

Old Wharf & Quarries, Annisquam Parish, Gloucester, Massachusetts

Field Notes April 10, 2021 with additions 11/24/2021

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Overview

We completed a field walk of the “Old Wharf Lot” on the western side of Annisquam Point in along the Annisquam River in Gloucester, Massachusetts on April 10, 2021. This private property has the remains of a stone quarry (#1) currently covered for the most part by tennis courts with a quarry face (ledge) behind the courts heavily covered by vegetation. There is an “L” shaped wharf made of quarried stone and quarry waste rock (grout). Historical records indicate the wharf was divided into three sections. The first section parallels the original rocky shoreline embankment which is now covered with quarry waste stone. The second section was the wharf that extends outward into the waters in a westerly direction. In 1855 these two sections were referred to as the “old wharves” build by Henry Wood & Co. between 1826 and 1830. They were referred to in the plural indicating they could handle the tie up of two or more ships. Between 1851 and 1855, Nathaniel W. Fellows built the “new wharf” (third section) which was an extension of the original wharf out into deeper waters. The deeper waters would have made for easier loading. The older wharves had shallower waters that would have been more affected by the tides than the deeper water of the new wharf. This would have impacted when the ship could arrive and depart from the wharf. In the 1850s Nathaniel Fellows was actively building the breakwater along the north side of the wharf. An 1855 lease agreement required the renter of part of the quarry to continue adding stone to the breakwater.

A walkover of the granite wharf found examples of several different types of quarrying technology & splitting methods. These methods dated from different time ranges. All of the examples were found on stone blocks on the top of the wharf. This mixing of different methods from different time periods on top of the wharf indicates the wharf has been repaired, altered and expanded over time recycling stones from earlier quarrying operations.

We observed a second quarry (#2) behind the house at 60 Adams Hill Road which was separate and distinctive from Quarry #1 (at the tennis courts). Historical records refer to this quarry as the “Great Rocks”. The quarry was opened up by Benjamin Hale at an unknown date. A dirt access road connects quarries #1 & #2 and the wharfs together. This quarry had evidence of machine drilled holes that indicated it continued to be used after 1865. All quarry operations appeared to have ceased by circa 1880.



The 2nd & 3rd sections of the wharf that went with the quarry. The quarry is to the right of the photo.





A tennis court now covers the bottom of quarry #1.
The ledge face of the quarry is obscured by vegetation.



The first section of the wharf which parallels the shoreline.

Timeline

- Blacksmith Shop built between the Fall of 1832 and Spring of 1834
- Original wharf built between 1826 and 1830
- Western end of wharf extended between 1851 and 1855, called the “new wharf”

Quarry Operations

1826-1830	Henry Wood & Ebenezer Bent
1830-1834	Ebenezer Bent & Nathaniel Bent
1834-1851	James S. Savage (owner) 1834-1847 Leased by U.S. government & known as “United States Quarry”
1851-1855-?	Nathaniel W. Fellows
18xx	Benjamin Hale opens up Quarry #2
1855-?	Leased to Henry C. Rogers & Horace P. Burnham
1865-?	Leased to Solomon T. Trumbull, Thomas W. Jordan. Charles E. Trumbull, Amos L. Anderson, & Charles Trumbull
1884	All quarry operations have ceased by this date

1826 Henry Wood & Ebenezer Bent of Quincy, Massachusetts purchased for \$100 from William Babson, John Haraden, & George N. Davis of Gloucester: “A certain Ledge or parcel of Rocks situated within the town of Gloucester and lying in Annisquam Parish & adjoining Squam channel near the Lobster Rocks so called between the spring & field of said George N. Davis ...” It was a one acre subdivision of a large pasture.

Essex County Registry of Deeds Book 253 Page 212 (6-20-1826)

1829 *Gloucester Telegraph* (12-19-1829) reported “Sailed, brig ---, of Steuben, from Squam for Gosport [Virginia], with rock [for the dry dock project].”

1830 Henry Wood of Quincy sold his half of the quarry business to Nathaniel B. Bent, a stone cutter, from Gloucester for \$150. Wood mentions in the deed that transaction comes “with the wharf recently built on the Westerly side it being the same lot which I possess in company with Ebenezer Bent of Quincy” *Book 266 Page 68 (7-13-1830)*

