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THE WEST FRONT:
HALIFAX CITADEL

by
RICHARD J. YOUNG

(1977)

PARKS CANADA
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Illustrations

Abstract

The following report is based on research at the Atlantic Regional Office, Parks Canada, at the Project Office, Halifax Defence Complex, and at the Public Archives of Nova Scotia during the period July to December, 1976. The primary intent of the study was to provide a detailed historical analysis of the structural elements of the west front of the Halifax Citadel. This information is to be used as a basis for discussion and design of restoration plans. A secondary, but no less important purpose, was to provide an idea of the historical context into which the new curtain wall exhibit area will be placed. A modern concrete and steel "box" is to be built under the rampart between the west curtain and its retaining wall. The "box" will initially house an audio-visual exhibit illustrating the history of the Halifax defences. For two centuries, since 1775, this curtain wall area has formed an important part of three Halifax Citadels. The engineering design for the "box" pays due respect to the aged fortification which surround it, by being almost completely unobstructive.

A major problem in the research and writing of this report was an almost total lack of documentation for the period after 1856. We know, fairly well, what existed at the Citadel in 1856. An excellent as found recording program has provided us with detailed descriptions of what remains in 1976. But there is a century and more of occupation, use, and repair that research is just now beginning to articulate. The problem is particularly acute in the casemate descriptions, where the reader will find more than a few tenative statements. The completion, this year, of the 1860 - 1906, 1906 - 1950, and armament studies will clarify most of the problems of documentation.

A second concern, which a glance at the table of contents and figure #1 will quickly make obvious, was a problem of proper dissection of the material.

The limits of the study (salient to salient, west front) were determined solely by the needs of restoration planning. The only possible treatment seemed to be a division into individual or compatible structural elements. As often happens, this kind of organizational logic plays havoc with readability. There is, consequently, a certain redundancy, chapter to chapter, that was unavoidable.

The report presumes of the reader a certain familiarity with Joseph Greenough's The Halifax Citadel, 1828 - 1856. My own report The West Curtain Wall and Sallyports 3 and 4, was intended as a pilot and companion piece to this volume.

I would like to thank Greg Corkum for the excellent drawings he has supplied, and the time devoted to my problems from his own busy schedule. Also, thanks to Caroline Parmenter, who supervised the salvage archaeology in the autumn of 1976, and provided me with much useful information. Her enthusiasm, amidst jackhammers and ankle deep October mud, was nothing short of inspirational.

Right Face and Flank: Southwest Demi-Bastion

Summary:

The escarps of the right face and flank of the southwest demi-bastion were built by the civilian contractor, Mr. William Flinn during the months of May to October 1829. In December 1830, barely fourteen months after completion, a fifty foot section of the right face collapsed into the west ditch. The flank wall was also showing signs that it would follow shortly. In 1833 the entire right face and approximately half of the flank wall were rebuilt by the Corps of Royal Sappers and Miners under the direction of Captain Loyalty Peake, R. E. The rebuilding program proved considerably more successful than the original. Peake's escarp wall has stood for 143 years relatively solid and intact. The flank wall has been taken down for stabilization.

Narrative:

Colonel Gustavus Nicolls had used military labour in the autumn months of 1828 to excavate the ditch in front of the southwest demi-bastion. This involved cutting into the earth a depth of 15 feet. (See figure 2) In October, a public advertisement was issued calling for contractors to submit tenders on the construction of an 800 foot length of escarp wall. The wall was to be 25 feet high, seven feet thick at the base, and four feet thick through the top, with buttresses placed every 14 feet. (See figure 3) The contractor was required to find and supply all his own material except the corner granite quoin work. The contractors were permitted to quarry ironstone at the government's large quarry in Purcell's Cove.[1]

William Flinn signed his contract for building a 400 foot section of the escarp on 16 December 1828.[2] In May of 1829 Flinn and his band of labourers and masons began construction of the walls of the southwest demi-bastion. They were finished the work, from the south casemates of defence in the curtain wall to the independent casemates of defence in the left face of the bastion, by late October 1829.[3] As early as a month later Colonel Nicolls had decided that Flinn's work was unsatisfactory,[4] and decided not to form the ramparts above the wall for fear of it collapsing under the weight.[5] Nicolls also refused to renew Flinn's contract and instead gave the 1830 work to William Metzler. At the same time Nicolls decided to hire a master mason as foreman of the works, and made marginal adjustments in wall thickness and masonry specifications for the 1830 building season.

If Nicolls watched Flinn's wall with some concern over the next year, no note of apprehension filtered through his official correspondence with London. Finally, during the night of the 9th of December 1830, after a month of heavy rains, a 50 foot portion of the right face of the demi-bastion crashed into the ditch. Two weeks later a similar portion of the left face of the northwest demi-bastion also collapsed.[6]

While not trying to completely exonerate himself, Nicolls did attempt to minimize his own responsibility when writing to the

Inspector General of Fortifications in February 1831. He had, after all, refused to renew Flinn's contract and initiated an unsuccessful legal action to have Flinn rebuild the wall. The main problem, Nicolls claimed, was the exceedingly wet weather and the bad workmanship of Flinn's masons. But the Colonel could no longer conceal the fact that his design and his estimates were simply inadequate. He did his best to convince London that with a greater proportion of large tie stones, a slight thickening of the wall, and the use of cement to face the masonry, the walls to be built in 1831 and thereafter, would be sufficient.[7] In the autumn of 1831 he inserted a small amount in the 1832 annual estimate for repairing the breaches in the walls.[8]

The responsibility for the disaster was divided three ways: Flinn for the bad masons' work, Nicolls for inadequate design and low estimates, and the Office of the Inspector General of Fortifications for not properly scrutinizing the 1825 proposals. Flinn stepped neatly out of the picture when the legal action failed. Nicolls was transferred to the Quebec command and, although not clear of problems associated with the Citadel for another five years, he did manage to avoid the worst of the immediate problems. For the London office, and for Colonel Richard Boteler who succeeded Nicolls as C.R.E. in Halifax, the problems were just beginning.

Colonel Nicolls had couched his reports to London in such terms that the Ordnance office had little idea of the seriousness of the problems which were about to unfold. It was left to Colonel Boteler in February 1832 to send off a thorough status report which would bring home to the London officers the shocked realization that the whole project would have to be reassessed. Boteler thought that the contract escarps would all have to be rebuilt.[9]

The Inspector General of Fortifications replied by reaffirming his statement made to Colonel Nicolls a year earlier, that he had never and would never sanction walls of a less mean thickness than that prescribed by Vauban. Boteler was instructed to continue work on the counterscarp and foundations of the casemates of reverse fire in the north front. The counter escarps, especially the 1829 portions, were

to be watched carefully and left alone for a few seasons to determine if any more collapses were likely.[10] Construction at the Citadel slowed to a snail's pace for the next eight years as the project was reassessed in the Halifax office, in the boardrooms of the Ordnance office, and eventually in Parliament.

The escarps were left in the collapsed or winding state for the 1832 building season. A sum of money had been inserted in the annual estimate for repairing breaches, but Boteler considered this money inadequate and abided by the IGF's advice to adopt a "wait and see" attitude . At the end of the working season he had completed four estimates for the completion of Fort George.[11] These estimates would have given London three clear options, and to argue his case in person, Boteler set sail for London. The Calypso on which he sailed floundered and sank in the North Atlantic.

With Boteler's departure, Captain Loyalty Peake assumed temporary command of the Engineer Department in Halifax. It was Peake who was responsible for rebuilding the right face and flank of the southwest demi-bastion during the 1833 season. There is absolutely no correspondence between Peake and the London officials concerning the rebuilding program. The only information available was contained in a lengthy exchange of letters between Colonel Nicolls and Colonel Rice Jones two years later. Where Peake got the instructions to proceed, or the authority to spend the money, remains a mystery. Boteler had suggested that the money identified for the rebuilding program was quite insufficient.

In any case, Peake superintended the reconstruction of the entire right face and approximately half of the flank of the southwest demi-bastion. Captain Peake abided by two principles which would thereafter influence any new or rebuilt escarps at the Citadel. Firstly, Peake obeyed the IGF's stricture that an escarp of less thickness than that proposed by Vauban would not be tolerated. Both in the face and flank, Peake built a wall that was ten feet thick at the base and seven feet through the top - three feet thicker than the wall built by Flinn.(See figure 1 and figure 4) The second change, insisted upon by Boteler

and carried out by Peake, was facing the wall with regular courses of granite ashlar instead of rubble ironstone.[12] This method seemed to Boteler the only means of overcoming the worst effects of the Halifax climate. The granite was carefully squared, chisel drafted on the edges, and laid in very thin horizontal beds, with vertical joints.[13] (See figure 12) To preserve the uniformity of the appearance in the flank wall, Peake decided to use ironstone for facing the work. But even this ironstone was squared and laid in the ashlar manner. (See figure 5)

Two years later Colonel Rice Jones got into a heated correspondence with Colonel Nicolls on the necessity of using granite ashlar. Nicolls was attempting to assess blame for the greatly increased cost of the project, and the price of granite was one of the main points in his argument. Colonel Rice Jones replied that the cost of granite ashlar and ironstone ashlar were the same in Halifax. Jones argued that random rubble ironstone of any description did not make "very good work", and that no better proof existed than the appearance of the walls built in 1829 and those built by Peake in 1833. The latter, he declared, were as tight and solid as when first built.[14] London agreed with Jones, so the fortress now has walls which are half ironstone and half granite.

Peake also discovered when he removed the material from the collapsed portion of the wall that the foundation was in such a bad state that the whole of it would have to be replaced. The stones were very small, and the mortar was still wet three seasons after construction. The old foundation was removed, and a new one, a foot deeper and three feet wider, was laid. The labour and masons' work on Peake's wall was done by the Sappers and Miners.

With the rebuilding completed in 1833, the history of the face and flank remained uneventful to the present day. The right face is still solid looking, needs repointing, and may need restoration above the batter. The facing stones of the flank wall have been numbered and taken down in preparation for a final stabilization. (See figure 6)

Structural Analysis

Superficial Appearance

Flank - The flank wall was 70 feet in length, 25 feet in height, topped by a sandstone coping, with a nine foot earthen rampart above it. The flank escarp was framed at either end with granite corner quoin work. Originally the masonry face was a roughly squared random rubble ironstone. In the western portion of the flank rebuilt in 1833, the ironstone facing was maintained, but there was a noticeably different appearance. Captain Peake wanted to ensure that the wall would not collapse again, and to this end he insisted that the ironstone be much larger, more carefully squared and hammer faced, and that the beds and joints be laid thinner. The line dividing the old and rebuilt section was well defined before the wall was taken down in 1976.[15] (See figure 5) There was but one opening in the wall, near the curtain re-entering angle, a vent hole framed in granite which was built in association with casemate 8, in 1847.
Right Face - The right face of the southwest demi-bastion was 200 feet long, 25 feet from footing to sandstone coping, with an earthen rampart rising another nine feet above the wall. Originally, the face wall had a rubble ironstone facing. In 1833, Captain Peake rebuilt the wall with the regular coursed granite ashlar facing existing today. Ashlar is a masonry term denoting regular courses of carefully squared stone, with close fitting horizontal beds and vertical joints. The granite had chisel drafted edges. Boteler and Peake argued that this was the only facing method acceptable for massive walls in so wet a climate as Halifax.[16] This wall was the first attempt at granite ashlar facing in the Citadel. Thereafter granite ashlar was used in all new construction. The wall stands today, practically as sound as when first built 143 years ago. (See figure 6)

Profiles

Flank - There were two profiles evident in the flank wall. The first was built by the contractor Flinn in 1829, and represents one of the

oldest escarp sections of the fortress. The second is the rebuilt portion erected by the Sappers and Miners in 1833. The original section, built in compliance with the specifications of a public tender issued by Colonel Nicolls, was rather poorly built by the civilian contractor. The public tender called for a profile seven feet thick at the base, four feet thick through the top of the wall.[17] (See figure 2) From Nicolls' plans we know the top five feet were vertical, giving a batter of three feet in the first 20 feet of height.

The wall built by Flinn had begun to wind even as the 1829 building season came to a close. In 1832, Colonel Richard Boteler reported that the whole wall would have to be replaced.[18] A year later Captain Peake decided otherwise, and rebuilt only one half of it. The exterior line dividing the two portions was quite visible. (See figure 5) On excavation behind the wall in 1975, it became obvious that rebuilding was not as extensive as the exterior suggested. While Peake rebuilt according to Vauban, a profile of ten feet through the base and seven feet through the top,[19] he did not carry this profile through the entire length of the rebuilt portion. The thickened wall extended only 20 feet from the corner of the right face. For the remainder of the rebuilt portion Peake contented himself with the old profile, and simply used larger stones, better mortar, and a greater quantity of tie stones. (See figure 7) The reasons for this remain unexplained - perhaps it was simply a matter of having run out of money.

Right Face - Originally this wall was an ironstone rubble masonry wall, with the original profile proposed by Nicolls and built by Flinn - seven feet through the base, four feet through the top. A 50 foot portion of this face collapsed in December 1830, and the entire wall was rebuilt in 1833. The profile adopted by Peake was that recommended by Vauban, ten feet through the base, seven feet through the top of the wall.[20] The wall was 25 feet in height, battered two feet six inches in the first twenty feet of height, and thereafter vertical to coping stone. Facing stones were granite ashlar. (See figures 2 and 4)

Foundations

Flank - The foundations specified in the 1828 public tender called for a masonry wall, "3 feet deep, 7 feet 8 inches thick, of good iron or blue building stone."[21] The excavation was to be performed by the military. Presumably this was the dimension of the foundation built by Flinn in 1829. When the foundation of the face was inspected by Peake in 1833, he found the mortar still wet after four years and the stones too small for the weight of the wall.[22] In the flank wall, Peake widened the foundation to ten feet and deepened it by one foot in the eastern 20 foot section. At this point the line dividing the old and new portions reaches the foundation.

Right Face - The original foundation built by Flinn was seven feet eight inches wide by three feet deep. This was in keeping with the contract Flinn had signed. This foundation was judged completely inadequate by Peake in 1833, and he ordered that the whole thing be removed. The new foundation was deepened by a foot and widened to ten feet six inches, to carry the very much strengthened wall proposed to be built above it.[23] Peake used ironstone, but much larger stones than had been used by Flinn.

