in a small shop with only a handful of skilled workers. Hayden as a shrewd businessman would have recognized a bargaining opportunity with a motivated seller.

Case

At first glance, the rather plain pipe fence camouflaged the venerable instrument's true age, and I knew one style of case in particular would have been prevalent at the time, a three part façade with Greek Revival and Empire design elements. Fortunately, there exists just this manner of case style close in age to Op. 16. The elegant organ now at Stoddard, New Hampshire, Wm. A. Johnson Op.27, 1853[18] suggested a possible answer to the question of what the original case might have looked like. In terms of resources, the two organs could have been musical twins, with the Haydenville organ slightly larger physically.

The 1850 Haydenville case was built from pine, finished with a dark faux-grain finish suggestive of either mahogany or rosewood. The manner in which the decoration was applied indicates the case was decorated in pieces rather than assembled. This type of decoration is much easier if done in the flat where the artisan has more control over their techniques. In the vertical, gravity affects the oil-based varnishes used in the graining process which have a tendency to "slump", run and drip. There is also an absence of ridges caused by medium collecting in the cracks where pieces join. The original decoration was done by someone of great skill, and it was a high-style finish. This is in definite contrast to the second layer of decoration, done in place as evidenced by numerous paint drips. This second layer contrasted a dark frame with a very light oak color applied to the inset case panels. The graining was rather crude in a vernacular manner, with bold strokes more theatrical in effect than realistic. In order to study the grain patterns, colors and application of the original decoration required careful stripping of selected pieces of the casework, layer by layer so as do no more harm than necessary to the delicate original layer. Portions of the bottom side panel now facing the wall were left unfinished in order to reveal the original decoration for evidentiary analysis and study. The surviving casework was stripped down to the original layer and no further. We elected not to go down to bare wood or to sand the original surface completely smooth in order to a) preserve as much of the original decoration encapsulated under the new treatment, and b) the uneven layers and crazing of the original surface gives a texture to the new surface, which when viewed from a distance gives the case and top coat finish a look of genuine antiquity.

It was obviously that at Whately, where the organ was installed in a chamber alcove, only the front was redecorated with the glossy varnish treatment seen in the period photos. At some

18. Sympathetically restored by Andy Smith Pipe Organ, Cornish, New Hampshire, 2002, replicating the original walnut burl faux-grained case decoration.

point the case was repainted three additional times, at least two of these paint jobs were at Heath. Only part of the right case side out of view facing the side wall at Heath escaped additional repainting. On these unretouched case panels was evidenced the second vernacular layer of Haydenville decoration, which along with the signatures of Heath pumper boys, was documented in photographs now in possession of the church, before being painted over. At Heath, the organ was painted at least three times, first white, the beige, than white again. The 1874 façade pipes, chastely decorated at Whately, were painted gold at Heath, and the pipes had darkened considerably with age.

The heavily painted pedalboard frame and footrest were stripped, revealing it was made of cherry. This was simply oiled and left natural. The heavy padding and velvet cover on the bench was removed. This revealed an unusual and rather handsome woven covering from the last third of the nineteenth century, and this is now hanging in the narthex.

In order to study the original decoration, it was necessary to strip at least parts of the case to expose the various layers of decoration treatments (at least six covering parts of the organ). While the top layers were not of interest, the bottom layers were and the stripping process needed to be gentle and careful around the bottom-most layers to do as little damage as possible. One begins by finding the weakest material necessary to do the required job. The top coats were removed with Zipstrip Industrial, an aggressive and caustic solvent, and which quickly removed the white layers, and was the only material that would cut through the miserably stubborn layer of industrial beige. Below this, caution was in order, and a water soluble citrus-based organic stripper was used. This is a gentle, very slow-acting stripper, which allows a maximum degree of control over the process. Rather than letting it sit and dissolve multiple layers, we found working the gel with a soft brush would help loosen the top coats one layer at a time. Intending to just spot-strip a few parts of the case to study the treatments, we ended up stripping the whole case down to the original layer, but not to bare wood, for reasons which will be elaborated in the decoration section.

Façade pipes

The façade pipes are a very heavy-gauge zinc, and all were found intact inside the organ, although several had been crudely mitered to fit in their new location inside the instrument. The original gilding is intact and while at first glance they seemed to be badly battle-scarred. I had warned the church to be prepared for the possibility we would have to amend the contract to cover redecoration of the façade, as the freshness of the new case decoration would accentuate the shabbiness of the façade pipes. One particularly prescient committee member opined instead, the "antique" condition of the façade pipes would instead make the new case painting look old, and she is absolutely right.

The mitered pipes had to be taken apart, straightened, (and in some cases extended), and the solder seams filed into invisibility. The repair scars had to be regilded and then carefully camouflaged with a variety of mica powders and tinted glazes. The same treatment was applied to the many battle scars, and the end result was the original gilding could be preserved as a rare example of original gilding with the genuine imperfections of antiquity intact. The careful eye can easily detect the repairs, but their effect within the whole is unobtrusive.

The original gilding on the bodies was done with the pipe size applied directly to the raw zinc without a tinted ground. However, the gilding of the mouths was done over copper leaf, a very rare technique not typically encountered in work of the period, and this would have given a warm richness to the color of the mouths against the yellower body color. However, over the years, the copper has reacted with the zinc and has begun eating through the gold, visible as reddish splotches on the mouths. The visual effect is imperfect but not objectionable and is left as is.

New façade

The lower portion of the original case existed up through the impost, but above that, only the side panels remained. The forensic examination of what the old case looked like, began with the clues left behind on the surviving casework such as witness marks, dowel holes, light/dark areas either darkened by exposure to light and the elements or protected from it by casework, penciled layout lines, and especially the residue of the original decoration such as where the ground color was or wasn't, varnish lines, and on the façade pipes, where the expensive gilding stopped and how much of the pipe top length was raw zinc.