1831 *Gloucester Telegraph* (4-9-1831) reported

We are seldom called upon to witness a more affecting scene or to mourn the loss of a more upright, enterprising and useful citizen than Mr. Wm. Wood, who was instantly killed by the fall of a huge block of granite in a quarry at Squam Parish, Gloucester, on Monday March 23. His mutilated remains were removed to his late residence in Quincy from which they were yesterday followed to the Meeting house and from thence to the tomb his afflicted widow, aged mother, brothers, sisters, and a large concurrence of citizens who deeply sympathize with the family, in melancholy exit of one so esteemed, respected and beloved. His worth, however, can be best appreciated by those who have been most intimately connected with him in business. Ever distinguished for sound judgment, promptness, perseverance and fidelity, he was extensively known and engaged in his business. He was employed by his neighbors as agent in contracting for the hammered work at the Mill Dam – was one of the contractors for and master builder of the State Prison in Thomaston, ME; superintendent in erecting the Jail at Newburyport, and also of the elegant Meeting House in Portsmouth, N.H. He contracted for himself and

in behalf of friends for furnishing the stone for those sea walls lately erected on Deer and Georges Islands ; and he was elected by his fellow townsmen their agent for erecting the stone Meeting house in his own village. He was also one of the contractors for procuring the stone for the Dry Dock at Gosport, Va. And was actually engaged in splitting stone for fulfilling that contract when he was pummeled to that `country from whose bourn no traveler returns” [reprinted from *Boston Patriot*]

1831 Oliver Whitredge sold to Nathaniel B. Bent an orchard (1/3 acre) on Annisquam Point. *Book 263 page 24 (12-19-1831)*

1831 Estate of Gustivus Sargent sold to Henry Wood and Ebenezer Bent a half a house and half a barn. It was located on Annisquam Point. *Book 262 Page 247 (6-8-1831)*

1832 The heirs of William Babson (deceased) sold to Nathaniel B. Bent (“rock layer” of Gloucester) for \$215 a 2/5ths interest in the Haraden Pasture. This was the pasture that the quarry was originally part of and surrounded the quarry on three sides (the fourth side of the quarry being the Annisquam River). Later deeds indicate the 2/5ths interest included the right to quarry rock in the pasture. *Multiple deeds - Book 266 Pages 215, 216, & 217 (9-24-1832)*

March 1834 Ebenezer Bent (stone cutter from Quincy) & Nathaniel B. Bent (stone cutter from Gloucester) sold to Joseph M. Blood (“dealer in stone” from Boston) **(1)** Half a house and half a barn for \$600 **(2)** the quarry and wharf for \$150, The sale included “the wharf built by Henry Wood & Ebenezer Bent ... [and] all the land, rocks and loose split stones below or within said bounds.” **(3)** They also sold a nearby orchard (1/3 acre) for \$185 **(4)** In addition, they sold 2/5ths interest in Haraden Pasture & a blacksmith shop on the property for \$150. The available evidence indicates the blacksmith shop was near the wharf and quarry but apparently build on the Haraden pasture lot rather than on the one acre quarry lot. (Total cost \$1085) *Three Deeds - Book 275 page 119, 120, & 121 (3-12-1834)*

July 1834 Joseph Blood (“dealer in stone” from Boston) sold to James S. Savage (mason from Boston) for \$1830 **(1)** half a house & half a barn **(2)** quarry & wharf **(3)** orchard **(4)** 2/5ths and 1/3rd interest in Haraden Pasture. *Book 278 Page 42 (7-12-1834)*

Aug 1834 Joseph S. Savage (“mason” from Boston) leases to the United States Government **(1)** half a house & half a barn **(2)** quarry & wharf **(3)** orchard **(4)** 2/5ths and 1/3rd interest in Haraden Pasture for the sum of \$1300 [per year?] for the purposes of operating a quarry. *Book 277 Page 197 (8-13-1834)* Levi Bates was deeply involved in various projects at Charlestown Navy Yard. [see the *Gloucester Telegraph* article (10-14-1835) below]

Sept 1835 Joseph S. Savage advertised the quarry and associated properties for sale at a public auction. There is no record of anyone purchasing it.

From the *Boston Daily Advertiser* (9-26-1835)

Granite Quarry, &c. at Annisquam.

To be sold by Public auction on THURSDAY, October 15th, at 12 o'clock, on the premises.

The Granite Quarry, lately improved by Messrs. Bent & Colby situated in Gloucester, in Annisquam Parish, with a convenient Wharf, connected with the same, a Blacksmith's Shop, and eleven undivided fifteenths of an adjoining Pasture.

Also, a House Lot, on the shore of Lobster Cove, in Annisquam Harbor, with half a Dwelling House, and a Barn standing thereon ; and eligible House Lot, containing about one third of an acre, situated on the highway in Annisquam Village, being part of the estate known as the Orchard.

The whole of the above property to be sold, subject to a lease to the United States for eleven years from the 1st of November next. For further particulars application may be made to P.G. Munro, at George's Island, Boston Harbor.