Buttresses

Flank - Nicolls' specifications of 1828 called for "...the Buttresses to be of good sound iron or blue building stone. The Buttresses to be 14 feet apart, 4 x 5 feet each, and the height of the wall".[24] Originally, there were three buttresses of these dimensions supporting the flank wall. In the rebuilding program in 1833 Peake left two of these buttresses unaltered. The third or easternmost one was incorporated into the widened escarp profile, and this marks the beginning of that profile. The excavation behind the flank has not proceeded far enough to allow as found recording of the eastern end of the wall. The buttresses were formed into a continuous mass and bonded with the escarp wall.

Face - According to the original specifications there would have been 11 buttresses 14 feet apart behind the right face of the southwest

demi-bastion. Each buttress would have measured four feet by five feet rising 25 feet to the top of the wall. When Peake rebuilt the wall in 1833 he not only used Vauban's recommendations for wall thickness, but also the dimensions and form suggested for buttresses. The new buttresses were not rectangular as built by Flinn but a trapezoid shape seven feet long, five feet wide next to the wall, three feet four inches at the tail.[25] The 1847 plan of the Citadel indicated nine buttresses behind the 210 foot length of the face. Lacking any as found evidence or documentation of any other type, this is what is assumed to be under the rampart.

Masonry and Mortar

Flank - The 1829 wall was composed of roughly squared hammer faced ironstone, laid in irregular courses, and bonded with a mixture of three parts lime to one part sharp sand. The ironstone was quarried on the government lot in the Northwest Arm by Flinn's labourers, shipped by boat to the Ordnance Wharf, and hauled by horse and wagon up the hill. In the western portion rebuilt by the Sappers and Miners in 1833, a noticeable change of appearance took place. The ironstone, while not laid in regular courses, was much more carefully squared and faced, and beds and joints were laid thinner. The number of large tie stones used was greatly increased to the dismay of the masons taking down the wall in 1976. (See figure 6) Also the density of the mortar mix seems much greater in the rebuilt portion. What Peake used for a mix has not been discovered. Other than periodic repointing, there is no documentation to suggest that the masonry was altered in any way until Parks Canada began dismantling the wall in 1976.

Face - Originally the right face resembled the flank - a rubble ironstone construction, roughly squared and hammer faced. This wall was ordered removed by Captain Peake in 1833, and rebuilt the same year with ironstone backing and granite ashlar face. The granite was laid in regular courses, the stone size roughly uniform throughout. The edges of the granite were chisel drafted with very close beds and joints. It was the first experiment with granite facing at the Citadel. The

mortar mix was lime and sand in the backing ironstone, and probably cement in the face granite. Except for periodic repointing, nothing has been done to the masonry of this wall since 1833.

Coping

Flank - The coping called for in the 1829 specifications was "... freestone...3 feet wide, and four inches thick...no stone to be less than 3 feet long...".[26] Richard Scott supplied the coping stone to the Citadel in 1829-30. Although Scott's contract did not specify tooling, an examination of the original coping extant on the northwest demi-bastion shows that a one inch gutter was chiselled into the coping two inches from the outside edge. The sandstone was higher at the back to facilitate drainage. The gutter drained into spouts that were tooled into the freestone and projected six inches from the face of the wall. The original coping of the flank of the southwest demi-bastion was undoubtedly of the same description. (See figure 10) When Peake rebuilt half of the flank wall in 1833, he changed the coping stone. The stone today has no tooled gutter or spouts, and is raised in the centre rather than at the back.

Face - The original coping would have been similar to that described for the flank wall or the northwest demi-bastion. When the centre portion of the wall collapsed in 1830, the brittle sandstone would probably have been destroyed. When Peake rebuilt and widened the wall, he contracted out for a new supply of coping stone.[27] The exact dimensions of this are not available from documentation, and no excavation has been made to examine just what is there, but whatever is there should be 1833 coping. The sandstone is plain faced, with no tooled work.

Openings

Flank - There were no openings in the flank wall originally. With the building of casemate 8 in 1847, the engineer, Colonel Calder, apparently felt that a back vent port was both necessary and practical. The ventilation hole was cut through the back of the casemate, then

angled in such a way that it passed out through the flank wall two feet from curtain corner.[28] The flue was lined with brick, and the opening through the escarp framed in granite.

Face - No openings at any time.

End Notes:

Escarps of the Southwest Demi-Bastion

1. Public Archives of Canada, (hereafter cited as PAC), MG12, WO55, Vol. 1558, p. 70, "Specifications for building a stone wall on Citadel Hill, 12 November 1828."

2. PAC, MG12, WO55, Vol. 887, p. 711, "William Flinn's Contract for a Wall at Citadel Hill", 16 Dec. 1828.

3. PAC, MG12, WO55, Vol. 865, fol. 580-1, "Plan of Fort George, Citadel Hill, shewing the work in progress, and on which the £15,000 granted by Parliament is supposed to be expended", Nicolls, 7 Oct. 1828.

4. Public Archives of Nova Scotia, (hereafter cited as PANS), RE 54, pp. 66-71, Nicolls to Bryce, 28 January 1831.

5. PANS, RE 54, unpaginated, Nicolls' observations No. 1 and No. 2, 13 January 1836.

6. PANS, RE 54, pp. 66-71, Nicolls to Bryce, 28 January 1831.

7. Ibid, p. 70.

8. PAC, MG12, WO55, Vol. 869, pp. 473-5, Boteler to Bryce, 14 February, 1832.

9. Ibid.

10. PANS, RE 18, pp. 17-8, Fanshawe to Boteler, 30 March 1832, with enclosures.

11. PAC, MG12,WO44, Vol. 227, pp288-309, Boteler's first estimate for the completion of Fort George, signed by Lt. Wentworth, 12 June 1833.

12. PAC, MG12, WO44, Vol. 227, pp 185-192, Jones' observations No. 12 dated Quebec, 13 January 1836.

13. PAC, MG12, WO44, Vol. 227, p. 312, Capt. Rivers' Report on Lt. Col. Boteler's Plan and Estimate for the Completion of Fort George.

14. PANS, RE 25, letter 387, Jones' Comments 30 April 1836, on Nicolls' Observations, Quebec, 13 January 1836.

15. Personal observation by author, and rectified photographs, Project Office, Halifax Defence Complex.

16. PANS, RE 25, Letter 387, Jones' comments, 30 April 1836, on Nicolls' observations, Quebec, 13 January 1836.

17. PAC, MG12, WO55, Vol. 1558, p. 70, "Specifications for building a stone wall on Citadel Hill, 12 Nov. 1828".

18. PAC, MG12, WO55, Vol. 869, pp. 473-5, Boteler to Bryce, 14 February, 1832.

19. PANS, RE 56, Plans accompanying the revised estimate of 1836. "Section through the escarp, southwest demi-bastion".

20. Ibid.

21. PAC, MG12, WO55, Vol. 1588, "Specifications...", 12 Nov. 1828.

22. PANS, RE 25, Letter 387, Jones' comments, 30 April 1836, on Nicolls' observations, Quebec, 13 January 1836.

23. PANS, RE 56, unpaginated, "Section through South West demi-bastion", plan to accompany revised estimate 1836.

24. PAC, MG12, WO55, Vol. 1558, p. 70, "Specifications ...", 12 Nov. 1828.

25. PANS, RE 25, Letter 387, Jones' Observation, 30 April 1836.

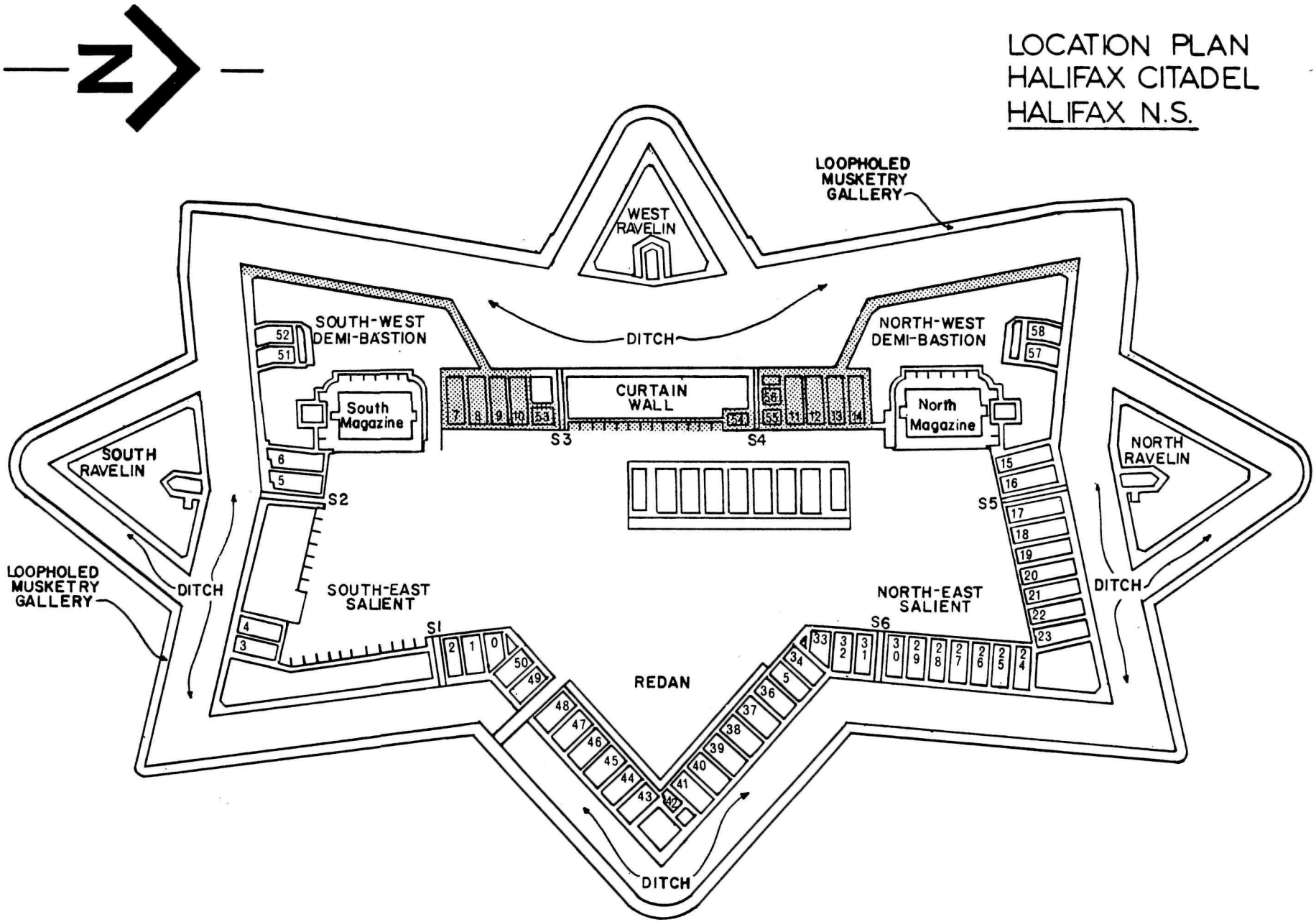
26. PRO, London, WO 49, Vol. 2, part 1, p. 1081.

27. Although there is no documentation to support this statement, the coping was changed. Both before and after 1833, the Engineer department let contracts for the supply of coping stone, and it would be reasonable to assume that Captain Peake followed this procedure.

28. This vent hole is not included in the plans or estimate of 1846. Calder was quite concerned with good ventilation of the casemates, however, and must have cut this vent hole through the escarp at that time.

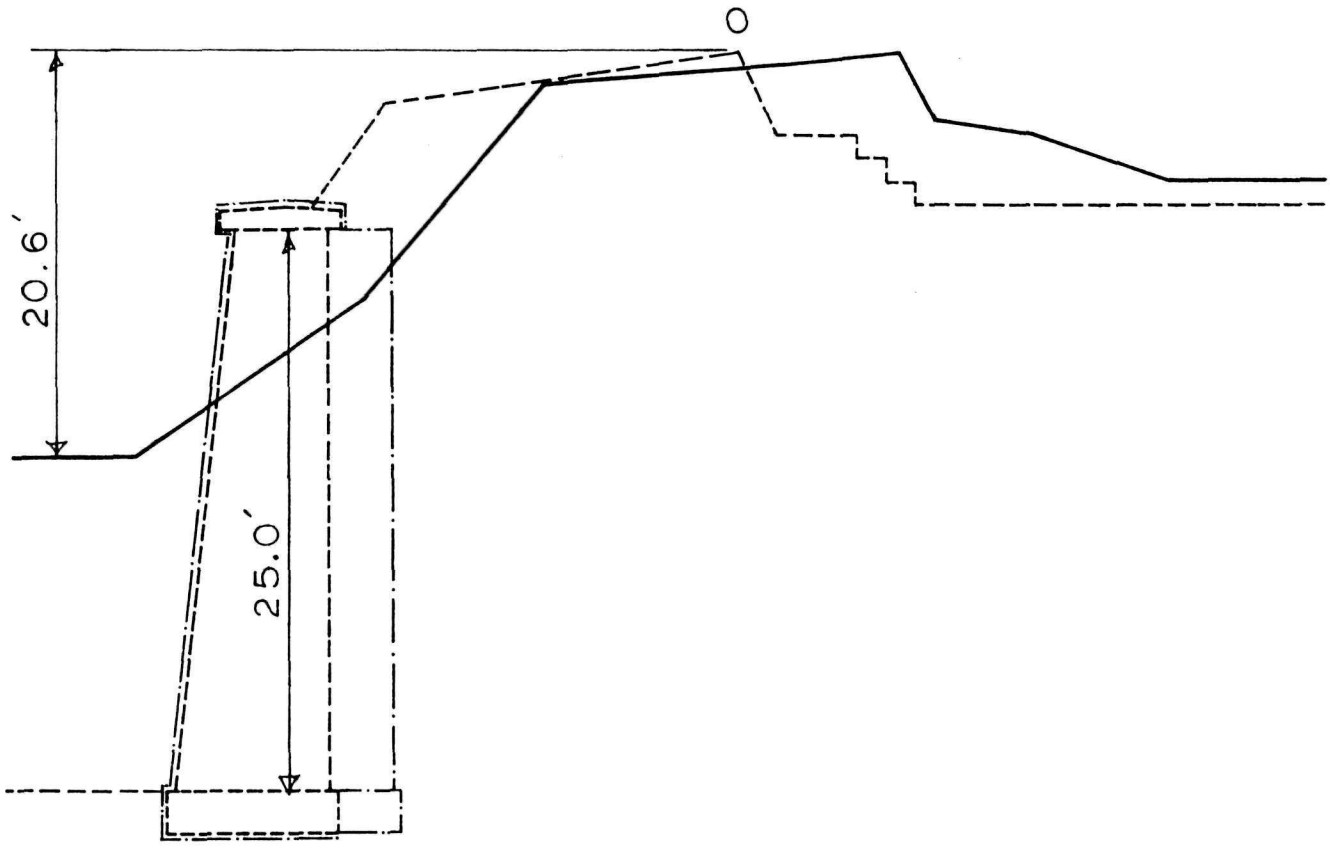
1 Location Plan Halifax Citadel.
The shaded portion indicates the subject matter covered in this structural report. The casemates are numbered according to the text of this report.