The gallery floor to ceiling measurement at Haydenville was a crucial starting point, 164 inches. During the disassembly of the 1874 case in Heath, the removal of the 1874 façade toeboards were a hope-for Eureka moment. Underneath were decoration outlines, dowel holes, and pencil lines, giving the hope-for confirmation that this was a 3-sectional façade with pilaster and panel elements similar to the Op. 27 reference case. However, this could not simply be a copy, as the Op. 16 instrument itself was physically taller, and wider with four additional façade pipes in the side towers, and the first façade pipe two notes lower. The toeboard and skyrack bits of 1850 case work recycled with the façade pipes inside in 1874 could be reconstructed by matching the grain. An inventory revealed the skyracks were intact except for one small piece, yielding the location and spacing of each pipe. The toeboard pieces were the only unaltered vestige of the original decoration, and from these pieces could be determined the channel borings, wood thickness, front molding profile, and dimensions of the plinth panels that supported them. The center toeboard created two mysteries only solved at the end of the design project– end cut-aways proved to be made to accommodate open wood basses placed behind center pilasters, and a miter cut on one end was completely elusive until it was apparent this was part of a molding extending around the pilaster which began at the impost, not on the top of the toeboard like Op. 27. This one clue caused a lot of erasing on the façade blueprint. Once this was figured out, the paint-line clues on the impost suddenly made sense. Likewise, a cut-away on the right tower skyrack proved to similarly accommodate the lone mitered bass seen sticking up over the top of the case (originally intended to be hidden by carvings)– the wood basses had been repositioned inside the instrument in 1874, and these mysterious cut-aways provided the clue as to their original location.

On the side panels, dowel holes, screw holes, and witness lines indicated how and where the cornice and façade wood work were attached and secured together. The amount of ungilded over-length on the façade pipes was a vital clue, suggesting the finished height of the cornice boxes and ultimately the location of the pipe feet, with the over-length feet of the interior *Open Diapason* pipes suggesting the height of the center façade toeboard which could not be exceeded. All that remained, was to get the shape and dimensions correct of all the individual pieces making up the new façade. At first glance, the Op. 27 is very pleasing and harmonious to the eye. A few quick measurements proves the case was largely designed using the classic proportions of the Golden Mean.

Golden Mean and the new case

Examining a number of early Johnson cases shows a consistent eye for good proportions, a few like Shelburne Falls (Op. 76) being curiously squat and heavy, and several like Syracuse (Op. 43) and Stoddard (Op. 27) that are especially light and elegant. The question remained whether Op. 16 could be as light as elegant as the latter instruments, or would be somewhat ungainly, heavy and squat due to its extra width in proportion to the available height. The tallest pipe in the façade, bass F, showed evidence it had received an on-site shortening, and unlike all the other pipes, had no tuner. When placed interior in 1874, a flap had been attached to flatten the pitch. This suggested to me that the pipe was shortened in its original home, either because the case was slightly shortened to accommodate the available space in Haydenville, or perhaps more likely, the pipe was so close to the ceiling it either wouldn't speak, or was shaded too flat.

There are now six starting points to begin reverse engineering the original case: the available Haydenville gallery height of 164 inches, the existing height of the original casework up to the impost, the height of the tallest pipes in the center and side flats, the length of ungilded pipe body length, the width of the original façade toeboard pieces, and the Golden Mean proportion of 1:1.618.

In its simplest terms, the Golden Ratio or the Golden Mean, is a specific proportion between a long and short segment of a line. It can trace its origins at least as early as Euclid, and the proportion can be easily found in the hypotenuse of a triangle with a few short geometrical constructs. At one time or other, everyone has seen the famous 16th-century drawing by philosopher Heinrich Agrippa of a man with out-stretched limbs superimposed over a pentagram within a circle, showing suggesting the body relations to the golden ratio. The application of the ratio in architecture and art is aesthetically extremely pleasing, and perhaps no other number in the history of mathematics has created so much fascination, across such a wide-range of disciplines, including its once "secret" application to pipe scaling and case design in organbuilding pursuits from the Gothic up to the present day. The application of the Golden Mean to a reconstruction of the Op. 16 case, was a hoped for possibility, but in the preliminary stages of the design, it took considerable trial and error at the drawing board- particularly so because I still use the time-honored but antiquated application of paper and pencil instead of the easier capabilities of computer-assisted design.

By close study of the reference case at Stoddard, one could see the economy of the builder's design and construction methods: the use of a limited number of cutters and planes to produce three specific molding profiles repeated in the impost and cornice constructions, the building up of the cornice box from only three pieces of lumber with the surface application of three additional pieces of molding, and the mathematical dimensional relationship of the individual case elements to each other. The dimensional relationship of every element comprising the design, down to the smallest detail, has the general mathematical relationship of 1:1.618. The whole can be proven with geometrical constructs of circles, rectangles, squares, arcs and bisecting lines, further proving the Golden Mean ration throughout. Without going into excruciating detail or showing a drawing black with circles, boxes and intersecting lines, the following are a few of the basic relationships:

1. Total height available= 164", therefore total case height equals 163" plus 1 inch headroom for lifting the center cornice off its dowels. The height to the top of the longest façade pipe, now extended to its proper speaking pitch, is 163".

2. The GS (Golden Section) of the total height of the organ = the height from the floor to the top of the impost.

3. The height from the floor to the impost = height of side towers from the impost to the top of the cornice.

4. The center of a circle drawn around the entire case is the mouth of the center pipe.

5. The height of the side and center cornice boxes are in a GS relationship to each other, and based on the amount of undecorated over-length on the longest façade pipes. The height of the cornice and microscopically of its various elements therefore become the core dimensional constant of the various elements, working top down and side to side.

6. The height of the center plinth = the height of the side cornice. The height of the two side plinths have a GS proportion to the height of the center plinth, and = the height of the bottom extension piece of the center cornice.

7. The width of the stiles supporting the cornice are in a GS relationship to each other, and = the exposed flat vertical portion of the cornice.

8. The projecting overhang of the cornice molding is the GS of the width of the upright stiles.

9. The width of the exposed portion of the three pipe flats as established by Johnson, are in a GS relationship to each other.

10. The various elements comprising the upright stiles are in a GS relationship to each other, as are the elements of the top cornice molding, which are in turn a GS multiple of the impost molding.

Wood for the upper case was purchased from the estate of Richard Lahaise, third generation descendant of Hook & Hastings's employee Eramus Lahaise, and the last member of the venerable Boston organ maintenance firm of Henri Lahaise & Sons. Lahaise had in storage about 80 board feet of old-growth pine, painted with brick paint and what remained from the salvaging of a discarded set of very old pedal wood Diapason pipes. The brick paint would date this lumber to the 1860s or older, and therefore close in age and species to Johnson's 1850 casework. This was the most beautiful wood we have ever had the privilege of working, flat, straight, stable, and it cut like butter.

The replicated casework is not finished however, and awaits additional generous donations to fund the carvings and scrollwork needed to complete the design. The original case would not have looked so austere, having an acanthus-like carving swirl on either side of the central tower to soften its height, to integrate the top case elements together, and to hide the one pipe overgrowing the case. Likewise, the terminus of the façade pipe tops would not have been so severe, but would have been softened with a delicate carved meander of Greek symbols, perhaps a Greek key or scallop motif. Once these elements are funded and restored, the organ will again look as William Johnson intended when it was first built.