George N. Davis who owned the remaining 1/3rd interest in the Haraden Pasture attempted to sell his interest at the same auction.

From the *Gloucester Telegraph* (10-14-1835):

QUARRY AT ANNISQUAM.

WILL be sold at Public Auction, on THURSDAY, THE 15TH of October, current immediately after the sale of the United States property (which is advertised to be sold at 12 o'clock on said day). One third part of the Rocks, or Granite Quarries in common and undivided with the United States, situated in the Pasture now occupied by George N. Davis, and others, adjoining the United States Quarry, now in operation by Col. Levi Bates, at Annisquam Harbor, in Gloucester.

Sale to at the premises. Terms and conditions at the sale.

SAMUEL LANE, Auc't.

1849 Ralph Bergengren in his article "The Hermit Ledge Settlement" which appeared in *Indoors and Out: A Monthly Magazine Devoted to Art and Nature* (vol.II No.6, (Sept. 1906, p.268) claims that the columns for the Boston Customs House (1849) were quarried at Annisquam. Arthur Brayley in the *History of the Granite Industry of New England* (1913, vol. I) states authoritatively that the columns came from a quarry in Quincy. Given the U.S. lease had expired several years before the Custom House was built, Bergengren's claim seems erroneous.

1851 James S. Savage of Southborough to Nathan W. Fellows of Gloucester for \$750 (1) orchard lot (2) quarry & wharf (3) interest in Haraden pasture *Book 440 Page 17 (1-6-1851)*

18xx Benjamin Hale opens up Quarry #2

1855 Nathaniel W. Fellows (Stone cutter of Gloucester) leased to Henry C. Rogers (of Gloucester) & Horace P. Burnham (of Biddeford, ME) the use part of Quarry #1, the use Quarry #2, and use of the old wharves. Quarry #2 was also know as the "Great Rocks". The lease agreement states "Right of quarrying, hammering and carrying off the Rocks and Stones on said premises including the great Rocks lying to the southward of said Fellows Blacksmith shop being the Rocks that were commenced on by Benjamin Hale." This indicates that Quarry #2 was originally opened up by Hale.

The lease also reveals that Fellows had extended the original wharf westward further out into the waters. This would provide deeper waters for ships to tie up and be less affected by tides like the shallower waters near the original wharves closer to shore. Fellows specified he would be using the new section of the wharf and this new section was not part of the lease. Fellows was actively quarrying stone at the time of the lease and intended to continue on the northeast section of Quarry #1. – The lease states "Northeasterly part of the Ledge which he [Fellows] reserves to himself and from that Ledge to his new Wharf at the West end of the Wharf hereby leased to said Rogers and Burnham and reserving also to said Fellows the right of taking off between this time and the first day of April next all the stones which he has split and which are now lying loose said premises." The lease was for a term of one year with an

option to renew for up to ten years. Rent was a royalty of eight cents per ton of stone removed from the quarry. All the waste rock was to be dumped on Fellows breakwater. The lease required Rogers & Burnham to employ a minimum of seven men (besides themselves) for eight months out of the year. *Book 520 page 125 (9-18-1855)*

1865 Nathaniel W. Fellows (Stone cutter of Gloucester) leased to Solomon T. Trumbull, Thomas W. Jordan, Charles E. Trumbull, Amos L. Anderson, & Charles Trumbull (stone cutters, Gloucester) both Quarry #1 and #2. (No mention of Fellows running any quarry operations of his own). Terms of the lease are a rent of \$800 per year plus 10 cents per ton for all stone over 8000 tons removed. *Book 679 Page 264 (2-12-1865)*

1884 Nathaniel W. Fellows sold all of his real estate holdings to his neighbor Dr. Adams. The wharf and the combined one acre quarry lot and Haraden pasture lot are shown on the 1884 Survey (*Plan Book 1135 Page 300*). Total acreage is listed as 18.75 and described on the plan as “Middle Pasture”. This designation may be incorrect. Deeds refer to it as the “Haraden Pasture” and note it abutted the Middle Pasture to the north: “Beginning at the northwesterly corner of said [Harden] Pasture on the Shore of Squam channel in the direction of the remains of an old wall which divides said pasture from the middle pasture (so called) ...”

Quarry #1 – Circa 1828 onwards

The tennis courts occupy the original circa 1828 quarry. The quarry face (vertical ledge walls) are largely obscured with vegetation. A small section of vegetation had been cleared recently exposing a section of the ledge. This revealed the ledge had very uneven horizontal layers of rocks. The granite was rust colored from oxidation of iron and/or manganese minerals. This was poor quality granite and which likely contributed to the abandonment of the quarry. Several round blasts holes were observed in the upper two layers. The blast holes were drilled through only one layer of rock at a time. They were significantly shorter compared to the blast holes at Quarry #2.