LOCATION PLAN
HALIFAX CITADEL
HALIFAX N.S.



2 A section through the right face of the southwest demi-bastion.

This modern drawing is a composite of Nicolls' "Plan No. 1" and "Plan No. 2", dated 1825. The shaded line indicates the profile of Straton's earthwork, the third Citadel. The broken line indicates what Nicolls had planned, and was built by Flinn in 1829. This face wall was entirely rebuilt by Captain Peake in 1833, and widened considerably, as the dotted line indicates. Drawing by Greg Corkum. (Public Record Office, London, WO78, No. 1786, MR947, "Plan No. 1"; and "Plan No. 2", Nicolls, 20 December 1825.)

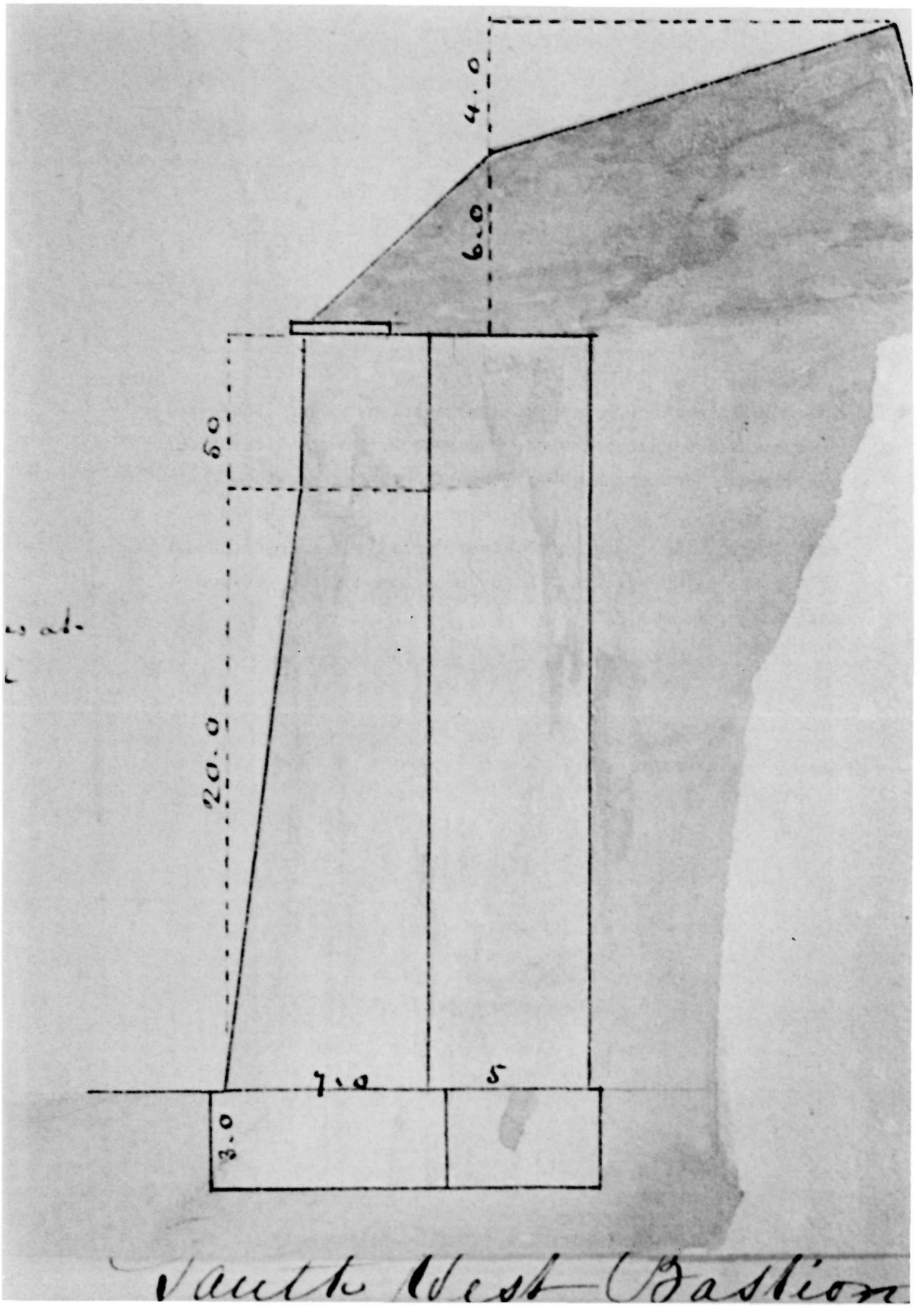


——— EXISTING 1825

– – – – – PROPOSED BY COLONEL NICOLLS
BUILT BY FLINN 1829

—·—·— REBUILT BY CAPT. PEAKE IN 1833.

3 The original escarp profile built by Flinn in 1829, showing foundation, escarp, five foot buttresses, coping and rampart profile. The central portion of the right face of the demi-bastion collapsed in December 1830, and was rebuilt by Peake in 1833. (PANS, RE 56, unpaginated, Plans to accompany the Revised estimate, 1 February 1836.)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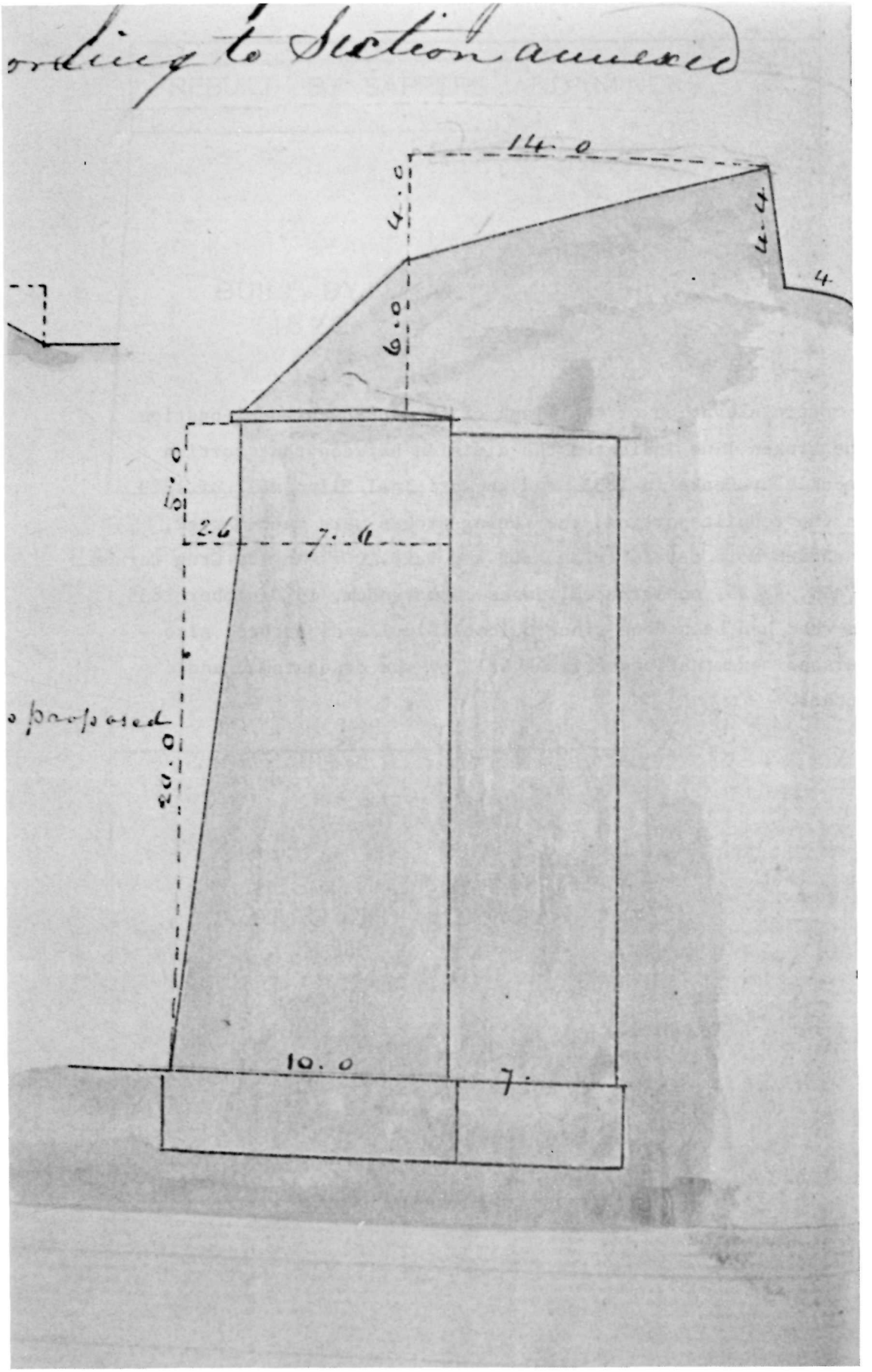
South West Bastion

4 The rebuilt escarp, southwest demi-bastion, 1833. The rebuilt escarp was considerably wider than the original, with stronger buttresses. Notice, however, that the batter remained the same as the 1829 profile. The coping stone was widened to cover the new wall, but the rampart profile remained the same. (PANS, RE 56, unpaginated, Plans to accompany the revised estimate of 1836.)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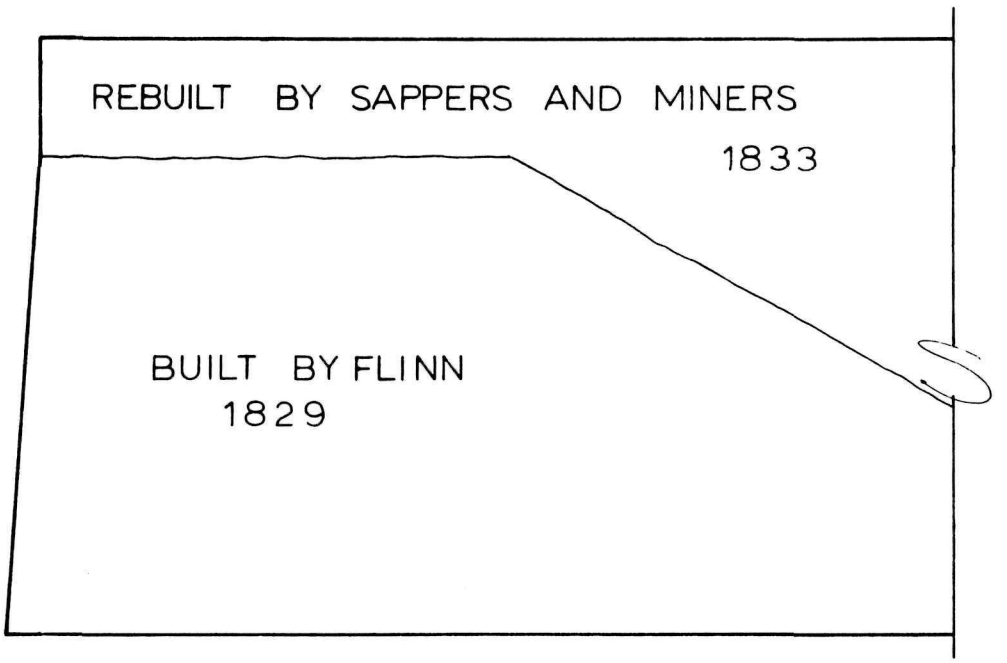
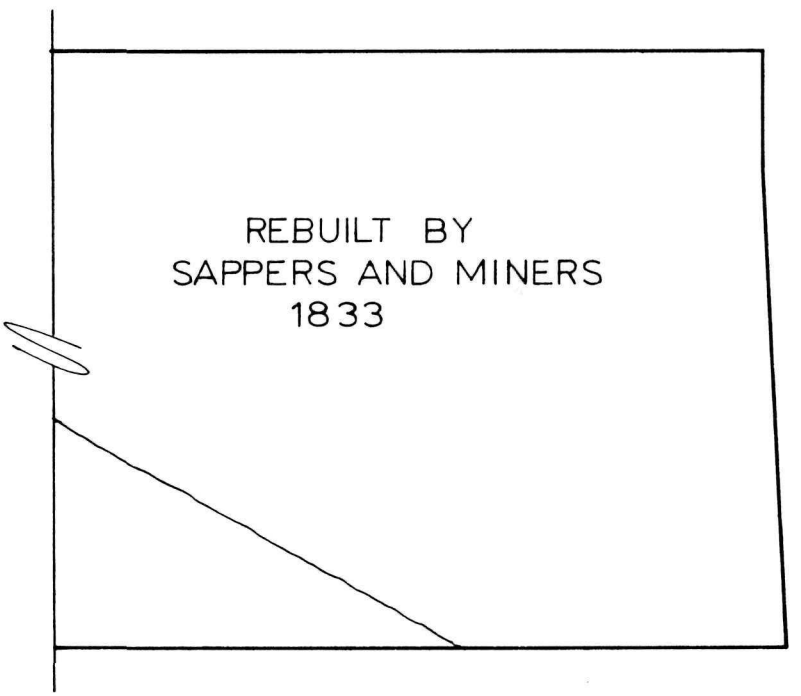
5 A modern elevation of the flank of the southwest demi-bastion. The broken line indicates the division between that portion rebuilt by Peake in 1833, and the original Flinn wall of 1829. In the rebuilt portion, the facing stones were much larger, and much more carefully squared and laid. Drawing by Greg Corkum. (PANS, RE 25, unpaginated, Jones' memorandum, 16 December 1835, on what had been done since Colonel Nicolls departure; also personal examination of flank wall by the draughtsman and author.)