Since this organ was not custom-designed for the church in Haydenville, and the case has been proven to have been built prior to its compass conversion, given the balcony dimensions there, and the extrapolated height of the present case, two questions are raised. Was the available height in Haydenville a happy coincidence? Or, was the center portion of the organ slightly lowered to fit? Or just perhaps, was the Haydenville balcony planned from the design stage to accommodate the partially completed organ? The Haydenville balcony is a tiered affair, with the organ originally placed at back of the balcony on the highest tier. If the organ was too tall as designed, either the organ or the floor could have been lowered to accommodate the situation. However, the harmonious composition that results from the application of the Golden Mean proportions to the surviving portions of the casework seems to be more than just a happy coincidence, as there are too many points of alignment and mathematical conjunction to be mere circumstance. We'll never know for sure, but the geometry does lead to tantalizing speculation.

2010 case decoration technique

In the nineteenth century when labor was cheap and materials expensive, a faux-grained case was an affordable alternative to a hardwood case of noble wood and veneer– the hallmark of expensive city instruments. Then as now, professional decorators who do this work every day, have a deft hand and can quickly produce surprisingly realistic finishes that rival detection, even when viewed up close. However, unlike a solid color case, with a primer and one or two quick coats of a single color, a carefully grained case can require a potpourri of specialty tools and color media, perhaps requiring upwards of 15 or 20 individual steps.

Decorative arts consultant Marylou Davis personally pigmented the multitude of varnish glazes, executed a variety of the case panel figurations, and acted a teacher, guide, and mentor throughout the painting process. We owe the ultimate success of the decoration project to her guidance, knowledge, and expertise.

The process begins with the laying of a ground color which will color the grain highlights exposed in later processes. The ground for rosewood is typically a gaudy salmon pink, while oak and mahogany use a neutral beige. The products were all from Benjamin Moore, the ground being a gray-beige flat latex primer tinted Chesterton Buff. The colorant media were all mixed in-house and comprised a dark garnet shellac/button-lac mixture, a dark brown tinted Renaissance-brand finishing wax, and four oil-based satin varnish glazes: clear, medium brown, dark drown, and red brown, all prepared and tinted using powered pigments, (Indian red, Burnt umber, raw umber). The oil-based varnishes function much differently than the water-based products now being required by the EPA, the oil-based varnish had already become a special order item while we were doing the project, and may have already been discontinued by this writing. Future projects of this nature will have a much more difficult time trying to replicate historic results with inferior, water-based products having noticeably different properties. Between every treatment layer, the surface was very lightly sanded with 320 grit sandpaper to level the surface, remove dust, runs and drips.

The simplest design, the panel frame painting imitating edge-sawing, had 10 treatment steps. The more intricate layers imitating vertical-grain veneer (impost and cornice molding), heart grain (knee panel), flat-sawn wood (inset panels), book-matched crotch pattern (center tower panel), and flame pattern (center stile plinths) would have as many as 20 steps. In addition, to heighten the effect of shadow and three dimension inherent in a case crafted from actual noble hardwoods, additional subtle shading was introduced with a very dark applied along the inside edges of the case panel framing to accentuate the three dimensionality of the recessed panels. The sense of shadowing was continued on the inset panels themselves, with a darker shadowing feathered around the outside edges of these recessed panels, leaving the center slightly lighter for the same purpose of fooling the with the realism of light and shadow. The one great advantage of a faux graining, is that if you don't like it, you can wipe it off and do it over. Something you are happy with on Monday afternoon might look hideous with fresh eyes on Tuesday morning, and the book-matched crotch pattern in the center façade panel was wiped off at least 15 times before it looked like the real thing, and not like a nursery school finger painting hung on the refrigerator.

Once the basic decoration was plaid down, this entire case was tinted with an additional layer of the red-brown toner glaze, and then to replicate the finish of a real-wood case and the darken effect of antiquity, the finish was further darkened with three layers of the garnet shellac. The final coat was the hand-rubbed brown wax to add the luster of a warm glow. One added benefit of the brown wax is the random way that it would get into the cracks and crazing of the encapsulated original finish in the same way the dust and grime works itself similarly into the finish of a fine antique.

The organ case in Heath sits in the shadows just as it did in its original Haydenville home. In direct daylight, the finish has the red glow of aged mahogany, but in the shadows it appears a more chocolatey purple-brown reminiscent not only of very old mahogany, but also rosewood, another popular furniture wood in the classical Empire period. The original decoration patterns suggested subtlety, details seen close up but not from a distance, and obviously not like the subsequent overpainted decoration, its theatrically graining having exaggerated gestures visible from the other end of the room. The desired effect we were striving for was that of a fine cabinet maker crafting an elegant case for a discerning city client, employing veneers and cutting patterns to create highlights and contrast in the woodwork grain, with the best pieces placed in the front where it mattered and would be seen, the plain pieces placed on the sides out of sight. I wanted the effect not of overdone fancies, but less is more, allowing the few extravagances to

enhance but not dominate or divert one's attention, and perhaps the eye might not even see the these fussier details at first glance, but becoming apparent with study. Finally, the end result needed to suggest the mellowing hand of time, the case and imperfect, battle-scarred, beauty-is-in-the-blemish façade pipes, the whole ensemble appearing as if it had never looked any other way. The success or failure of the endeavor, remains in the eye of the beholder.

Internal Structure

Except for parts of the instrument made of mahogany or cherry where a hardwood was required, the entire instrument is made of pine. The entire support structure, casework, and reservoir stands upon a floor frame which also provides the decorative baseboard of the instrument. The massive central frame supports the manual chests, independent of the case, but is tied to the case for stability. The case sides structural support the pedal chests. The organ is "stacked", meaning the Swell is above the Great. Originally designed without a bass to the tenor-f swell division, as Op. 24 remains to this day, a 17-note *St. Diapason* bass was added below the swell box and immediately behind the Great walkboard. The style of construction is consistent with that found in the rest of the organ, and considerably finer than that executed in 1874. The Pedal division consists of two chests on either side of the main chassis, divided diatonically in C and C-sharp sides, and as stated previously, following a layout consistent with its G-compass origins but backwards to the layout of the Great division. The open wood basses of the Great Diapason C and D are tubed to the left side wall, C# is mitered and stands on the chest but tubed off its wind, and D# and E are tubed to stand behind a center case stile.

After a light cleaning with either a red-ruby pencil erasure or a weak solution of Murphy's Oil Soap and water, all wood surfaces were treated with a coating of Butcher's Wax. The brick paint surfaces were cleaned and rejuvenated with a citrus-based Contractor's solvent, which unlike water does not dissolve and lift the paint, and seals it with a wax film that retards the surface's absorption of dust and dirt, and causes water to bead on the surface.