Quarry #2

This quarry is located behind the house near the top of the access road to the wharf. The access road was likely built from grout (waste rock) from this quarry. The quarry was being worked by a very experienced crew of quarrymen. They adapted their quarry methods to meet the unique conditions of the rock in different parts of the quarry. All of the quarry holes currently visible in the quarry were likely machine drilled (compressed air or steam). Machine drilling came in after the American Civil War. The shorter plug and feather holes were drilled with a hand-held machine drill. The blast holes were likely done with a tripod mounted large drill.



Quarry #2 (looking East)



Quarry #2 (Looking east)



Quarry #2 (Looking northeast)



Quarry #2 (looking north)



Vertical and horizontal lines of closely spaced drill holes (on eastern ledge)

Flat Wedge Method (1800-1870) - Only two examples of this method were found both on the wharf. When viewed from the top these holes have a narrow elongated rectangular shape. When split in half and viewed from the side these marks have a trapezoid shape $\backslash/$. They were hand cut with a cape chisel. The method dates from 1800 to the 1860s. One block of stone had a combination of half round holes (plug & feather method) and flat wedge marks. This dates it to 1820 or later. Another block had only flat wedge marks. It was badly worn from exposure to the sea but still identifiable. Both of these examples likely date from the earliest use of the quarry #1 in the late 1820s. The combined use of the plug and feather and flat wedge methods on the same block of stone was found on buildings and quarries in Quincy, Massachusetts dated to 1823 to 1830 period. Given one of the owners of the early quarry was from Quincy, this makes a lot of sense.

How it Worked:

Step 1: Using a cape chisel the quarryman cut a series of flat wedge holes along the intended line of fracture spacing the holes about 4 inches apart. (a) The cape chisel was held in a vertical position and hit with a hammer. This created a divot in the stone. The chisel was move $\frac{1}{4}$ inch or so and hit again. This was repeated along the whole length of the hole. (b) Next the cape chisel was held at about a 45 degree angle and was repeatedly hit with a hammer to remove the humps formed between the divots. (c) Steps "A" and "B" were repeated until the designated depth of the hole was reached. The odd trapezoid shaped hole was a byproduct of this technique rather than intentional made shape.

Step 2: A pair of thin flat upside down "L" shaped metal shims was placed in each hole with a flat thinly tapered metal wedge placed between each pair of shims.

Step3: A hammer was used to tap (but not hit hard) each flat metal wedge one after another down the line of wedges. This process was repeated until a cracking sound was heard. The wedges were tapped the rest of the way down to widen the crack.