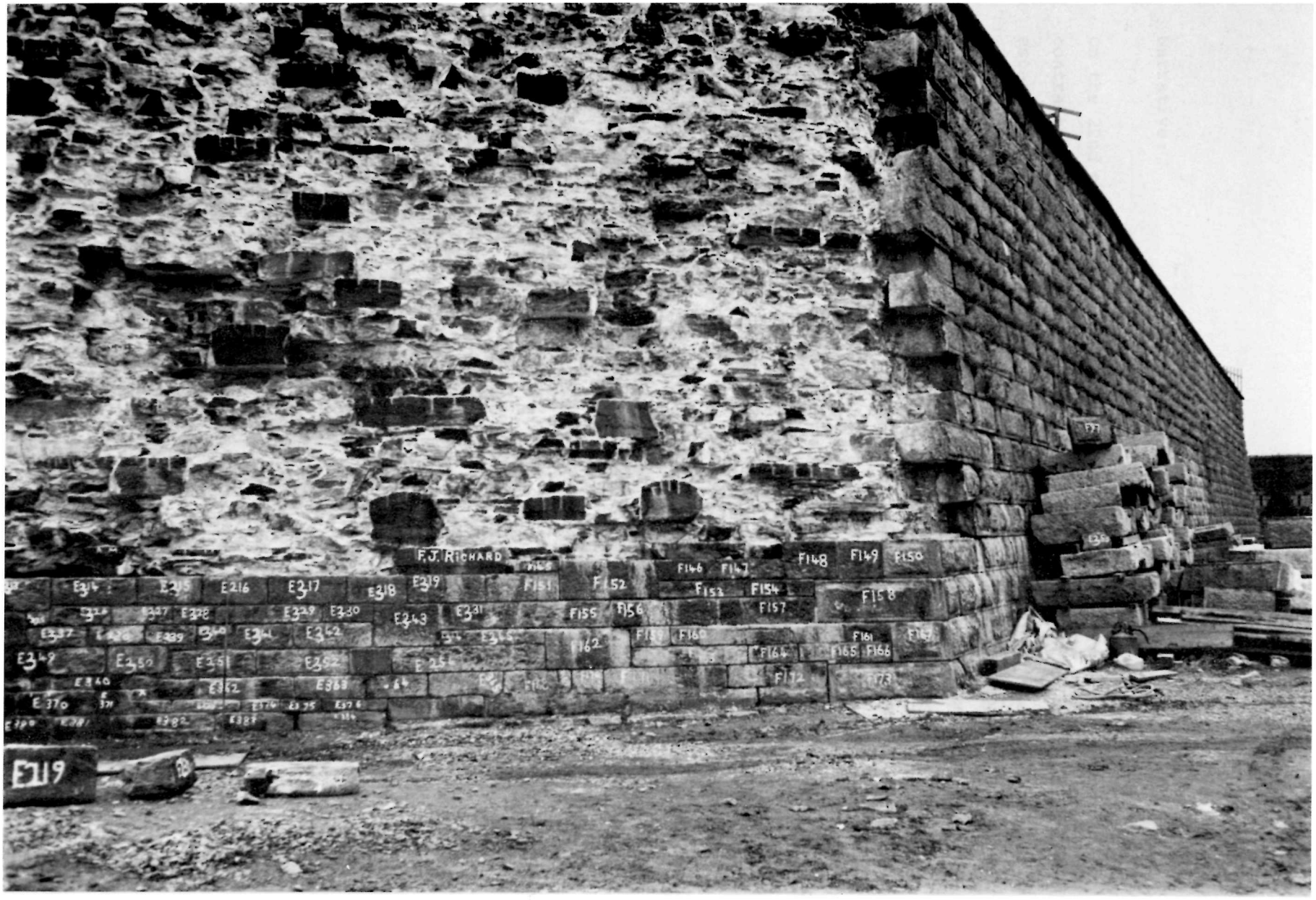


EAST PORTION, SOUTH FLANK, SOUTH-WEST DEMI-BASTION



WEST PORTION, SOUTH FLANK, SOUTH-WEST DEMI-BASTION

6 Photo of the flank and right face of the southwest demi-bastion, October 1976. The flank wall is now in the process of reconstruction. Note the large number of tie-stones which had to be cut through to remove the facing stones of the wall. This area was the portion rebuilt by Peake in 1833. The original wall to the left (not shown in photo) had no large tie-stones and the facing stones were much smaller. The right side of the photo shows the granite ashlar face wall rebuilt by Peake in 1833 -- still intact after 143 years. (Photo by author, October 1976.)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Left Face and Flank: Northwest Demi-Bastion

Summary:

The left face and flank of the northwest demi-bastion were built by the constract mason, Mr. Peter Hays, during the summer of 1829. In December 1830 a 70 foot section of the left face collapsed into the west ditch. The following summer, Colonel Nicolls had a small work force of Sappers and Miners begin the reconstruction of the breach in the escarp. The central portion of the wall was rebuilt to a height of 14 feet, but remained there, unfinished, unitl Colonel Rice Jones won approval to complete the escarp eight years later. The flank excarp of the bastion remains unaltered to this day. Except for some periodic repointing, nothing has been done to either wall since 1842.

Narrative:

On the 22nd of December 1828, Mr. Peter Hays, a Halifax building contractor, signed a contract to build a 400 foot section of the Citadel escarp wall.[1] The contract was in every way similar to the one signed a week earlier by Mr. William Flinn, but for some reason Hays was awarded 1 shilling per perch more than Flinn. In May of 1829, the two civilian contractors and their crews of masons and labourers began the actual construction. Colonel Nicolls had used military labour the preceeding autumn to survey and excavate the ditches of the western bastions. Flinn was assigned the work on the southwest demi-bastion, Hays the northwest demi-bastion. The Corps of Royal Sappers and Miners worked midway between the two civilian contractors, building the counterscarp and escarps of the west ravelin.[2] All of the escarp walls built that summer and autumn, except for the flank of the northwest demi-bastion, had to be rebuilt eventually.

The contract that Peter Hays had signed called for an escarp wall 25 feet high, seven feet thick at the base, four feet thick through the top.[3] A batter of three feet in 20 feet was given to the wall, with the final five feet vertical. (See figure 3) By late October 1829, Hays' workers had finished an escarp wall from the north end of the curtain to approximately 20 feet east of the casemates of defence in the northwest demi-bastion. Flinn had finished a nearly identical portion of the southwest demi-bastion. Colonel Nicolls expressed himself pleased with Hays' work, and renewed his contract. The following two building seasons, Hays' crew again worked on the escarps of the north front and northeast salient. William Flinn's contract was terminated at the end of 1829, and never renewed.

Despite Nicolls' confidence in Hays' work, a 70 foot section of the left face of the bastion collapsed into the ditch two days before Christmas 1830 - a bare 14 months after completion.[4] (See figure 7)

An almost identical collapse had taken place two weeks earlier in Flinn's wall on the southwest demi-bastion. Nicolls had been expecting trouble with Flinn's wall, but expressed some dismay to the Inspector General of Fortifications when reporting the failure of Hays' work. In the same letter to London, Nicolls explained what he felt were the reasons for the failure, and what steps he was planning to ensure that future escarp walls would not suffer a similar fate.[5]

Rainy weather or not, the Inspector General had the right to expect that escarps designed by officers of the Royal Engineer Corps should stand when built. In replying to Nicolls' news, the IGF expressed shock at the situation, and ordered that all civilian contracts be suspended after the working season of 1831. He also insisted that he had never and would never approve of an escarp thickness less than that recommended by the French fortification expert, Marshall Vauban.[6]

In the summer of 1831, Colonel Nicolls began the task of rebuilding the breach in the left face of the bastion. It is not clear where he got the authority or money to do this. By the time Nicolls was transferred to Quebec, however, the collapsed portion of the wall had been rebuilt to a height of 14 feet.[7] (See figure 7) Nicolls was taking no chances this time. The rebuilt portion was a full ten feet thick through the base, and intended to be seven feet thick at the top. In addition to thickening the new wall, Nicolls had square wooden tubes inserted behind the escarp which connected to granite gargoyles near the base of the wall.[8] Nicolls used a similar method on the west curtain wall and left face of the southeast salient in 1831. At the same time, the stones used to face the work were considerably larger and more carefully squared and jointed than the 1829 work. Roman cement was used to point the face work to a depth of six inches.

With the arrival of Colonel Richard Boteler at Halifax in October 1831, all construction work on the 1829 contract escarps was halted. Boteler was of the opinion, and the Inspector General agreed, that the contract escarps should be left for a few seasons, to see if any further collapses were likely to take place.[9] Except for Peake's program of rebuilding the right face and flank of the southwest demi-bastion, no repairs of the contract escarps were undertaken

for the next eight years. In 1838, when Colonel Rice Jones finally won approval for his revised plan for the completion of the Citadel, work began again on replacing the derelict contract work. In either 1839 or 1840, the top part of the left face of the northwest demi-bastion was completed, coping laid, and ramparts formed. In 1841 or 1842, a 120 foot section of the right face of the northwest demi-bastion was rebuilt. At the same time, the salient and about 20 feet of the left face was done.[10] In all, four different building periods are represented in the left face of the demi-bastion. On close inspection, comparing the types of masonry, colour, and size of stone, the lines dividing these four periods are quite different. (See figure 8)

The flank of the northwest demi-bastion was the most successful of all the contract escarps. Although built with an inadequate profile, this wall has stood for 147 years without collapsing. The reason for this seems to have been the vein of "stiff blue clay" which the miners found behind it, and behind the west curtain wall. As early as 1798, Colonel Fenwick, who was in charge of the construction of the third Citadel, had reported to London that miners and diggers were having extreme difficulty in cutting through this clay.[11] However well the flank wall has fared, it is now on the verge of a complete collapse. (See figure 10)

After 1841-42, no further work, except for periodic repointing was undertaken on the northwest demi-bastion escarps. The rebuilding program proved considerably more successful than the contract escarps.

Structural Analysis:

Superficial Appearance

Flank: The oldest escarp section in the Citadel, this wall has remained virtually unchanged since its construction in 1829. The escarp was a plain ironstone rubble wall, 70 feet long, 25 feet in height, with a sandstone coping and earthen rampart above. Either end of the wall was framed in granite quoin work, cut and put in place by the Sappers

and Miners. There were two small vertical openings in the corner shared with the west curtain wall. These vent ports were associated with the building of casemate 13 in 1847. The wall is now on the verge of collapse. The stones of the wall have been numbered by the rectified photography method used at the Citadel for taking down and rebuilding walls. (See figure 10)

Face: The left face of the northwest demi-bastion was originally a plain ironstone facade framed at either end with granite quoin work. The wall was 210 feet long, 25 feet high, with a batter of two feet six inches in the bottom twenty feet. The wall had a sandstone coping on top. The uniformity of this superficial appearance was broken up with the rebuilding periods in 1831, 1839-40, and 1841-42. On close inspection each of these sections can easily be identified. (See figure 8) The original section is located at the southern end and can easily be located by noting the small size of stone and irregular course work. The central section, reconstructed to a height of 14 feet by Colonel Nicolls in 1831, is identified by the use of more carefully cut and faced ironstone and the noticeably larger size of stone. Also in this central portion are the 3 granite gargoyles placed by Nicolls in 1831 to help drain water from behind the wall. Above this 1831 section is the 1839-40 portion rebuilt by Sappers and Miners under the direction of Colonel Rice Jones. Here the ironstone is even larger and has a noticeably different colour tone from the work below. Obviously this stone came from a different quarry, or a deeper section of the same quarry in Purcell's Cove. The final section, the corner work dates from 1841-42. It was built at the time the right face of the demi-bastion was replaced. The stones here are again much larger than the central portion and again of a slightly different colour.[12] Except for periodic repointing nothing has been done to this wall since 1831. The wall is presently bulging in a number of places and needs stabilization.

Profiles

Flank: There was only one profile in this wall, built by Hays to conform with Colonel Nicolls' public tender of 1828.[13] The wall was to be 25 feet high, seven feet thick at the base, four feet through the top. The wall was battered three feet in the first 20 feet of height and became vertical thereafter. The wall has not been altered since 1829. (See figure 3)

Face: There were two profiles represented in this wall, one representing the standard contract escarp of 1829, the second from the 1831 rebuilding representing Nicolls' conformity with the recommendation of Marshal Vauban. The first profile located at the southern end of the face was 25 feet high, seven feet thick at the base, and four feet through the top. In the central portion begun by Colonel Nicolls in 1831 and finished off by Jones in 1839-42, the base of the wall measured 10 feet through, while the top was a full seven feet thick.[14] The original batter of two feet six inches in 20 feet was maintained in the rebuilt portion. (See figure 4) The wall has not been altered since 1842.

Foundations

Flank: The foundation of the flank wall has never been altered. The foundation which is there is presumably the one asked for by Nicolls in his public tenders of 1828 - a foundation three feet deep by seven feet eight inches wide. The material was to be good sound iron bluestone.[15]

Face: Two foundations of differing dimensions support this escarp wall. The first section located at the southern end of the wall and built by Hays in 1829 measured seven feet eight inches wide and three feet deep. It extends from the southern corner to the beginning of the central portion rebuilt by Nicolls in 1831. The foundation under the reconstructed wall accommodated the wider dimensions of the new escarp. The footing measured 10 feet six inches in width by three feet deep, and was constructed of rubble ironstone. Nicolls reported in 1835 to Jones that he had not felt it necessary to deepen the foundation

under this wall, as Peake was forced to do in rebuilding the right face of the face of the southwest demi-bastion.[16]

Buttresses

Flank: The buttresses of the flank wall were built to the 1828 contract specifications. Hays' contract had specified that they be "of good sound iron or blue building stone."[17] The buttresses were to be 14 feet apart, four feet by five feet, and to run up the entire height of the wall. There has been no excavation in this area, so it is impossible to be sure of the number of buttresses behind the wall. If the buttresses bear any resemblance to those behind the flank of the southwest demi-bastion, there should be three behind this wall as well. The buttresses were formed into a continuous mass and bound with the escarp wall. The 1847 ground plan of the Citadel shows these buttresses as being trapezoid shape not rectangular.[18] This must be a draughtsman's error as Nicolls had a prejudice against tailed buttresses.