As the instrument was dismantled, screws were bagged and meticulously labeled as to their original location. Opus 16 was built well before the era of the machine-made screw, and old hand-cut screws have individual and varying threads. Putting a screw with a different thread into a hole where the threads won't match, can result in the enlargement of the tap hole, recutting of thread grooves, and especially in soft wood, may easily lead to stripped screws. We are fussy about not adding non-original old screws to old work, using modern screws to clearly indicate an added, non-original material. Because the sizes of old screws fall between our modern diameters, when finding an old screw that has stripped, we plug the old tap hole and redrill it, using a modern screw of larger size as a last resort. Often one finds the driver slot in old screws to be too narrow and shallow to fit a modern tool, and we have a set of screwdrivers machined to fit these narrower slots. Often in the course of dismantling, one may occasionally find an old screw made of soft steel, frozen in the place, impossible to get out without mangling the slot, screw head, and surrounding wood. In this case, we drill an oversize plug, redrill the tap hole, and substitute a modern screw.

Windsystem

The wind system consists of a double-rise reservoir (84" x 41 ¾"), and two feeders of unequal size (the larger connected to the down-stroke of the handle). Unlike later construction, the rib hinges are not small twill cloth strips, but a leather strip the full length of the rib, and are additionally leathered both inside and out. Every piece of leather used in the organ was lamb skin, and the replacement material available to us today has a life span less than 20 years, so chrome-tanned goat skin was substituted. The reservoir leather was still in amazing condition for its age, only the gussets have a few small holes. The leather condition in an instrument this old is of interest to the leather suppliers in the industry, and samples have been sent to the American Organ Institute in Norman, Oklahoma, for examination as part of their on-going

leather longevity and treatment survey. We hated having to remove original leather in such good condition, and preserved examples of the original material in the organ. We did however, leave the original leather on the inside edge of the ribs. The reservoir and organ interior contained quite an assortment of nuts…

Part of the telltale wind indicator, original pump handle, and axle stand were found inside the organ and restored to operation, and any missing pieces were replicated. A new ½ h.p. Ventus blower was installed to replace the under-powered Spencer but it too proved illusively under-powered. A quick check of an altimeter gave the answer. The church is 1800 feet above sea level, and at 2000 feet and every 1000 feet thereafter, it is recommended to step up to the next size blower. A larger ¾ h.p. unit was installed which remedied the problem. The Great chest is winded from the left side, the Swell treble chest from the Great bungboard, and the Swell bass from a wooden ventil box also on the bass side, painted with brick paint suggesting it dates from early in the organ's life, perhaps from the original installation, but using the *Bellows Signal* as its control. The pedal ventil in on the left, and sits atop a single wooden truck connecting both pedal chest and traversing the front of the organ in front of the reservoir, behind the roller board. The pump handle is at the treble rear. The wind pressure, lowered to 59 mm perhaps in the 1960s to conserve wind, was raised to 68 mm (2 11/16") reinstating the old bricks found with the organ.

The original barrel-type Spencer Orgo-blo used an internal butterfly valve to regulate the wind, the metal duct crudely attached to the bottom of the left feeder. With the restoration of the hand-pumping mechanism and the installation of the new blower, a new curtain valve was introduced elsewhere in the wind line for wind regulation. The installation of the blower and new main windlines connections were the carried out by Czelusniak et Dugal, Inc.

Windchests and swell box

The Great windchest grid was designed for G-compass with 58 note channels (GGG,AAA-f ^{3}), laid out like the Swell and pedal chests with the C-side being on the right. As part of the conversion to C-compass, 4 channels between the bass and tenor region were left unused and their pallet openings plugged. When laid out as a C-compass chest, Johnson followed modern practice, with the C-side on the left side. The Great is an N-chest, i.e. diatonic for 17 notes, C-e, then chromatic from tenor-f. The 37-note Swell treble chest is an A chest, the tallest pipe in the center, and arranged diatonically throughout, with the C-side being on the right, also backwards from the Great. the Swell bass chest is diatonic, and like the Great, laid out with the C-side on the left. The two pedal chests sit outside the chassis next to the case sides and are diatonic, also following their compass conversion with C on the right side. The C-side chest has seven notes, C-sharp chest having six.

The Great and Swell treble chest have mahogany tables. The Swell bass and Pedal chests have pine tables. None were retabled, small hairline cracks were repaired with glued-in flitches, and the channels were poured out with diluted hide glue. The underside of the mahogany tables had been extensively cross-hatched with a scoring plane to facilitate better adhesion to the grid. The underside of the tone channels were sealed with pine sponsels (channel fillers) with slightly tapered sides– pounded in tight and then planed flat. At least a third were loose causing pallet leakage and channel cracks, and there were a multitude of bleeds holes bored in the bottom of the channels to exhaust ciphers caused by poorly-seating pallets. The chest work was done during the winter when the shop humidity was between 18 and 25%, and as the chests sat, additional sponsels loosened until roughly half the Great sponsels were ultimately replaced, and about a quarter of those in the Swell. The bottom of the chests were sealed with gummed paper, and this was replaced with an identical material.

The pine pallets were double-faced with leather and their tails glued in place, secured with tightly-screwed hold down strips. However, the strips were placed slightly too far back instead of tight to the pallet tails. This created a "pillow" between the pallet tail and hold-down strip,

which compounded by the forward placement and compression of the pallet spring, allowed the pallet tails to actually lift away from the grid, creating a chronic ciphering which must have plagued the organ through much of its life. The simple This would have been a problem created by inexperience, and was simply corrected by moving the hold-down strips closer to the pallet tails. The spring tension varied wildly with many springs tightened to try and solve cipher problems. The springs were regulated to a uniform resistance of 40 grams. The old pull-down wires were retained. the inset bungs, held in place with steel straps and wood wedges, were releathered.

The tables and toeboards were flattened as needed, and relubricated with a mixture of graphite powder and Butcher's wax. The original sliders and bearers are of mahogany and the chests received additional shimming only as necessary. The original shims were some kind of card stock, and one shim on the Great chest contained a tally of the pipe count by division. The toeboards, thin rackboards, and round rack pins are all pine. Numerous offset pipes sit on pine toeblocks, fed by common metal conduits.