- (1) Shims
- (2) Wedge
- (3) Cape Chisel

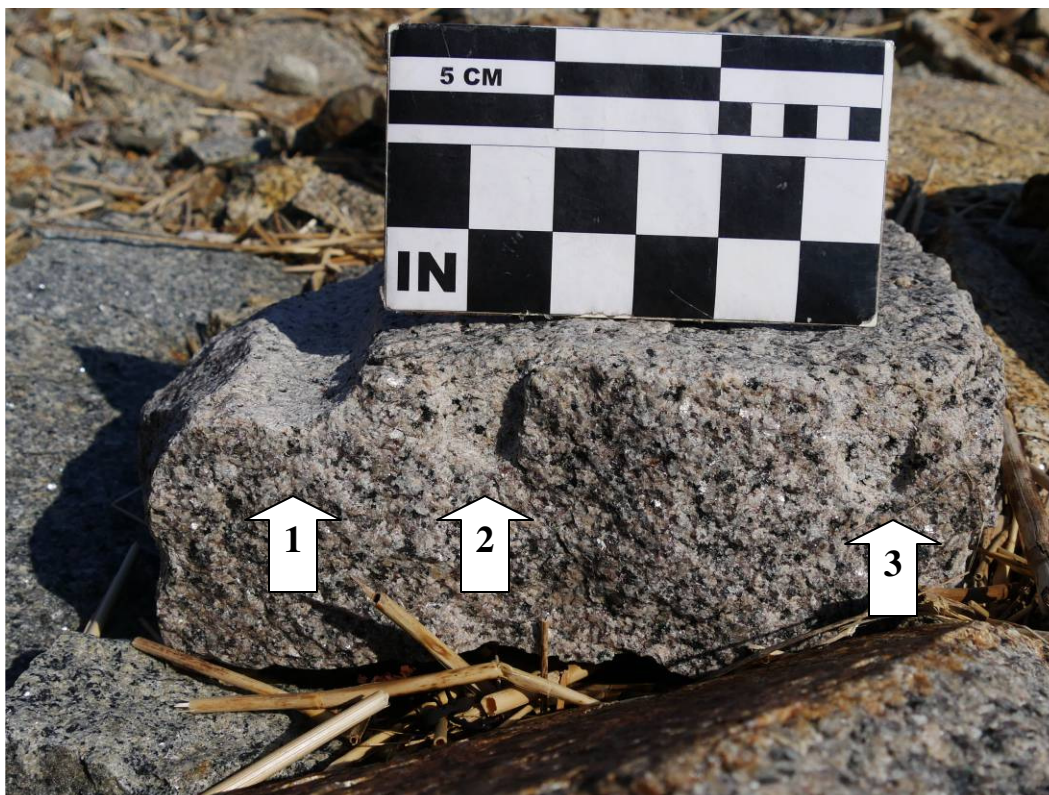


Examples of quarry tool marks made by the flat wedge method. Holes are worn from storms.

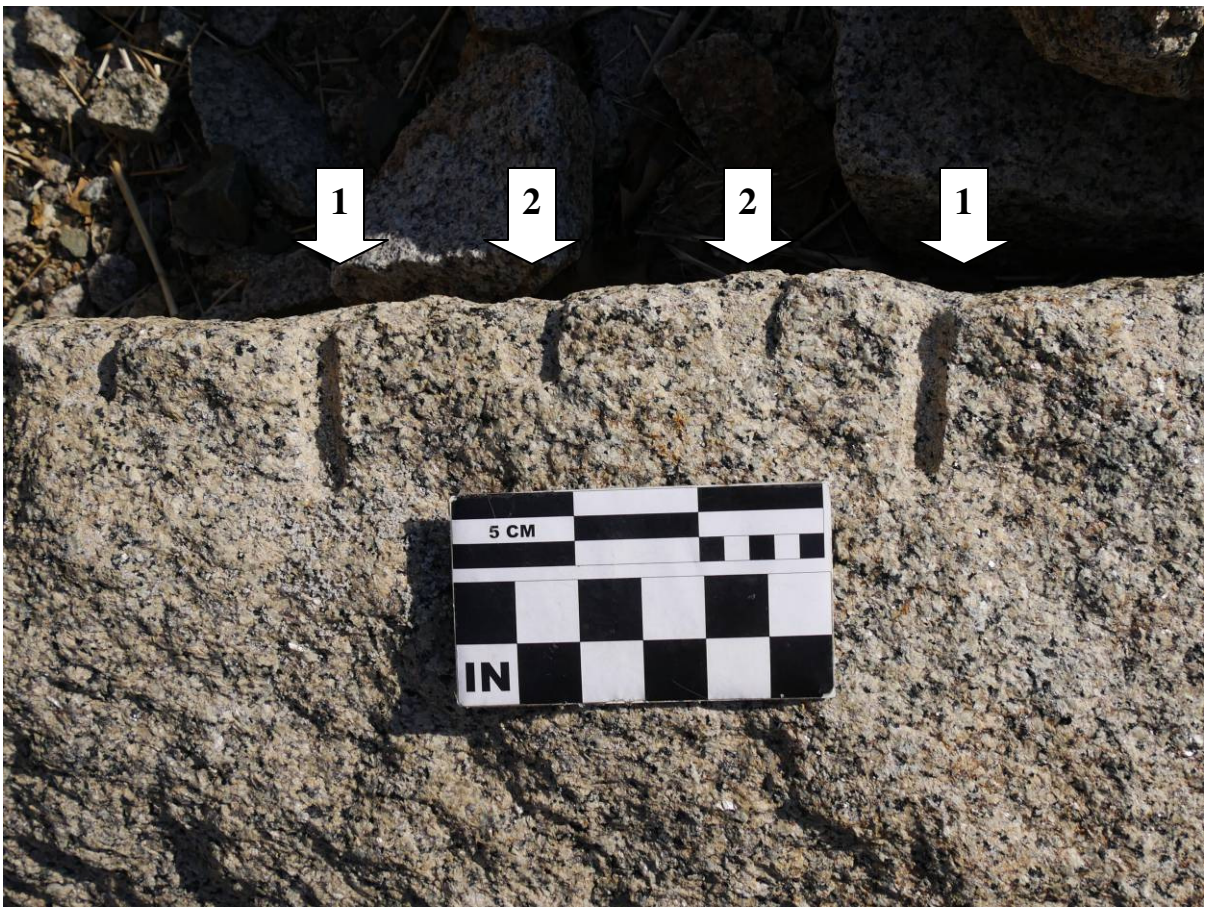
Rock Hammer (1868-1870) – These are rectangular holes generally 1 to 1 ½ inches deep. They are distinguished from the flat wedge holes by their rectangular shape (versus trapezoid) and their smaller size. Examples of this technique are rare. It was a short lived technology introduced around 1868 and disappeared by 1870. The holes are believed to have been cut with a jacket hammer like tool which proved too dangerous and unsafe to use. A similar set of flat wedges and shims (as used with the flat wedge method) would have been used with this method. One example found in the wharf had the partial remains a round machine drill blast hole and rock hammer marks. We did not find any examples of rock hammer marks in either quarry. It was only found on the rock in the wharf.