Face: Behind the original face wall there must have been 11 buttresses, each measuring four feet by five feet. This would have been the number necessary to abide by the 1828 contract specifications for a wall of this length. When Nicolls began rebuilding the wall in 1831, he did not indicate the number or dimensions of the new buttresses. From his later correspondence from Quebec, however, it is obvious that he disagreed with Captain Peake's method of tailing the buttresses. Nicolls claimed that this trapezoid design would simply aggravate the pressure of the earth on the inside of the wall.[19] In 1831 he stuck to the four foot by five foot rectangular buttresses which he had insisted on in the 1828 specifications. What Jones did in completing the buttresses in 1839 was not clear either. The 1847 plan shows 10 buttresses behind the face, but as has been mentioned before, the draughtsman may have been as ignorant of the true situation as we are today.

Masonry and Mortar

Flank: The flank wall was a rough hammered, random rubble, ironstone construction. The 1828 specifications spell out in some detail the masonry requirements, but the contracts themselves were not binding enough to force either Flinn or Hays to rebuild even the collapsed portion of the escarps. The stones in this flank wall are considerably smaller than in the later rebuilt portions of the Citadel. Either end of the wall was framed in granite quoin work, cut and placed by the Sappers and Miners. The mortar was to be composed of "one third of the best white lime and two thirds of fresh water, sharp sand."[20] The flank wall has been repointed a number of times, presumably with cement.

Face: Originally this wall was a rather uniform rubble ironstone wall conforming to the 1828 specifications resembling the flank wall. During the three rebuilding programs, however, the facing masonry changed slightly in appearance and quality. In the central portion rebuilt to a height of 14 feet by Colonel Nicolls, the stone size was much more carefully squared and laid. The stone size was not only increased, but presumably the number and size of tie stones was increased. In the top of the central portion, rebuilt under the direction of Colonel Jones 1839-40, the size, colour, and cutting of the stone was distinctive. The hammer facing was more rugged, and the length of the beds considerably longer. On the north end where the corner and part of the left face were rebuilt by Jones in 1841, the masonry was again different. The main distinction here was the colour of the stone, and the number of very large tie stones placed in the wall to secure the corner.[21] The original mortar was specified to be one part lime and two parts fine sand. In the portion rebuilt in 1831, and presumably in those parts rebuilt later, however, the masonry was pointed to a depth of six inches with Roman cement. (See figure 7)

Coping

Flank: The original freestone coping placed over the escarp is still intact on this flank wall. The contract specifications for the coping

called for "...freestone...3 feet wide and four inches thick...no stone to be less than 3 feet long...".[22] Although not mentioned in the specifications, the free stone had a channel cut into it about two inches from the edge. This gutter carried water to the curtain wall coping spouts. The flank coping was raised slightly towards the rear, to carry the water towards the outside gutter. (See figure 10)
Face: Originally the coping of this wall was identical to that on the flank wall. When the central portion of the wall collapsed into the ditch in 1830, however, much of this coping was lost or destroyed. Since the central and north part of the escarp was not rebuilt until 1839-41, the coping was supplied by a different contract quarrier. The newer coping stone, which extended approximately 2/3 the length of the wall, had no channel course or spouts like the original. It was throated on the underside of the projection. The new coping was a lighter shade of freestone, and sloped from rampart to the edge of the escarp.[23]

Openings

Flank: Originally there were no openings in the plain facade of this wall. In the building of casemate 13, however, Colonel Calder provided for two vent ports which emerged through the corner quoin work of the escarp. From ditch level, these two small holes are barely visible, but on close inspection they are cut through the granite and travel through the brick wall of casemate 13.[24]
Face: Originally the left face escarp had no openings whatsoever in the ironstone face. In the summer of 1831, however, Colonel Nicolls decided that one of the methods he would use to combat the frost problem was to design a system of shoots and gargoyles to drain water from behind the escarp. In the central rebuilt portion he placed square wooden tubes behind the wall and four granite gargoyles near the base of the wall for this purpose.[25] He also used this system behind the 1831 section of the curtain wall, and in the left face of the southeast salient. The three gargoyles on the left face of the northwest demi-bastion were approximately five feet above ditch level and spaced evenly along the rebuilt curtain wall. (See figures 7 and 8)

End Notes

Escarps of the Northwest Demi-Bastion

1. PAC, MG12, WO55, Vol. 887, p. 712, Peter Hays contract for Wall at Citadel Hill, Halifax 22 December 1828.

2. PAC, MG12, WO55, Vol. 865, fol. 580-1, "Plan of Fort George, Citadel Hill, shewing the Work in Progress, and on which the £15,000 granted by Parliament is supposed to be expended", Nicolls, 7 October 1828.

3. PAC, MG12, WO55, Vol. 887, p. 712, Peter Hays contract..., Halifax, 22 December 1828.

4. PANS, RE 54, pp. 66-71, Nicolls to Bryce, 28 January 1831.

5. Ibid.

6. PANS, RE 54, pp. 26-7, No. 202, Fanshawe to Nicolls, 29 June 1831.

7. Public Record Office, London, WO78, No. 1679, MPHH 205, "... Elevation of the North West Bastion, No. 8", Colonel Boteler, 14 February 1832.

8. Ibid.

9. PAC, MG12, WO55, Vol. 869, pp. 473-5, Boteler to Bryce, 14 February 1832.

10. PANS, RE 55, unpaginated, Citadel Accounts, "Revised Estimate 1st Feb. 1836 - balance remaining 6 Oct. 1840, item 19, pulling down and rebuilding...", signed by Henry Westmacott, Capt. RE. And the next page, "expended between 30 Sept. 1840 and 31 Dec. 1841".

11. PAC, WO55, Vol. 857, p. 31, Fenwick to Morse, 29 April 1799.

12. Personal examination August 1976, and rectified photographs on file, Project Office, Halifax Defence Complex Restoration.

13. PAC, MG12, WO55, Vol. 1558, p. 70, Specifications for building a stone wall on Citadel Hill, 12 November 1828.

14. PAC, MG12, WO55, Vol. 873, pp. 703-26, revised estimate, February 1836.

15. PANS, RE 54, pp. 71-4, Nicolls to Jones, 23 November 1835.

16. PAC, MG12, WO55, Vol. 887, p. 712, Peter Hays contract..., Halifax, 22 December 1828.

17. PANS, map section, "Ground Plan of Fort George on the Citadel, Halifax, N. S. from actual measurements, showing the state of the work, Dec. 31, 1847", signed by Colonel Calder, 10 March 1848.

18. PANS, RE 54, unpaginated, observations Nos. 1 and 2 by Colonel Nicolls, 13 January 1836.

19. PAC, MG12, WO55, Vol. 1558, p. 70, Specifications for building a stone wall on Citadel Hill, 12 November 1828.

20. Personal observations by author.

21. PRO, London, WO 49, Vol. 2, part 1, p. 1081.

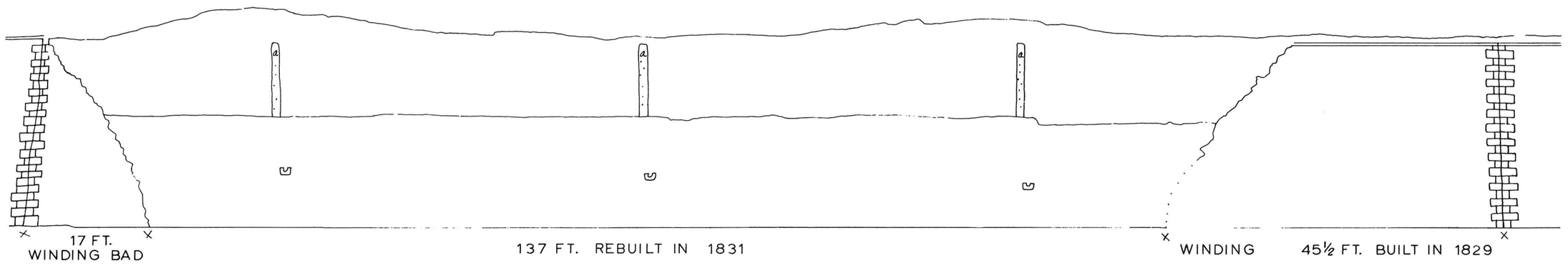
22. Personal observations by author.

23. These openings were not provided for in Calder's estimates in 1846, but considering his concern for proper ventilation of the casemates must have been cut through the escarp as the casemate was built.

24. Public Record Office, London, WO78, No. 1679, MPHH 205, "Elevation of the North West Bastion, No. 8", Boteler, 14 February 1832.

7 A modern retracing of Boteler's plan of the face of the northwest demi-bastion. This plan shows the portion rebuilt by Colonel Nicolls in 1831, and the "square wooden tubes" connecting to gargoyles which Nicolls hoped would solve the drainage problem. The wall remained in this unfinished state until 1839-40, when Colonel Jones finished the rebuilting program. Drawing by Greg Corkum. (Public Record Office, London, WO78, No. 1679, MPHH205, "Elevation of the Northwest Bastion, No. 6". Boteler, 14 February 1832.)

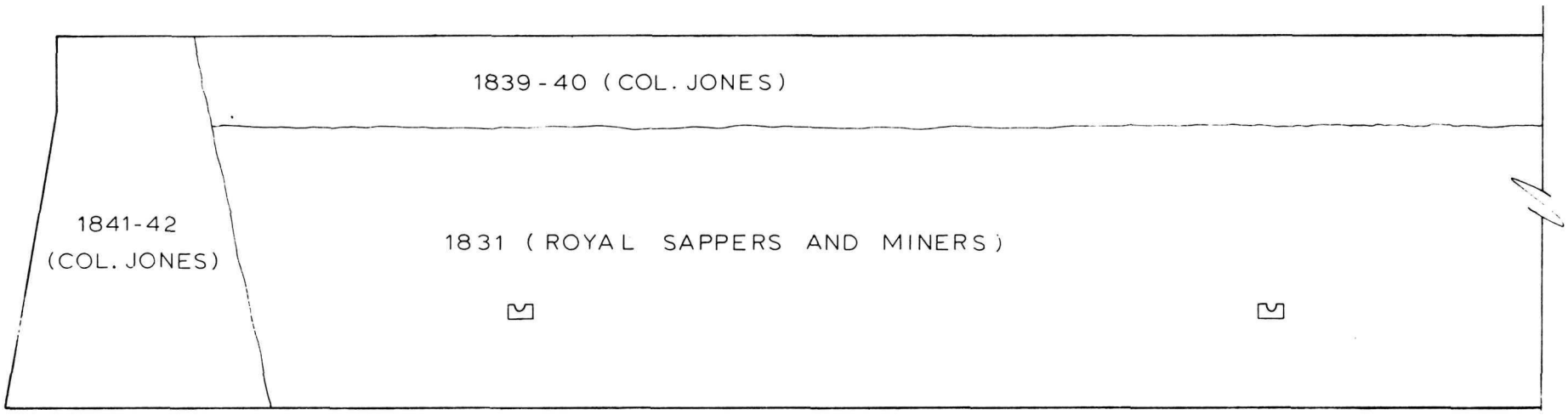
ELEVATION OF NORTH WEST BASTION № 6



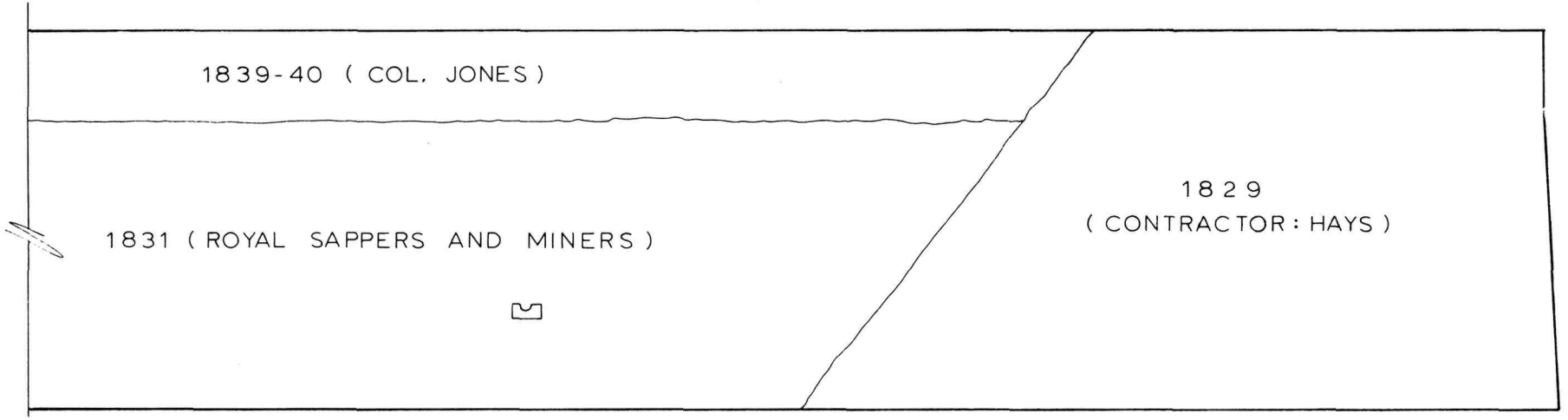
a. a. a. SQUARE WOODEN TUBES
FOR CONDUCTING DRAINAGE
TO WEEPERS

SCALE : 10 FEET TO AN INCH.

8 Modern elevation of the left face of the northwest demi-bastion. This drawing indicates the four building periods in the wall. The south portion is all that remains of the original 1829 contract escarp built by Hays. The central lower portion shows the 137 feet of wall rebuilt by Nicolls in 1831. The top central and northern portions were rebuilt by the Royal Sappers and Miners, under the direction of Colonel Jones in 1839-40 and 1840-41. Each of these building periods is quite distinctive in the wall by comparing stone size, stone cutting techniques, and stone colour. Drawing by Greg Corkum. (Public Record Office, London, WO78, No. 1679, MPHH 205, "Elevation of the North West Bastion No. 6", Boteler, 14 February 1832; also PANS, RE 55, unpaginated, Citadel accounts 1840, 1841; also personal examination by author and draughtsman.)