The swell box of pine is finished with brick paint, has 5 horizontal shutters, weighted, operated by a cherry hitchdown pedal, which has a hitch position only for full open. The action is a long wooden rod the height of the organ connected to a large center-balanced backfall sitting on top of the swell box, and connected by a trace to a shoe in the center of each shade. The beveled edge of the shutters is a squishy woven material covered with leather. In good condition, this was left unchanged. The interior of the Swell box was once lined with a sound-absorbing material, perhaps some sort of carpeting, attached with a multitude of tacks. This was removed at least by April, 1874, as the organ's maintenance history written on the interior wall of the swell box begins with this date, under an area originally covered with cloth.

Stop action

The Pedal and Swell bass ventils were releathered. The manual stop action is of pine and iron squares (cleaned with a wire brush and reblackened with a rust inhibitor and top coat of wax. The design of the Swell treble stop action was inexpertly designed– a screw through the slider into the end grain of the wood stop trundle- a mistake one would learn in junior high shop class not to make. The end result was predictable– the screws had split the trundle ends and been repaired so many times there were no repairs left, and worn an ovalized hole in the slider end. The end result was the Swell stops could neither be turned fully on nor fully off. The ends of the sliders were repaired with added mahogany stop blocks, a large dado was cut through the end of the swell trundles and filled with cross-grained strips of mahogany, and fitted with brass pins engaging the slider stop blocks. This original system obviously dated from the earliest days of the organ's construction and the Great stop action from trundle to chest used and more professional and secure system of dowels and slider blocks instead of screws driven into end grain.

The stop action is otherwise completely original. The boxwood stopknobs have ivory inserts lettered in an elegant shaded Spenserian script, in two vertical rows on square walnut shanks. The four missing labels were replicated in bone by A. David Moore of N. Pomfret, Vermont, and the missing *Bellows Signal* (Swell bass) label was found underneath the floor frame.

Keyaction and keydesk

The keydesk is recessed behind sliding doors and exhibits the walnut interior typical for New England work. The keyframes however, have an elegant rosewood veneer, a signature treatment of New York instruments and those by Thomas Appleton. The keyboards are flat-fronted and non-overhanging, with ivory naturals and ebony accidentals. The center and front pins are cylindrical and unbushed. The action to both manual chests is by backfalls fitted within a stout frame with a steel rod common-axle passing through the one-piece frame, the Great is a fan, the Swell backfalls are straight. The Swell bass backfall is a retrofitted separate assembly, glued to the underside of the treble backfall frame. The action is transmitted laterally by wooden

rollers having wooden roller arms. The manual rollerboard connections were all fixed, with bent wire connections at the end of the trackers. The Pedal rollerboard utilized all threaded-wire adjustable connections. The Swell to Great coupler consists of mahogany cams attached to a sliding register. At the end of the Great keytail is a wooden ramp, leathered and graphited. When engaged, the register moves the cams up the inclined ramp into position, and the action of the Great key pushes up the Swell keytail. The manual coupler has a tenor-f compass. Many cams in the middle region were badly worn, and they were rebuilt.

The 17-note pedal clavier is centered in the middle of the keydesk recess. The pedalboard frame, footrest and narrow keys with half-round accidentals were obscured by multiple layers of dirt and dark stain. After stripping they were discovered to be made of American cherry, and were left in their natural state. The pedal pipes stand perpendicular to the organ along the sides of the case, but the orientation of the windchest channels is front to back, with the pallet boxes at the front behind the case panels. The action from the keys to chest is via a long rollerboard running the full width of the instrument. The pedal key tracker attaches to the key with a steel loop, and the tracker goes straight to the pedal coupler backfall. Glued to the side of the vertical pedal trackers is a substantial wooden shoe with an imbedded threaded end connected to the appropriate roller arm going to the chest. The pedal coupler is a fan backfall, the operating end being a sticker which pushes up on the keytail when a note is engaged, and affects only the Great keyboard.

The keys are kept under uniform tension by an up-stop thumper rail of pine, weighted with lead disks, and free-floating in grooves cut into the sides of the key frame. There were originally no global key depth adjustments– the keyboards, backfalls, and rollerboards are all fixed in place. In order to facilitate future global adjustments, especially to increase the key dip during the winter months, the two manual backfall rail supports were fitted with long, slow-rise wedges, which can be repositioned to raise or lower the backfall frames thereby causing the key dip to increase or decrease as needed.

Although predictably somewhat fragile, all original pine trackers deemed reliably sound were reused, any replacements copied the originals. All original threaded wires were reused, broken bent-wire end connectors were replaced with heat-tempered phosphor bronze, and only leather nuts were used on the threaded connections, those from the German supplier house Aug. Laukhuff used exclusively as these will not oxidize and corrode the wires as the American-made products do.

Pipework

The historic pipework in the instrument is completely original, and expertly crafted. The pine pipes of the Pedal and Great *Open Diapason* C-E are painted, but the *St. Diapason* pipes are all left natural. The façade pipes and *Principal* C-E are thick-walled and very hard zinc, almost black in color. The remainder of the interior pipes are common metal (approx. 25-28% tin) of substantial construction and hand-scraped inside and out to thickness. The languid angle is approximately 63° throughout, except the metal chimney flutes which are 55°. The open pipes shorter than three feet long are cone tuned, and the zinc pipes are either dead-length, tuned by turning the pipe, or if left slightly long have tuning tabs cut at the top. The metal flute trebles in the Swell and Great are metal chimney flutes with soldered caps and large tuning ears. Five façade pipes had been shortened when moved inside, (bass F was shortened in the original installation likely because of its proximity to the ceiling), and these were all extended. A number of pipes with irreparable cone tuning damage were also trimmed and extended.

In 1874, the Great *St. Diapason treble* was replaced with a Melodia. Examination of Johnson organs of similar vintage proved that the builder employed identical scales for Great and Swell ranks of the same name. It was therefore easy to replicate the missing original Great rank by copying the identical pipes from the Swell. The replacement pipes were made by A. David Moore of N. Pomfret, Vermont. The two surviving metal chimney flute ranks in the organ, at

8-foot in the Swell and 4-foot on the Great, all had a one or more solder seams slightly below the cap. At first glance, this might indicate the pipes were either cut too short or pitched slightly higher and later extended. Perfectly sizing extensions is a task requiring great skill, and the majority of these extensions appear to be part of the same pipe body. I propose a different scenario, which is what we followed with the voicing of the reconstructed 8-foot pipes on the Great: the pipes were left very slightly long, the caps soldered on, and the pipes voiced in the shop. Then, as part of the on-site final tuning, the pipes were cut apart, trimmed, and the two pieces resoldered. A small handful of original pipes have more than one additional solder seam at the top, and this extra bit of tuning adjustment would suggest the theory is correct. This proved a very quick process, and faster than voicing and trimming the pipes in-situ. The manual wood flutes are pine with glued-on caps and blocks of cherry. The Pedal pipes have pine blocks and caps. The mouths of the five *Open Diapason* basses are inverted, and the pipes are cut to length.