Remains of a round blast blast hole



(1) Round blast hole (2) Rock hammer mark (3) Rock hammer



(1) Plug & Feather round holes and (2) rock hammer rectangular holes

Plug and feather Method (1820-present) – The bulk of the rock in the wharf was quarried with this method. This technique dates from 1820-present. Two variations were observed. Normally the round holes are drilled about 6-7 inches apart in this method. These holes can either be hand drilled or machine drilled (1870-). Several blocks were observed with very closely spaced holes (2-3 inches part). These come from quarry #2. They are machine drilled. Quarry #2 had high quality granite which was difficult to split. The closely spaced holes improved the odds of getting a clean straight split. Some of holes were drilled deeper than others. These deeper holes occur several holes apart. This is post 1865 technique experimented with to improve the splitting.

How it Worked:

Step 1: Using a plug drill or star drill, drill a series of round holes along the intended line of the fracture spaced every 6-7 inches. The drill was held an upright position and hit with a hammer. Between blows of the hammer the drill was rotated 1/8 to 1/4 of a turn.

Step 2 - A square shaped wedge (“plug”) was inserted between two half round shims (“feathers”) into each hole.

Step 3 – A hammer was used to tap (but not hit hard) each metal wedge one after another down the line of wedges. This process was repeated until a cracking sound was heard. The wedges were tapped the rest of the way down to widen the crack.