NORTH PORTION, LEFT FACE, NORTH-WEST DEMI-BASTION

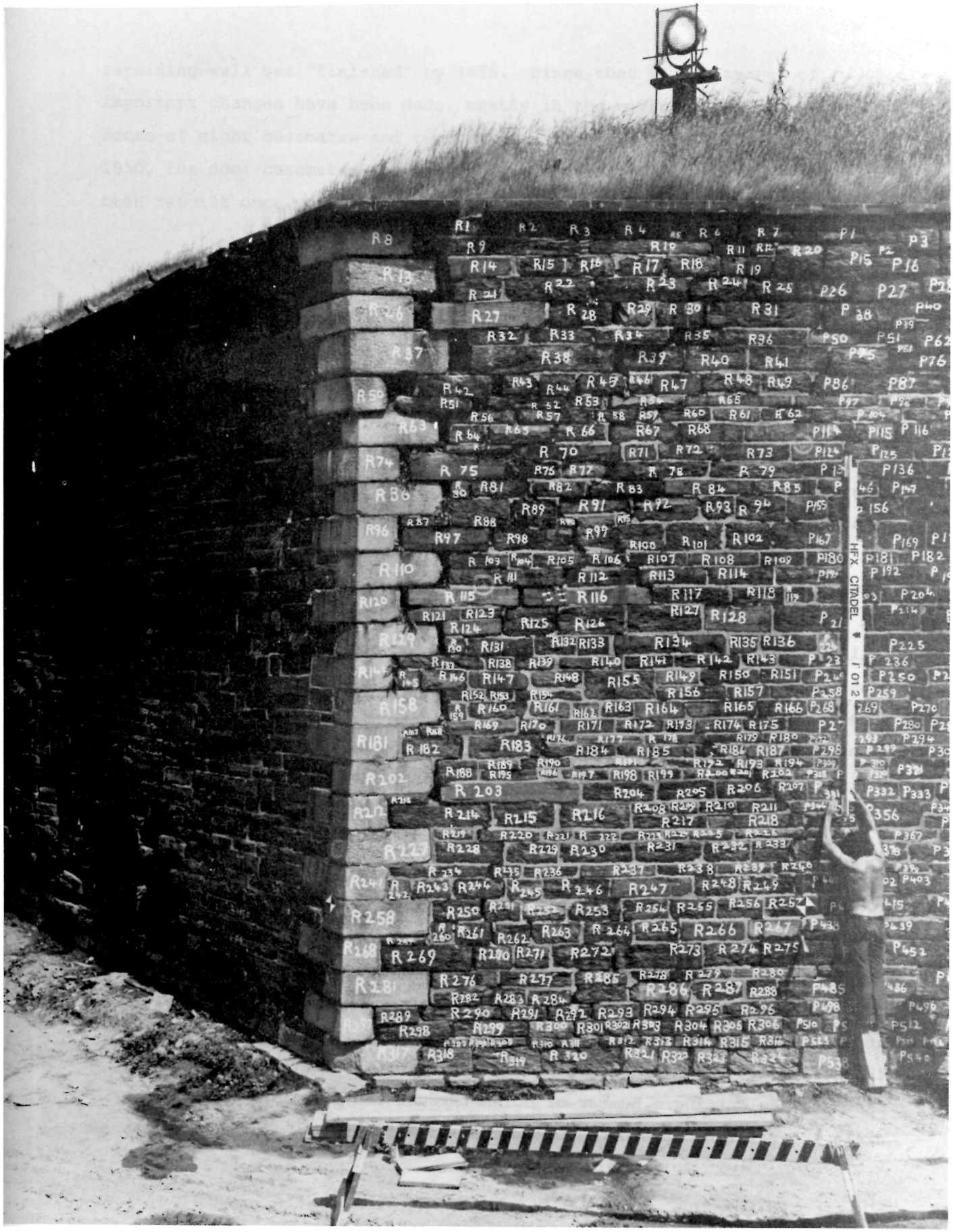


SOUTH PORTION, LEFT FACE, NORTH-WEST DEMI-BASTION

9 Photo of original coping (1829) above face and flank of northwest demi-bastion. Note the chiselled gutter. Also note, to the lower right, one of the spouts broken off. (Project Office, Halifax Defence Complex, as found photo file.)


HALIFAX
CITADEL
DAM
C 6 7

10 Photo of flank wall, 1976. This wall is the oldest complete escarp section in the Citadel. After 147 years, the wall still stands, but is on the verge of collapse. Note the small size of the stones, and original coping above the wall. (Photo on file, Project Office, Halifax Defence Complex.)


HEX CITADEL

West Curtain Retaining Wall:

Summary

The west curtain wall is the granite retaining wall facing the parade square. It extends from the ramp of the southwest demi-bastion to the stairway of the northwest demi-bastion. This wall includes the fronts of eight casemates, 13 demi-casemates, two privies, and the dwarf wall behind the terreplein of the curtain ramparts.

Except for the backs of the four casemates of defence, the original curtain retaining wall designed by Colonel Nicolls was never constructed. The fate of the original proposition after 1831 reflected the fate of most of Nicolls' original design - it was completely altered in the next twenty years. The lengthy process of redesigning and refinancing the Citadel after the collapse of the contract escarps in 1830 affected the curtain retaining wall as completely as any other part of the Citadel. The first fundamental change came soon after Nicolls' departure - Colonel Richard Boteler's insistance on using granite ashlar for facing any new walls. This principle was followed thereafter by succeeding Royal Engineers. The second alteration, proposed by Captain Peake in 1833, accepted and built by Colonel Jones later in the decade, was the proposal to build 13 demi-casemates in the uncasemated portion of the retaining wall. The third change was the inclusion of two privies behind the retaining wall on either side of sallyport 4. These were built by Jones 1839-41. The fourth major change was proposed and built by Calder in 1847-48- four new casemates (7, 8, 13, 14) on the west front and the rebuilding of the fronts of the existing four casemates of defence. The final changes before 1856 were associated with attempts to waterproof the casemates by cutting a number of holes through the retaining wall to drain the valleys between the casemates and terreplein. The curtain

retaining wall was "finished" by 1856. Since that time a number of important changes have been made, mostly in the windows, vents, and doors of eight casemates and two privies. (See figures 11 and 13) By 1950, the demi-casemates and wall above them had collapsed. They have been rebuilt once, and are presently being restored again.

Narrative:

The original retaining wall planned by Colonel Nicolls was a vertical wall 21 feet high, of roughly hammered rubble ironstone similar in appearance to the escarps. This wall was to be bounded at either end by stairways leading to the north and south demi-bastions. Except for the door and window openings of the four casemates of defence, and the door openings of the three sallyports, the superficial appearance would have been a plain ironstone facade.[1] Only the back walls of the four casemates of defence were built in 1831. The rest of the plan lapsed with problems associated with the collapse of the escarp walls. For eight years the area between, and on either side of the casemates of defence, remained an unfinished mound of earth and mud. Even the entrances from the interior of the fort to the two sallyports remained unfinished until Jones began work on the privies and demi-casemates in 1839.

Even after the collapse of the contract escarps in December 1830, Nicolls publicly expressed optimism that the Citadel project could be finished with very little extra expense.[2] Privately he may have had reservations, and certainly London was less than re-assured. But it was not until Nicolls had been transferred to Quebec and until Colonel Richard Boteler had sent off his status report on the Citadel in February 1832 that London was made fully aware of the inadequacies of Colonel Nicolls' design and estimates. The implications of Boteler's independent assessment were quite enormous for the Citadel program. A full eight years lapsed before the construction recommenced on a scale approaching the 1829-31 level of activity. Specifically it was a full quarter century before the curtain retaining wall was put in a finished state.

Boteler's personal preference was for a very much strengthened retaining wall.[3] The Inspector General of Fortifications believed that the only way to save the escarps already built was to build casemates under the ramparts wherever possible. This meant that the living quarters, privies, and cooking facilities proposed for the

north and south cavaliers would be placed under the ramparts between escarp and retaining wall.[4] Boteler disagreed. One of the few points of agreement between Boteler and Nicolls was their conviction that in a climate as wet and unpredictable as Halifax's, casemated soldiers' quarters under the ramparts were quite unacceptable. Boteler believed that the only solution was a greatly thickened escarp and retaining wall faced with granite ashlar, and that the complete rebuilding of the 1829 contract masonry was inevitable. The cost of this proposal was its undoing. London insisted that the money for the two cavaliers be spent under the ramparts.

Captain Loyalty Peake, who temporarily assumed command at Halifax after Boteler's death in February 1833, originated the idea of the arched demi-casemates. He claimed these "arches of recess" would avoid the enormous expense of a thick retaining wall, and at the same time, prove very useful bombproof shelters for stores of all kinds.[5] He supported Boteler's proposal that all new walls at the Citadel be faced with granite ashlar. Peake submitted three very complex estimates for the completion of the Citadel, but they were rejected because they were too complex and unorthodox. London was confronted with too many options. Colonel Rice Jones arrived in Halifax from Plymouth in late 1833 to assume command, and was instructed to formulate a final revised estimate for the completion of Fort George.

Colonel Jones' final revised estimate was submitted to London in March of 1836.[6] This estimate determined the final shape of the Citadel trace and much of the interior arrangements. Jones went along with the IGF's suggestion that the ramparts be casemated. The troops who were to live in the north and south cavaliers were eventually to sleep under the ramparts. Jones made three specific decisions relating to the curtain retaining wall. The first was the acceptance of the principle that all new or rebuilt walls be faced with granite ashlar, as Boteler had proposed.[7] The second was the adoption of Peake's proposal for arched demi-casemates for all areas of the retaining wall not casemated.[8] His third proposal was to build the two privies in the west front.[9] The middle sallyport had been cancelled by the

IGF sometime after 1835 as an economic measure.

If all of Jones' proposals had been built as planned, the retaining wall would have been totally demi-casemated except for the privies on either side of sallyport 4, and the four casemates of defence, which would still have been ironstone.

But it was three years before work on any of these proposals was undertaken. Since there are no detailed copies of the estimates for these years, it is difficult to know exactly what was done. It appears work on the soldiers' privy C-54 was done in 1839,[10] and, consequently, on finishing sallyport 4. The second privy C-55 was built in 1842.[11] The demi-casemates between the two sallyports were built in 1841. Work on the retaining wall between the casemates of defence and on either of the north and south magazines was still not begun by 1843. In that year Colonel Calder made a supplementary estimate for more casemating at the Citadel. This proposal called for four new casemates (7, 8, 13, 14) and the rebuilding of the front walls of the four casemates of defence. Calder argued that he needed more casemates for storage and accommodation, and that the backs of the existing casemates of defence were perfectly rotten. He wanted to rebuild them and achieve a uniform appearance along each end of the wall by placing granite ashlar facing on them.[12] This work was done during the 1847 season.

Further minor work was undertaken on the retaining wall before 1856. This was in association with the attempt to waterproof the casemates in the period 1848-56. The work involved brick and asphalting that portion of the retaining wall which was casemated, and cutting through the wall in the valleys between the casemates to drain casemates and rampart. Gargoyles and cast iron drain pipes appeared on the outside of the retaining wall.[13]

Complete documentation of the changes to the retaining wall after 1856 will have to wait the completion of the 1860-1906 and 1906-1950 structural studies. Some major items can be identified. Extra windows were cut in the casemated portion of the wall after 1870. The entrances to the casemates north of sallyport 4 have been

considerably altered after that time. Figure 12 gives an indication of the changes which have taken place. The retaining wall and arches of the demi-casemates had collapsed by 1950, (See figure 18) were rebuilt, and in 1976 taken down and rebuilt according to the 1856 appearance based on historical documentation. In casemate 10, only the shell remains - both back and front walls were demolished to provide a rear entrance to the Citadel.[14]

Structural Analysis:

Superficial Appearance:

When finally completed in 1856, the retaining wall was a vertical masonry wall, 300 feet long, 21 feet high, faced with granite ashlar, and capped with a granite coping. There were 33 openings in the wall: one door, two windows, and two vent holes in each of the eight casemates, 13 arched demi-casemates recessed six feet, 5 windows and 1 door in the two privies, and a total of 14 gargoyles and four down pipes for drainage. (See figure 11) This superficial appearance has undergone considerable change since that date. The first major change was the introduction of an extra window in each of the casemates, sometime after 1870. The drainage pipes and hopper heads from the rampart gargoyles have disappeared. The windows of the soldiers' privy (C-54) have been blocked up at some time. The door and window arrangements of the NCO's and women's privy (C-55) have been altered. The door and window openings of the four casemates north of sallyport 4 have also been greatly changed. The front and rear walls of casemate 10 have been removed.[15] (See figure 13)

Profiles:

There were three profiles represented in the retaining wall when it was finally completed: the profile of the casemated portion of the wall (See figure 21); the profile through the demi-casemates (See figure 16); and thirdly the profile through the uncasemated area between sallyport 3 and casemate 10. The profile through the front

walls of the eight casemates on the north and south ends are uniform. This entire section of wall was built by Colonel Calder in 1847. In this portion, the wall rose from the footing to a height of 19 feet, where the thickness was reduced from three feet to two feet six inches, to form the two foot dwarf wall above.[16] (See figure 21) The section through the two privies, built at an earlier stage of construction, resembled this profile. The second wall profile, that through the demi-casemates, built before 1843, is similar in all respects to the first except in the bottom portion where it includes the arch and back wall of the demi-casemates. The arch was one foot six inches thick; the back wall three feet thick. (See figure 16) The third profile, that through the uncasemated area between sallyport 3 and casemate 10, was originally the same as the first, but was more than doubled in thickness when casemate C-53 and its light chamber were built sometime after 1870.[17] The wall is now nine feet thick.

Foundations:

There are three types of foundations under the retaining wall - the footing for the casemated portions, the foundations under the two privies, and the foundation under the back and pier walls of the demi-casemates.

The original foundations under the front walls of the four casemates of defence were built of rubble ironstone by the Corps of Royal Sappers and Miners 1829-31. The depth of this foundation was never specified but can probably be assumed to have been five feet. The breadth was three feet six inches. In 1847, when Calder decided to build the four new casemates and rebuild the front walls of the four casemates of defence, he used a width of three feet, six inches and a depth of three feet for the foundations.[18] In his estimates, Calder did not mention the renewal of the foundations of the four casemates of defence, presumably because he considered them well enough built to support the new walls.

The foundations of the privies were much deeper than the other casemates because of the soil pits below. The soil pits themselves

were six feet deep, and naturally the foundation continued some distance below this level. According to an 1856 plan, the foundation below the soil pit walls was four feet six inches deep by four feet six inches wide.[19] This foundation ran a total of 53 feet under the retaining wall, from the north end of C-55 to the south end of C-54.