The zinc diapasons and principals on the Great have no soldered-on toe points, i.e. the toes are fully open and the feet are set into straight-sided toeboard holes. The wind/volume regulation was done with pipe-metal washers inserted over the windchest holes in the toeboards.

The pipes received conservative restorative repairs only, were regulated for speech and volume on the shop voicing machine, repairing after-market bleed holes, pipes chewed by mice, and reversing changes compensating for external problems now rectified. The preliminary pressure the pipes were first regulated on was 63mm (2 ½"), but once in place, the organ was anemic. Raising the pressure to 68 mm made the organ come to life, (at 70 mm it lost its sweetness and small trebles became yippy), but the increase heightened the effect of altitude on the first blower, necessitating a larger unit. The pitch is A441, equal temperament.

The final regulation in the organ proceeded only after the correct pitch and pressure were established, thereafter using the dead pipe length as one guide as to whether or not a pipe was behaving too soft or loud. A record was kept of the starting toe hole size for every pipe, and all subsequent changes recorded. I do not subscribe to the theory or regulating to the loudest pipe as the one exhibiting the least change over time. Pipes get both louder and softer as they age, and the goal is to find the happy median– the goal is to find a point where the majority of pipes fall into a narrow range, with the minority of loud and soft pipes adjusted to match. When done with each rank, the voicing sheets show how many pipes were loudened or softened, and how many remained unchanged– the goal being to make sure one has found an average, never having the majority of pipes falling in one extreme or another, unless one is correcting an obvious revoicing.

The Op. 16 pipework comes to speech quickly and efficiently, overblowing normally by mouth with only a little extra wind. The windways are healthy, and as all the contemporary critiques of Johnson's work singled out for especial notice, the voicing is uncommonly rich, sweet and almost silvery, without a hint of hardness or edge, the note to note regulation impeccable, with efficiently prompt but unexaggerated speech. The individual stops are possessed of a certain nobility and intrinsic beauty that is unexpectedly endearing. Even in the overly-carpeted acoustic of the Heath church, the organ overcomes that unnatural impediment, still filling the room with a surprisingly fulsome sound. The organ is unquestionably aided by the new hardwood floor which now surrounds it, instead of the carpeted expanse which previously lay before it.

Conclusion

Those contributing labor and expertise to the project were: Amory Atkins, Robert Barney, William Czelusniak, Marylou Davis, Richard Frary Jr., Richard Hamar, Scot Huntington, Gary Smith, Tom Spooner, Jon Van Houten and Joshua Ziemski.

The current *O.H.S. Revised Guidelines for Conservation (2008)* are both more strict and more lenient in advising how one should approach an historic instrument than the original 1972

version which allowed interpretive leeway of a different sort. One of the most stringent changes in the new version is the requirement for documentation of the work performed so the instrument's historical record is clear and complete. Thirty years ago we prided ourselves on camouflaging repairs so they were undetectable and the instrument looked as if it had never been touched. We now know now this obscures the historical record. Today, changes need to be as faithful to the original artifact as possible, yet clearly distinguishable from original material. In instances where a visible change would be unacceptable, such as exterior casework and the façade, we would label the repair in an unobtrusive place, or follow the 6-inch/6-foot rule: make the repair visible at a close 6-inch inspection, but invisible at 6-feet. We always try to use similar materials when making a repair, and either label it or give it a different treatment so 100 years from now it would still be obvious what constituted a repair. Most important, is a permanent document recording the condition of the instrument as found, documenting the restorative interventions and methods, and whenever possible, including the technical data. Documentation can take many forms: a maintenance log, repair invoices, a condition report, a repair or restoration contract, correspondence, recital and dedication programs, internal labelling of changes and additions (crucial), technical documentation, and an exit report. The instrument itself is the most primary of sources, but where that information can be muddled or hidden, the written history is a vital part of the instrument's complete biography.

This report serves as such a documentation report as specified by the 2008 guidelines. A true exit report could easily be twice as long, including measured drawings, photographs, technical details of every part of the organ not just pipe scales, and even specify sources and materials, such as the brand of glue, type and supplier of leather, model numbers and sources of replacement parts, etc. The restoration of this instrument was relatively straightforward, but the reconstruction of the case based on subtle clues and quite a bit of forensic investigation. Assembling this jig saw puzzle without the picture on the box was a fascinating learning experience for everyone involved, and an especially privileged one at that. There are a goodly number of Johnson organs still around, (but not as many as we would wish for), many in faithfully original condition. This unique instrument however, has multiple unique tales to tell, unknown as a complete biography until now. The more the layers of the onion were peeled away, the more interesting the organ and its biography became. We can now look upon the face of its first bellows pumper, an eleven-year old boy who went on to a life of distinction, recall the tragedy which befell its original home, and witness the construction evolution of an instrument which straddled both sides of a watershed revolution in American organ history

Given the number of times this organ was moved, it's a miracle the organ made it to a third home when many of its aged sisters had reached the end of their days. It is precisely the move to Heath, the site of its most enduring home, now a century old– a place hidden away from the rat race, cell phones, and pollution, imbued with the Yankee virtues of thrift and reverence for history and its objects of value and antiquity– that this organ is still here to speak to us a century and a half after its creation. How much richer is our knowledge of American organ history and the formative years of one of the nineteenth century's most gifted and enigmatic practitioners because of this once forgotten gem. In the majestic mountain beauty and tranquility of this place, we can step back in time here, meet William Johnson at the threshold of an amazing career, and witness in person a monumental survival of American musical culture.

Heath Organ Documentation

Wm. A. Johnson, Opus 16, 1850
All measurements in millimeters.
Post-restoration, 2011

GREAT

Op. Diapason

54 pipes. C-E brick-dust paint on pine, block facing and screwed-on caps of cherry, caps set slightly below the top of the block (*reveal*)– the front edge of the block slightly raised above the top of the block by a distance equal to the cap reveal with a voicing bevel on the top edge; inverted mouths, pipes cut and tuned dead length. English blocks and caps, i.e. the block is flat-fronted, and the windway is cut in the cap.

F-g^0 zinc, in-soldered bay leaf mouths, façade. Remainder interior, common metal, dubbed mouths. Interior pipes have long feet to put the mouths above the center façade toeboard. Façade pipe are open-toed, the wind regulation is by common-metal washers inserted in the toeboard directly over the slider opening. Interior pipes cut to pitch with slight top coning from g^0. Upper lips slightly skived, vertical nicking. Long feet to speak over the façade toeboard. Ears FF-b^1. Labeled "Op Dia".