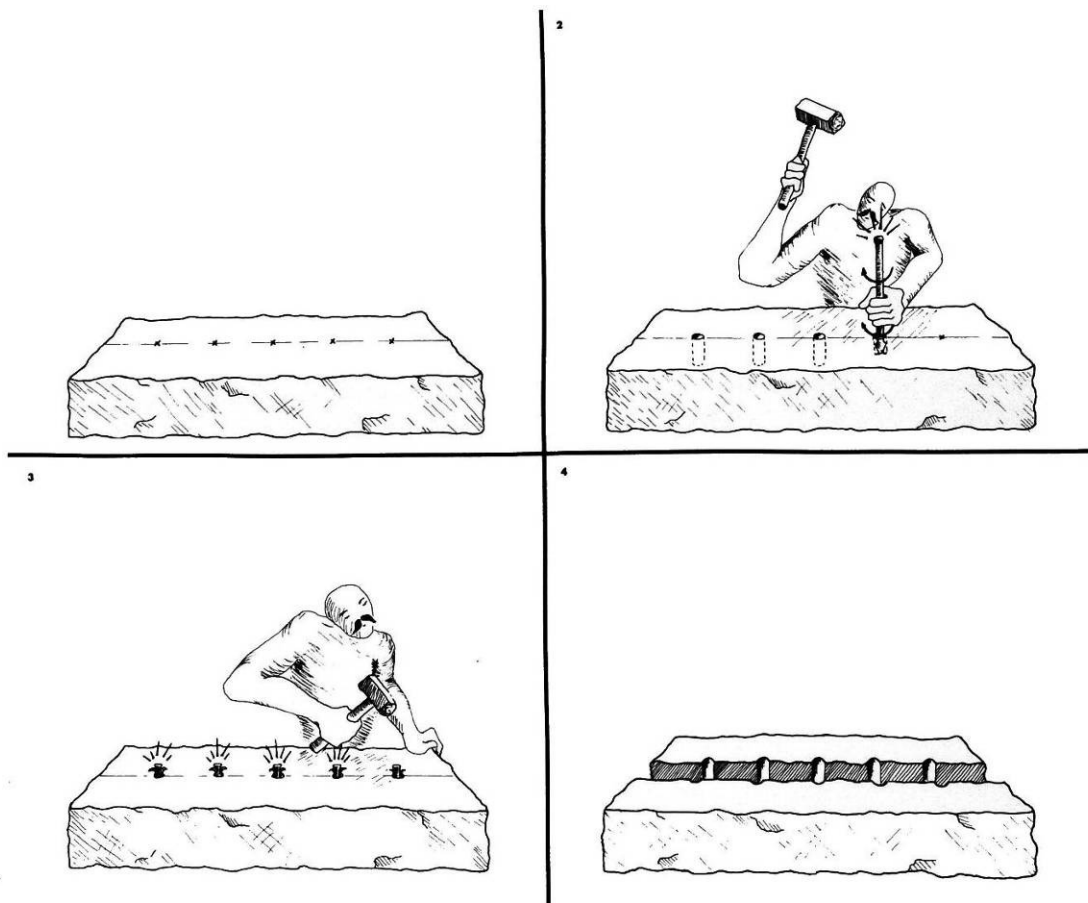


Illustration by Janet Freedman, from:
E. Pierre Morenon, Lauren Cook, Janet Freedman, & Kevin Callanan
 (1984) *Upland Archaeology: A Case for Extensive Prehistoric and Historic Land Use in Woonsocket, Rhode Island. Occasional Papers in Archaeology, Number 8.* Providence, RI: Public Archaeology Program, Rhode Island College.