The third foundation system in the retaining wall was that adopted for the demi-casemated section of the wall. Colonel Rice Jones specified in the revised estimate of 1856 that the foundation under the demi-casemate pier and back walls be five feet deep and three feet six inches in width.[20] Presumably the foundations were built to these dimensions. (See figure 17)

Masonry and Mortar:

The retaining wall was composed of rubble ironstone masonry and faced with granite ashlar. The granite was random punched rustic work, chisel drafted on all edges, laid in regular and close fitting beds and vertical joints.[21] (See figure 12) The mortar for the ironstone was a lime, sand, and water mixture, while the granite was set in Roman cement which had proved considerably more resistant to weather than regular mortar. The two foot dwarf wall above the level of the terreplein was composed solely of granite, and laid in Roman cement.

Coping:

In Jones' 1836 revised estimate, the dimensions of the coping were not detailed. All that Jones indicated was that the coping would be made of granite. The plan which acccompanied the estimate shows the coping overhanging the dwarf wall three inches on either side. This would indicate a coping three feet in width and approximately six inches thick, sloped slightly to the interior of the fort.[22] In 1846, when Calder was submitting estimates for the rebuilding of the front walls of the casemates of defence, he called for a coping six inches thick projecting three inches on either side of the dwarf wall. The coping was to be throated on the underside of both projections.[23] This coping is still intact on the retaining wall. (See figure 21)

Openings in Retaining Wall:

In 1856 there were 63 openings through the retaining wall. Some of these openings provided entranceways, light and ventilation for the casemates: others provided drainage for the tops of the casemates and the ramparts.. Thirteen of the openings were demi-casemates, and there were two doors to the two sallyports. (See figures 11 and 13)

Doors: There were a total of 11 doors in the retaining wall in 1856- one in each of the eight casemates, one in each sallyport, and one door opening into the women's privy in casemate 55. The doors for the casemates of defence have been the best documented.. These doors were constructed at the time the fronts of the four casemates were rebuilt in 1847. Calder was quite specific in his estimates for the doors. They were to be six feet two inches in height, and three feet wide. The door frame was set back in the retaining wall nine inches where a top check of four inches and a side check of three inches began. The granite door step was splayed downward and chiselled. Holes were mortised into the stone, and these filled with lead to hold the nut and bolt which fastened the fir door frame to the wall. The doors themselves were constructed of two inch deal fir, framed, braced, and sheeted on the outside, with a herring bone back. The doors were hung on 24 inch hook and eye hinges, held shut by a thumb latch. They were also equipped with a 10 inch iron rimmed dead lock.[24] (See figure 21)

No description has ever been given of the two sallyport doors. These items were included in Nicolls' original general estimate, and although the sallyports remained unfinished until 1840-41, there is no item in any of the subsequent estimates to indicate when they were brought forward. They must have come under the general heading of the retaining wall in Jones' revised estimate of 1836, but he does not mention them in that document. In estimating for the two sallyports yet to be constructed (1 and 6) he called for doors of three inch oak plank.[25] The sallyport door measured six feet six inches by three feet nine inches, much wider than the casemate doors. The doors themselves were set back six inches from the face of the retaining

wall, when the check of three inches on either side and soffit began.[26]

The remaining door in the retaining wall was the entrance to the women's privy in casemate 55. This casemate was partitioned in the middle, with the NCOs' privy on the south side and women's on the north. The NCOs entered the privy through sallyport 4, while the women entered through the door in the retaining wall.[27] (See figure 34) This door measured six feet six inches by two feet six inches, similar to the other eight casemate doors. The only difference to be noted is that the soffit was not throated. There is no documentation available on the door materials. The doorway is now completely blocked up, the north window has been enlarged to provide access to the privy. Windows: In 1865 there were a total of 23 windows in the retaining wall - two in each of the eight casemates, three in the soldiers' privy (C-54), and four in the NCOs - women's privy (C-55).

Each of the eight casemates had a lower and upper window. The lower window openings measured three feet nine inches in height by two feet wide. Like the doorways, the lower windows were set back in the retaining wall nine inches. The sills of these windows were chiselled to splay downwards and measured 10 inches deep. The check at the window soffit measured one inch, while the check on the sides measured four inches.

The sash frames for the lower windows were cased with fir, the sunk sills were made of oak. The sashes were to be constructed of two inch bevelled fir. The lower windows were single hung with patent lines, brass case pulley boxes, and cast iron weights. They were locked by spring sash fasteners. There were 12 panes in each window, measuring seven inches high by nine inches wide.[28] (See figure 21) The upper windows in the eight casemates were positioned in the arch, midway between door and lower window. These openings measured one foot by three feet long. The granite sill of this window was considerably splayed so that the height of the opening on the face of the retaining wall measured one foot nine inches, a full nine inches higher than the window itself. The soffit check measured seven inches and the check on the side four inches. The frames for

the upper windows were solid fir six inches by four inches; the sashes were made of two inch chamfered fir. The frames of these windows were attached to the masonry by iron bolts and nuts sunk in the wood. The whole frame was bedded with hair mortar. There were four panes of glass, each ten inches high by eight inches wide.[29]

Ventilation Openings:

To overcome the problem of damp floors and rotting wood common to the casemates, Colonel Calder devised a system of ventilation for the four new casemates built in 1847. This vent system was also used in renovating the front walls of the four casemates of defence in the same year. The system was simple enough. Two holes were punched through the retaining wall beneath the window, and four vent holes were built into the brick backs of the casemates. The drying air flowed from the parade, under the floor joists, then up through the ventilation shafts in the rear walls of the new casemates.[30] In the four casemates of defence, the holes were opened through the retaining wall, but the ventilation shafts were not cut into the masonry of the back walls. The ventilation ports in the retaining wall measured nine inches by twelve inches, and were constructed in a Z-shape. These openings were fitted with cast iron ventilators perforated with 154 holes. (See figure 21 for an illustration of the vent system) Each of the eight casemates had two of these vent ports through the retaining wall. Some of the iron grates are still intact.

Gargoyles of the Rampart Drainage System:

Colonel Nicolls in his original estimates had made no provision for draining the water from the ramparts of the Citadel. This oversight was corrected by Colonel Jones in item 16 of his revised estimate of 1836. Jones provided for a system of drainage covering the entire 2000 foot length of the ramparts behind the retaining wall. What Colonel Rice Jones proposed to do was to lay pebbles, four or five inches in diameter, on edge in fine sand behind the retaining wall.

The water would then be conducted through wooden shoots down behind the ramparts.[31] Just how the water was to pass through the retaining wall Jones left unclear. In any case, this system was never adopted. It would have frozen solid in winter, and Colonel Calder by 1848, already harassed by the problems of leaking casemates, suggested that a new system be devised.

What Colonel Calder proposed in 1849, and what was built sometime later, was a granite gutter behind the retaining wall, with gargoyles placed periodically through the wall to carry the water into the courtyard. Huge pieces of granite were quarried, and a three inch concave gutter chiselled into them. These were eventually laid at the level of the terreplein behind the entire length of the interior wall. The water was collected in a series of basin stones and channelled through the retaining wall to the gargoyles and down pipes. (See figure 14) Five of these basin stones, gargoyles and down pipes were placed at even intervals behind the retaining wall of the west curtain. The headwaters for this modest waterway were located at the mid-points of the area wall behind the north and south magazines. A very gradual incline carried the water north and south to the basin stones of the west front. The water eventually ran waste in the surface drain of the parade square.[32]

A very good illustration of the copper heads and cast iron down pipes was prepared by Colonel Calder in 1849. (See figure 15) The pipes were fastened to the retaining wall beneath each gargoyle. While the down pipes of the west wall have disappeared, many of these cast pipes still function on other walls in the Citadel.

Gargoyles of the Dos d'ane Drainage System:

Below the large gargoyles of the rampart drainage system, there are a regular series of smaller guttered gargoyles along the retaining wall. These openings provide an exit for water collected in the valleys between the dos d'anes of the casemates. They are connected to a lead gutter which runs between the casemates from retaining wall to escarp wall. Originally this was the only system for keeping the water off

the arches and pier walls of the casemates. The problem was that this system froze solid in winter, "putting the masonry of the arch to a most severe and unfair test", according to Lieutenant Burmester.[33] Various methods were later attempted for waterproofing the casemates. There were some failures and some successes. But through all the tearing up of earth and rubble, and laying of flagging and asphalt, this original system remained untouched. Archaeological excavation in October of 1976 uncovered one of the lead gutters which carried water to the gargoyles. The water from these gargoyles was not channelled by down pipes, but simply dripped on the face of the masonry, and ran waste in the parade square.

Ammunition Hoists:

This hoist system was installed in the retaining wall to the south of both sallyport 3 and 4 sometime after 1860. At present there is no documentation regarding them. Details will have to await the completion of the 1860-1906 structural history, and the armament study. There is a similar gate and hoist on the southeast salient, which may be of use in a comparative report.

Demi-Casemates:

Restoration drawings for the demi-casemates were completed in January 1976, and restoration began in April 1976. This work was based on an historical report made to the design team by Terrence MacLean in December 1975. Little new documentation has become available since that time. What follows is a brief historical description, and a demi-casemate appropriation list based on the information available.

"Arches of recess" as the demi-casemates were first called, were first mentioned by Captain Peake in 1833 as an inexpensive alternative to a thick retaining wall. Peake felt that they could provide useful bombproof shelters for stores of all types, and should be located in all parts of the retaining wall not casemated. In preparing his revised estimate of 1836, Colonel Jones agreed with Captain Peake's assessment, and asked for approval to build 60

demi-casemates. Thirteen demi-casemates were built in the curtain retaining wall between the sallyports sometime between 1840 and 1843.

As anticipated by Peake, the demi-casemates provided useful storage areas. It was not until 1891, however, that a Citadel plan was prepared which included a description of the uses to which the demi-casemates were put. There is very little information about their construction or appropriation before that time.

By 1950, the demi-casemated portion of the retaining wall had completely collapsed. (See figure 18) During the years of a stabilization program which followed the Massey Commission recommendation, this wall was rebuilt. During that reconstruction period, the back walls of the demi-casemates were built only to a depth of six inches from the face, with no inside arches or pier walls. In 1976, a decision was taken to rebuild the demi-casemates to their 1856 appearance. In 1976 the reconstruction work began.

The basic problem in the preparation of the reconstruction drawings was that the demi-casemates were not built to the specifications provided in Jones' 1836 estimates. Jones' original plan called for a height of 11 feet three inches. (See figure 16) Sometime before Jones or Calder built the demi-casemates, this height was reduced by approximately two feet. Later record plans of the Citadel do little to clarify the construction details. A plan prepared for the reconstruction, in 1875, of the demi-casemates in the right face of the southeast salient provides the most reliable information.[34] Using that plan, and as found records, the reconstruction drawings were prepared.

The pier walls were built to a height of seven feet, not nine as Jones had originally intended. These ironstone walls were stepped back three inches from the granite ashlar facing of the retaining wall. The original arch plan was retained - a rise of two feet three inches in the nine foot width of the demi-casemate. (See figures 17 and 19) The arch was formed of brick, Flemish bond, one foot six inches deep. Above that, red tiles provided a primitive waterproofing. No provision was made for gargoyles in the valleys

between the demi-casemates. The back wall of the demi-casemates, like the pier walls, was random rubble ironstone construction.

Doors were provided in 1875 for two of the demi-casemates in the southeast salient,[35] but there is no documentation or plan to suggest that doors were built to enclose the demi-casemates of the curtain retaining wall. Completion of the structural studies for the post 1860 period may provide more information on this matter. There is likewise no documentation to suggest that the floors of the casemates were anything but plain earthen floors.

Following is a preliminary demi-casemate use list, prepared from plans available for the 1891-1922 period.[36]

DEMI-CASEMATES

USE

DC	1891 PLAN	1908 PLAN	1922 PLAN
29		LIME STORE	
30		OIL	
31	LAMP ROOM	LAMP ROOM	
32		CANTEEN OIL	
33		COAL	
34		OIL	OIL
35	ENGINE HOUSE (exterior building attached)	SWILL	
36		U. TUBS	
37	ASHES	ASHES	
38		STORE	
39	TANK HOUSE (exterior building)	PIONEER'S STORES	
40	TANK HOUSE (exterior building)	PIONEER'S STORES	
41	URINAL	STORE	

End Notes

Curtain Retaining Wall

1. Public Record Office, London, WO78, No. 1786, MR 947, "Plan No. 1, Nicolls, 20 December 1825.

2. PANS, RE 54, pp. 66-71, Nicolls to Bryce, 28 January 1831.

3. PAC, MG12, WO44, Vol. 227, pp. 287-309, "Colonel Boteler's Estimate No. 1", signed by Peake, 12 July 1833.

4. PANS, RE 54, pp. 26-7, No. 202, Fanshawe to Nicolls, 29 June 1831.

5. PAC, MG12, WO44, Vol. 227, pp. 339-56, Peake's 1st estimate, 12 June 1833.

6. PAC, MG12, WO55, Vol. 873, pp. 703-26, revised estimate, Jones, 1 February 1836.

7. PAC, MG12, WO44, Vol. 227, pp. 185-192, Jones' explanatory note upon Colonel Nicolls' observations, dated Quebec, 13 January 1836.

8. PAC, MG12, WO55, Vol. 873, pp. 703-26, revised estimate, Jones, 1 February 1836, and PANS, RE 56, unpaginated, plans to accompany revised estimate, 1836.

9. Ibid, item 4.

10. PANS, RE 41, pp. 42-3, Jones to Lt.-Col. Snodgrass, 3 July 1840.

11. PANS, RE 56, unpaginated, "Examination of Nova Scotia Progress Report to 31 December 1831", initialled by S.H.H. and S.B.N., 16 March 1844, and signed by Calder, 1st May 1844.

12. PAC, MG12, WO55, Vol. 878, pp. 514-22, "Estimate of alterations and renewals...", Calder, 22 May 1843.

13. PAC, MG12, WO55, Vol. 883, fols. 843-54, "Special Estimate...", 30 April 1849.

14. See figure 13. This modern drawing is a composite of as found records, various historical plans and documents cited in the report.

15. PAC, MG12, WO55, Vol. 880, fol. 961, "Plan, Elevation and Section of Retaining Wall to be built, casemate of defence...", Calder, 31 March 1846. Also PANS, RE 56, unpaginated, "Supplementary Report and Estimate...", 31 March 1846.

16. Ibid.

17. Project Office, Halifax Defence Complex, as found record, Set C, section through casemate 8.

18. PANS, RE 56, Plans to accompany estimate for alterations and renewals, 1843.

19. PAC, MG12, WO55, Vol. 887, fol. 659, "Plan and Sections showing the work described in improving the soil pits at the Soldiers' Privy", Stotherd, 1 January 1856.