	C	*c^0*	*c^1*	*c^2*	*c^3*
Diameter/Depth	167.0	86.9	53.8	30.6	19.6
Mouth width	129.7	63.0	40.0	21.5	15.6
Cut-up	31.9	16.0	9.6	5.3	3.5
Nicks	31	48	30	22	22
Reveal	4.4	*N/A*	*N/A*	*N/A*	*N/A*
Toe hole			5.4	3.6	2.6
Foot length			283	235	217

St. Diapason Treble

37 notes. f °-b° unpainted pine, blocks and glued-on caps of walnut, English block and caps; splayed mouth sides, left-leaning diagonal nicking, bevel at the top of the block equal to the *reveal* distance; narrow wood feet with wind regulation by small wood wedges; oval stopper handles.

c°-f ³ new 2010, common metal, dubbed upper and lower lips, slightly skived upper lips with arched cut-ups, upper lips slightly bowed out, vertical knife nicking, thick 55° languids, soldered caps and tuning by large ears, set back from the sides of the mouth. Graduated foot lengths 170-160mm. New pipes labeled "St. Dia".

	f°	*b°/c¹*	*c²*	*c³*
Depth/diameter (O.D.)	50.3	38.0/46.0	30.8	19.0
Mouth width	40.8	31.6/36.4	24.7	14.9
Cut-up	8.5	6.0/ 9.2-9/8	5.2-5.8	3.5-3.4
Block reveal	3.1	2.7	*N/A*	*N/A*
Nicks	13m	16m/19mf	15mf	15f
Toe hole		/5.0	3.2	2.8
Chimney length		/98	56	35
Chimney diameter	/10.0	6.9	4.6	

[Melodia]

1874, replaced in 2010. Johnson & Son open wood pipes, inverted mouths, upper lip thin but not sharp, vertical nicking, block front face and screwed-on caps of walnut, top edge of block has slight bevel, and front of block is raised above the top of the block by an amount equal to the *reveal*. Wood feet with wind regulation by wood wedges. Rolled spotted metal tuning flaps. Pipes speak with a very slight but pleasant attack. English blocks and caps.

	c¹	*c²*	*c³*
Depth	43.0	23.6	14.0
Width	34.7	19.8	10.7
Cut-up	11.3	6.5	3.3
Block Reveal	3.3	2.3	1.2
Nicks	14m	10m	7mf

Dulciana

37 notes. Common metal. Dubbed mouths, ears f ^{0}-b^{1}. Vertical nicking, bubbles by mouth, i.e. does not overblow, substantial but not sharp upper lip skiving. Graduated foot lengths 180-152mm. Labeled "Dul".

	f^{0}	*c*^{1}	*c*^{2}	*c*^{3}
Diameter	46.0	35.9	19.5	11.0
Mouth width	33.5	23.6	13.8	8.2
Cut-up	8.3	5.7	3.3	1.7
Nicks	18m	23f	13vf	13vf
Toe hole	3.4	2.25	1.25	0.9

St. Diapason Bass

17 pipes. Stopped pine, brick paint C-B only, then unfinished; block face and glue-on caps of cherry, rounded and slightly thick upper lips, nicking slightly slanted to the left, slightly splayed mouths above c^{0}, pronounced bevel at top of block. English blocks and caps.

	C	*c*^{0}
Depth	103.4	62.4
Width	88.3	52.4
Cut-up	18.6	9.2
Block Reveal	5.6	3.8
Nicks	28m	21m

Principal *(replacement stop label 2010)*

54 pipes. C-E heavy gauge zinc with in-soldered mouths and no upper lip skiving, C, C# in the façade. Common metal from F, dubbed mouths, lightly skived, vertical nicking. Ears C-b^{0}. Graduated foot lengths 190-155mm. Labeled "Pr".

	C	*c*^{0}	*c*^{1}	*c*^{2}	*c*^{3}
Diameter	79.0	43.0	24.8	13.9	8.8
Mouth width	58.9	30.4	18.3	10.3	6.9
Cut-up	14.2	7.7	4.6	2.6	1.7
Nicks	23f	13vf	13vf	17vf	11vf
Toe hole	*N/A*	4.0	2.6	1.6	1.2

Flute

42 pipes from c^0. Common metal, dubbed mouths with arched cut-ups, vertical nicking, 55° languid angle, soldered caps, most large tuning ears set back from mouth, many replaced. Cylindrical, open flue trebles from $c\#^3$. Graduated foot lengths 180-160mm. Labeled "fl".

* *This stop is the last toeboard at the rear of the chest, and the large slider and chest borings suggest this position was originally intended for a reed stop.*

	c^0	c^1	c^2	$c^3/c\#^3$
Diameter (O.D.)	42.9	31.2	18.2	11.8/16.0
Mouth width	29.7	22.0	11.8	7.9/12.3
Cut-up	7.4-8.7	5.4-6.0	3.1-3.5	2.1/2.4
Nicks	21mf	23f	15f	8vf/15vf
Toe hole	4.1	4.0	2.3	1.6/1.6
Chimney length	100	59	34	28
Chimney diameter	9.6	7.2	4.7	3.8

Twelfth *(replacement label 2010)*

54 pipes. Common metal. Dubbed mouths with light upper lip skiving, fine diagonal nicking, ears C-e^0. Very gentle and slightly fluty voicing. Several tenor pipes cut down and extended to eliminate mouths chewed all to pieces by mice. Graduated foot lengths 215-156mm. Labeled "12"

	C	c^0	c^1	c^2	c^3
Diameter	54.6	31.0	17.8	10.2	6.8
Mouth width	38.8	22.7	13.2	8	5.5
Cut-up	9.4	5.4	3.5	2.2	1.5
Nicks	33f	25vf	14m	11f	0
Toe hole	4.3	3.1	2.1	1.6	1.2

Fifteenth *(replacement label 2010)*

54 pipes. Common metal. Dubbed mouths, light upper lip skiving, two mouths in tenor with severe rodent damage. Light diagonal nicking. Ears C-B. Graduated foot lengths 190-157mm. Labeled "15".

	C	c^0	c^1	c^2	c^3
Diameter	42.2	24.7	13.7	8.6	6.2
Mouth width	30.5	17.6	10.2	6.8	5.3
Cut-up	6.8	4.5	2.5	1.5	1.4
Nicks	29vf	19vf	15vf	11vf	0
Toe hole					

SWELL

Op. Diapason Sw.