Plug drill (top) and a set wedge and feathers

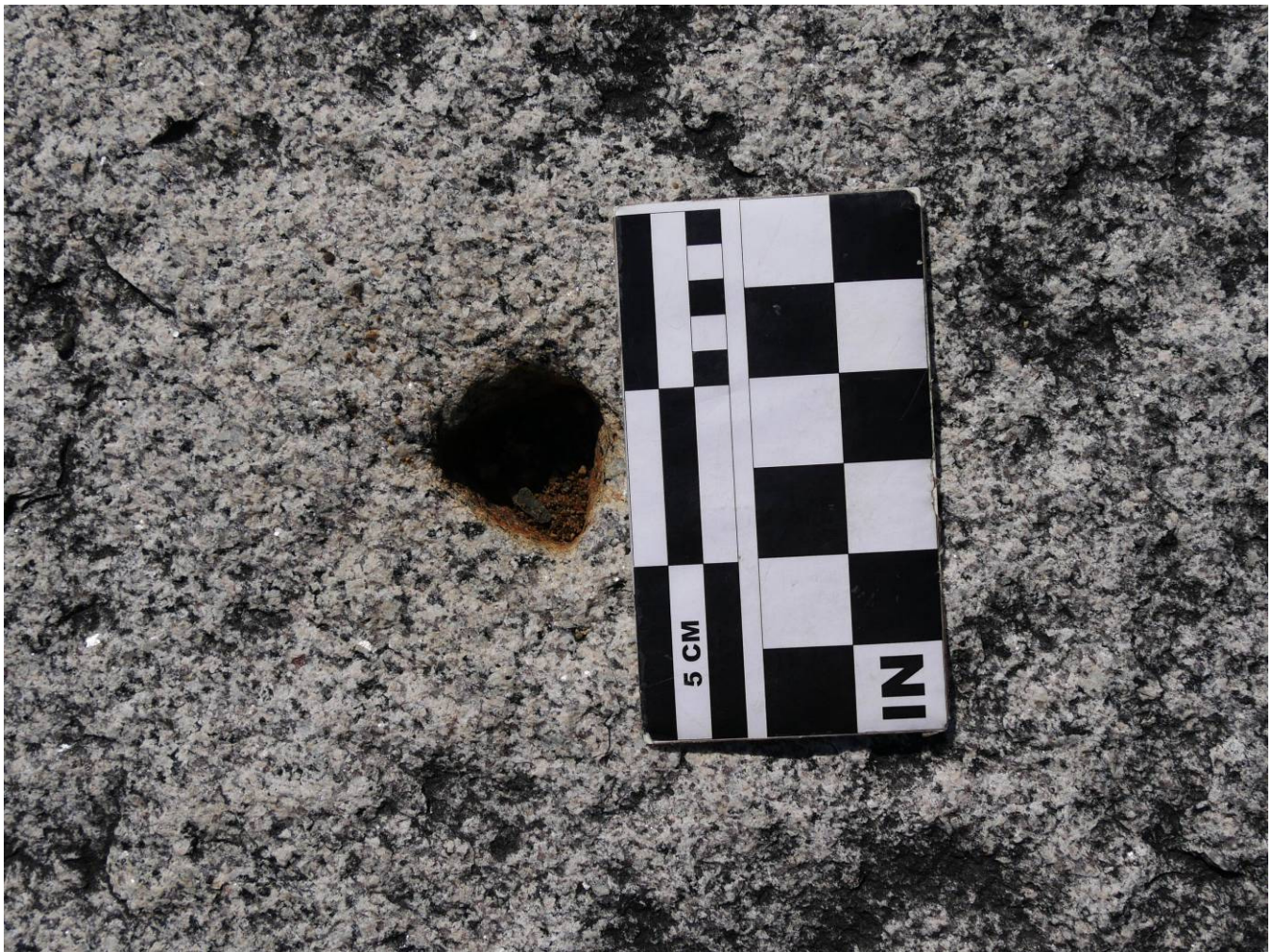


Half round quarry holes from the plug and feather method

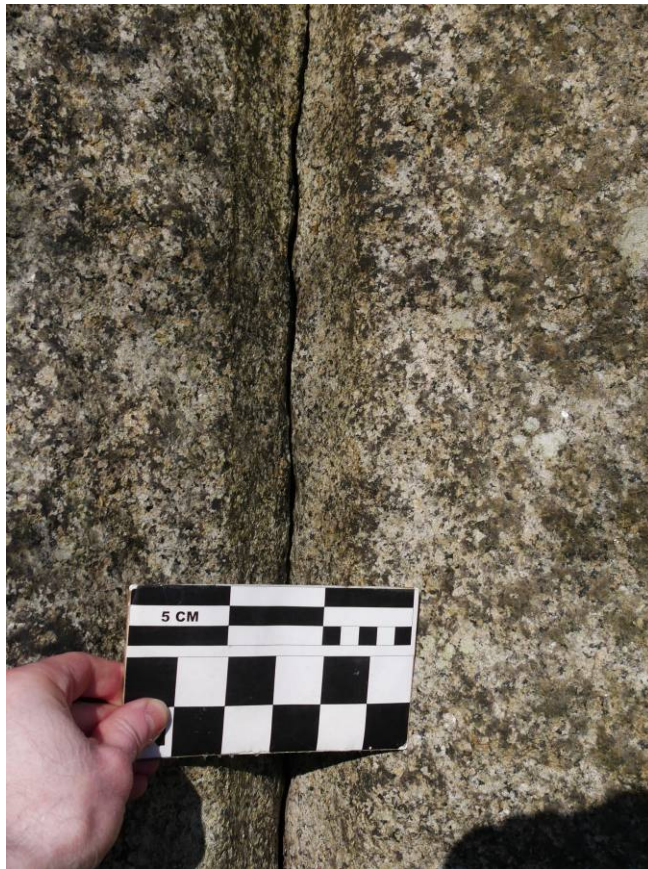


Closely spaced half round holes with alternating depths, part of an effort to split some difficult to quarry granite

Triangular Holes – As the name implies the holes have a triangular shape. The points of the holes are rounded. The top section of several triangular blast holes were found in the wharf. They came from quarry #2. Triangular holes were created by drilling with a drill bit that had a flat bottom like a cold chisel or woodworking chisel. (In comparison the plug drill which creates a round hole has a “V” shaped bit.) Triangular holes were primarily used for blasting. The force of the blast would be directed out of the points of the triangle therefore the quarrymen could control the direction the granite split in. Black powder was used as the explosive. The powder usually only filled the bottom $\frac{1}{4}$ to $\frac{1}{3}$ of the hole. The rest of the hole was filled with sand, clay, or stone dust. Because the powder was in the bottom of the hole it was not uncommon for the top of the hole to remain intact (i.e. not blasted apart). The wharf has several examples of intact triangular holes. These were the tops of the drill hole (the bottom $\frac{2}{3}$ or more being blasted away).



Triangular shaped drill hole used for blasting



Remains of a triangular blast hole. A crack radiated outward from the point of the hole.



Following the drill hole upwards in quarry #2, you will see the unblasted top section of the blast hole in the overhanging ledge above.

Round Blast Hole – This is the most common type of blast hole found at quarries. They have a larger diameter than the round holes drilled for the plug and feather method. Diameters generally range from 1 ½ to 3 inches. Blast holes could be drilled by hand using sledge hammers or by a tripod mounted machine drill. The depth of blast holes varies considerably. At quarry #1 (tennis courts) short blast holes were observed which were only drilled through one layer of rock. At Quarry #2 much deeper holes were observed.



Remains of round blast hole

Rifled Blast Hole (a/k/a star hole) – In quarry #2 a single deep blast whole that looked like the inside of a rifle barrel was found. When viewed from the top of the hole, the hole looks like a five or six point star or * symbol. They are generally known as “star holes.” These holes are the result of a dulling drill bit chattering in the hole due to vibrations being transmitted down the drill shaft. These holes are only produced by machine drilling. (For a detailed discussion of star holes – see our online webpage <http://www.stonestructures.org/html/star-holes.html>)

Pair of Blast Holes – One example of a pair of closely drilled blast holes was found. The holes were drilled about 2 to 3 inches apart. After drilling both holes, a broach bit was attached to the drill and used to break away the stone between the two holes. This created an elongated oval shaped blast hole. The force of the blast would radiate out the two ends.