37 pipes. Common metal. Common metal, dubbed mouths, ears f ^{0}-b^{1}. Light upper lip skiving, very fine diagonal nicking on both the languid and lower lip. Pipes had previously been shortened and fitted with tuning slides, now extended from b^{1}-f ^{2} to restore cone tuning, new slide tuners installed c^{3}-f ^{3}. Graduated foot lengths 225-188mm. Pipes labeled: "Pr".

	f^{0}	*c^{1}*	*c^{2}*	*c^{3}*
Diameter	60.6	42.7	26.4	14.2
Mouth width	44.4	32.1	18.7	13.3
Cut-up	10.0	7.4	4.4	3.1
Nicks	29vf	24vf	18f	18f
Toe hole	5.8	4.4	3.0	2.2

St. Diapason Sw. *(replacement label 2010)*

37 pipes. Stopped, unpainted, quartered pine f ^{0}-b^{0}, blocks and glue-on caps of cherry, English blocks, sharp upper lip, vertical nicking, top edge of block has voicing bevel, wind regulation in the toes by wooden wedges, vertical knife nicking.

c^{1}-f ^{3} common metal chimney flute, dubbed mouths, thick 55° languids, large tuning ears set back from the mouth, slight upper lip skiving and fine diagonal knife nicks. Upper lips skived, and slightly bowed out. Graduated foot lengths 184-166mm, wood feet 160. Pipes labeled "St. Dia".

	f^{0}	*b^{0}/c^{1}*	*c^{2}*	*c^{3}*	
Depth/diameter (O.D.)	43.5	36.4/47.6	31.9	20.6	
Mouth width	36.0	30.5/33.5	20.7	13.4	
Cut-up	8.3	6.6/ 8.0-9.9	5.4-6.2	3.5-3.9	
Block Reveal	1.2	1.7/			
Nicks	18m	20m/20f	19f	12vf	
Toe hole		/5.7	3.9	3.2	
Chimney length		/100	56.3	28.3	
Chimney diameter		/11.6	7.2	4.6	3.6

Principal Sw.

37 pipes. Common metal, dubbed mouths, slight upper lip skiving, ears f °-b°, vry fine diagonal knife nicks. Thicker metal found than elsewhere in the organ's pipework. Graduated foot lengths 175-152mm. Labeled "Sw. Pr.".

	f°	*c¹*	*c²*	*c³*
Diameter	32	23.7	16.0	10.8
Mouth width	21.8	16.9	11.5	8.6
Cut-up	5.6	4.3	3.0	2.3
Nicks	18f	18vf	17vf	10vf
Toe hole	3.2	2.7	1.8	1.6

Hautboy Sw.

37 pipes– 30 reeds, cylindrical, cone-tuned flue trebles from c#³. Double-taper Oboe construction, pipe bodies entirely of zinc, resonators tuned dead-length; common metal boots. Tapered brass shallots with a strong reverse bottom bevel (7-10°) creating a dampening pocket behind the tongue. Narrow shallot opening one-half of shallot length at g°, gradually lengthening to fully open at g¹. Stepped blocks, brass wedges, and brass tuning wires. The blocks from f °-b° are an unusual construction, stepped both front and back, the front step support the tuning wire. The author has not encountered this construction before, and this may possibly be an indication of a particular reed maker. This construction makes removal of the wedge and shallot particularly difficult. Very small letter stamp on shallot. Boot length 168 throughout. The tongues are very slightly narrower than the shallot face. Seven kinked tongues replaced. The top of the tuning wire is a shepherd's crook, not a flat bend. The first pipe in the rank has a very faint zinc maker's stamp on the bell-stem seam:

ETTE DELAV
★

	f°	*c¹*	*c²*	*c³*
Diameter top/stem/block	59/26/10.5	49/22/9.3	30/17/8	23/13/7
Length stem/bell	519/267	340/162	161/53	59/22
Shallot length	62.7	53.4	40.6	29.4
Shallot bottom dia. O.D.	10.9	9.4	7.7	7.1
Shallot top dia. I.D.	6.4	5.7	5.2	4.3
Tongue width bottom/top	5.6/3.5	5.0/4.0	4.2/2.9	3.8/2.5
Tongue thickness	0.3	0.25	0.2	0.15
Boot upper diameter	8.5	7.0	6.0	6.4
Toe hole	8.5	7.0	6.0	6.4

Bellows Signal [St. Diapason Bass Sw.]

17 notes. Stopped, unpainted pine. Block face and glued-on caps of cherry. Strong voicing bevel at top edge of block; upper lips *not* splayed. English blocks and caps. Narrow wood feet with wind regulation by wooden edges inserted in the toe. Sharp upper lip, lightly winded, voicing like the same stop in the Great, very quinty tone. Oval stopper handles.

	C	*B/c⁰*
Depth	89	51/65
Width	77	42/53
Cut-up	31	23/19
Nicks	30	9/11
Reveal	1.4	1.4/1.4

PEDAL

Dou. Op. Diapason

13 pipes, C-c⁰. Pine bodies with brownish paint over brick-dust paint. Blocks and screwed-on caps of pine. Shallow German blocks and caps, i.e. windway cut into block, cap flush with top of block. Pipes were originally a unison open wood diapason from 10 2/3-foot GG, shortened and fitted with stoppers, thereby creating a very large scale. Pipes still labeled inside the caps and blocks with the old G-compass lettering. C-B have rectangular wooden feet, c⁰ has an octagonal foot. Rectangular wood wind regulating sticks C-F, remaining regulators are dowels. Several high cut-ups lowered with wooden inserts. Pipes are very soft, but with a pronounced effect throughout the church.

	C	*c⁰*	
Depth	277	157	
Width	231	115	
Cut-up	80*	48	(**cut-up lowered 10 mm*)

Coupler Gt. & Sw. *f⁰- f³, cam coupler coupling Swell to Great*

Pedal Coupler *C - e⁰, coupling Great to Pedal*

Nicking symbols:
m medium
f fine
vf very fine

Manual compass: C-f ^{3}, 54 notes
Pedal compass: C-e^{o}, 17 notes
Pressure: 68 mm
Pitch: A441 @ 70°
Tuning: Equal temperament
Blower: Ventus ¾ h.p.
Keydesk built into case behind sliding doors, vertical stop jambs, flat-fronted keyboards.
Great action: key–sticker–backfall-pulldown-pallet
Swell action: key–sticker–backfall- tracker–rollerboard–tracker/pulldown–pallet.
Pedal action: key–tracker-rollerboard–tracker/pulldown– pallet.
Swell expression: cherry hitchdown pedal operating weighted horizontal shades
Casework: Pine, faux grained in imitation of mahogany: flat sawn, quarter sawn, heartwood, flame, crotch, and vertical grain veneer patterns.
Original bench, restored.

LEN LEVASSEUR