20. PANS, RE 56, unpaginated, plans to accompany the revised estimate, 1836.

21. PANS, RE 56, unpaginated, "Estimate and Report of Works to be carried on at the Citadel, Halifax, Nova Scotia, for the year 1846-47."

22. Ibid., plans to accompany the revised estimate, 1836.

23. Ibid., "Estimate and Report...1846-47."

24. Ibid.

25. PAC, MG12, WO55, Vol. 873, pp. 703-26, revised estimate, Item 4, Jones, 1 February 1836.

26. Project Office, Halifax Defence Complex, as found record, Set C, plan through the curtain wall at elevation 224.

27. PANS, Map Division, "Ground Plan of Fort George or the Citadel, Halifax, N. S. from actual measurement showing the state of the works, December 31, 1847...", Calder, 10 March 1848.

28. This description is based on Calder's 1846 plan, PAC, MG12, WO55, Vol. 880, fol. 961, and PANS, RE 56, unpaginated, "Supplementary Report and Estimate...", 31 March 1846.

29. Ibid.

30. Ibid.

31. PAC, MG12, WO55, Vol. 873, pp. 703-26, Revised Estimate, Jones, 1 February 1836.

32. PAC, MG12, WO55, Vol. 883, fol. 858, "Sections shewing the mode proposed in staunching the leakage in the arches of the casemates...", Savage, 30 April 1849.

33. PAC, RG 8, C Series, Vol. 1825, pp. 108-19, report of Lt. Burmester, 30 November 1848.

34. PAC, National Map Collection, "Halifax, N. S. Citadel, Rebuilding Retaining Walls, East Salient, Right and Left Faces...", Item 2, FAE, 1876-7. Signed by Watkins, 18 October 1875. One of the sections of this plan shows the demi-casemates before reconstruction, and is the most accurate plan we have of the demi-casemates.

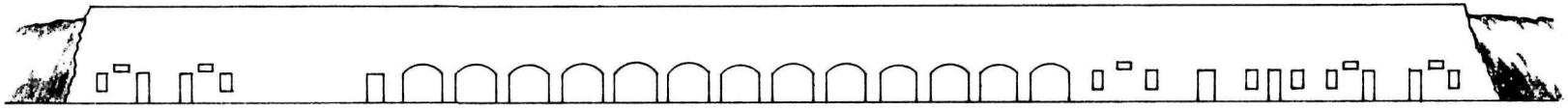
35. Ibid.

36. Plans consulted were: PAC, National Map Collection, "...Fort George, Block Plan", Hill, 21 November 1891. Also Ibid, "...Fort George, Block Plan", Dalton, April 1908. Also Ibid "...The Citadel...Ground Plan.", Benoit, January 1922.

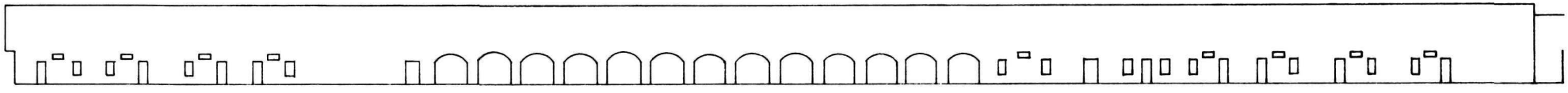
11 Modern drawing to demonstrate the development of the retaining wall. By 1831, only the four casemates of defence and half of the two sallyports were built. The retaining wall remained in this state until 1839, when Jones began work on the soldiers' privy. By 1843, the central portion of the wall between the casemates of defence was finished. In 1847, Calder added the four casemates, and later, drainage gargoyles. The lower drawing shows the wall as found in 1976, and demonstrates how its superficial appearance has changed since 1856. Drawing by Greg Corkum. (Various historical documents used in this report, and in "The West Curtain Wall, and Sallyports 3 and 4", Richard Young, 1976, manuscript on file, Halifax Defence Complex.)

EVOLUTION OF THE CURTAIN RETAINING WALL

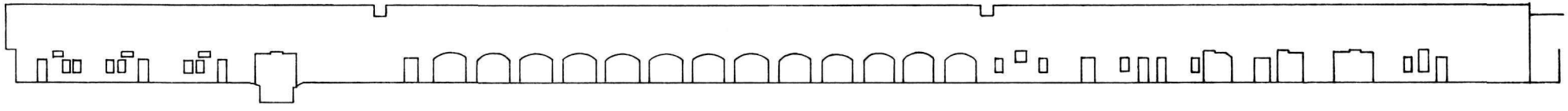
1831



1842

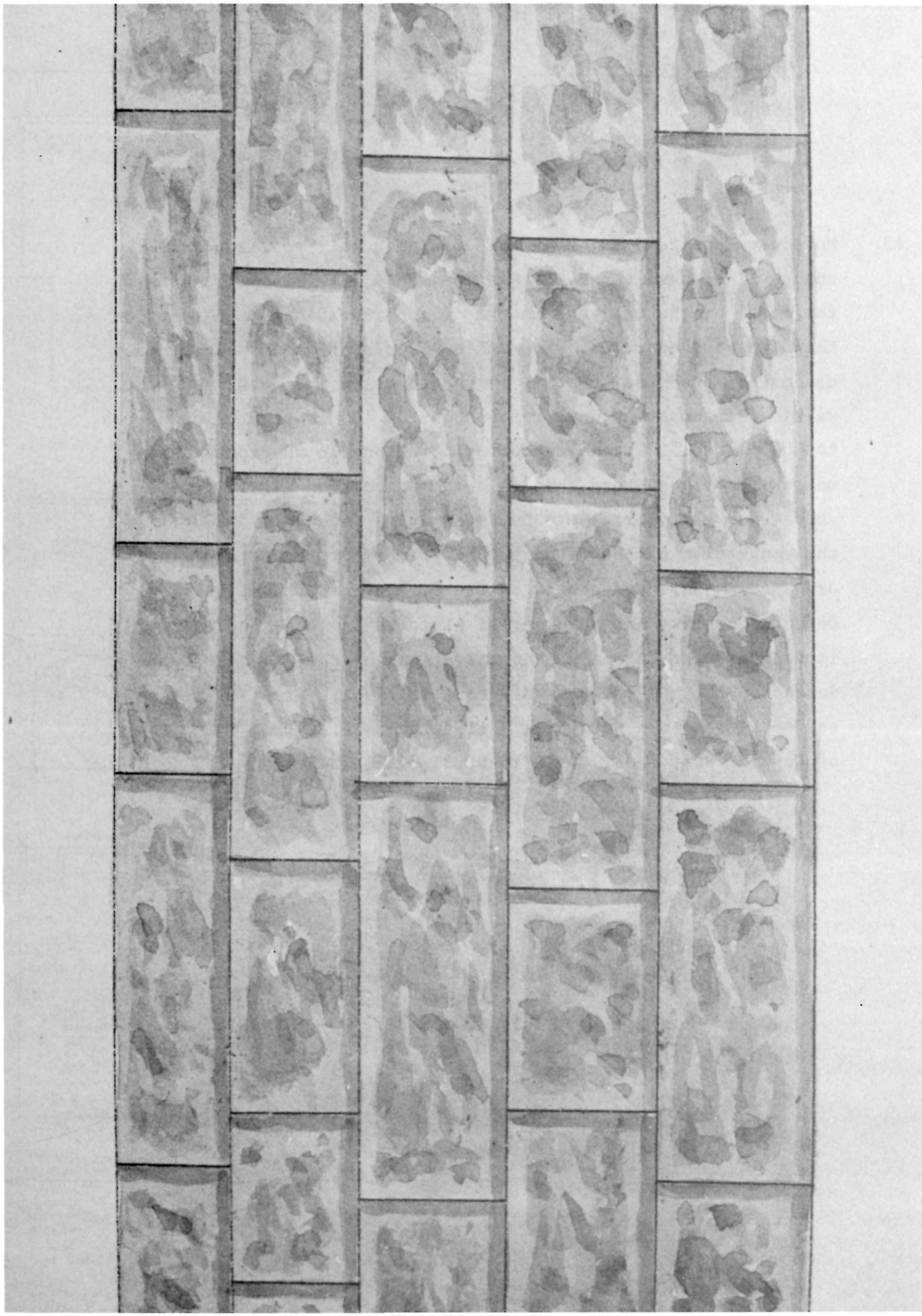


1856

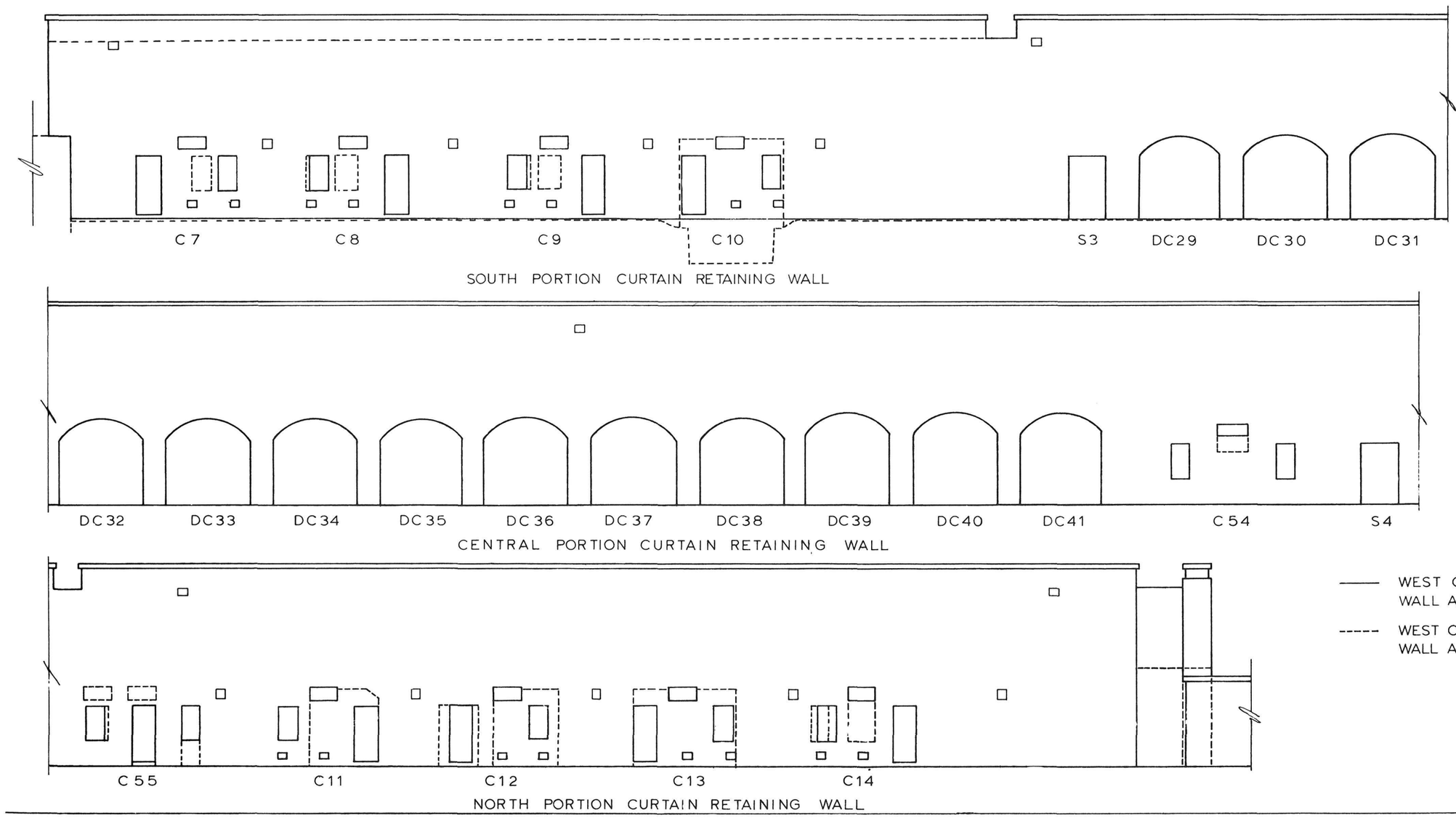


1976

12 Ashlar masonry construction familiar at the Citadel. First used by Peake on the right face of the southwest demi-bastion in 1833, this type of granite facing was used almost exclusively by the succeeding Royal Engineers to build new walls. This illustration is taken from plans accompanying Jones' 1836 revised estimate. The old rubble ironstone escarp walls seem to fit the nature of the fortification, and, in appearance, age well. The immobility of the granite ashlar lent an edge of severity to the fort, but structurally has proved more successful. The walls of the Citadel are about equally divided between ironstone and granite ashlar. (PANS, RE 56, unpaginated, plans to accompany the 1836 revised estimate.)



13 Modern composite drawing of the retaining wall to illustrate the changes that have taken place since 1856. The casemated area at the north of the wall has undergone considerable more alteration than the south portion. The extra lower windows in each of the casemates were made sometime in the 1870's. The back and front walls of casemate 10 were removed in the 1950's to provide access to the Citadel. The major door alterations to the north casemates are 20th century changes. The ammunition hoist gates, above each sallyport, were built sometime in the 1870's during the conversion of the Citadel guns from smooth bore to rifled ordnance. (As found drawings, Set C, Project Office, Halifax Defence Complex; and a number of historical plans, the most important being Calder's 1846 elevations of the casemates of defence, PAC, MG12, WO55, Vol. 880, fol. 961, "Plan, Elevation, and section of the Retaining Wall to be rebuilt to 4 Casemates of Defence West Face...", Calder, 31 March 1846.)


C 7
C 8
C 9
C 10
S3
DC29
DC30
DC31
SOUTH PORTION CURTAIN RETAINING WALL
DC32
DC33
DC34
DC35
DC36
DC37
DC38
DC39
DC40
DC41
C 54
S4
CENTRAL PORTION CURTAIN RETAINING WALL
C 55
C11
C12
C13
C14
NORTH PORTION CURTAIN RETAINING WALL
WEST CURTAIN RETAINING WALL AS FINISHED IN 1856.
WEST CURTAIN RETAINING WALL AS FOUND IN 1976.

14 Photo of one of the granite basin stones installed by Savage after 1849. These stones collected the water from the channelled granite drain system behind the retaining wall, and diverted it out through the gargoyles to the parade. Four of these basin stones were located behind the curtain retaining wall. (Photo by author, November 1976.)

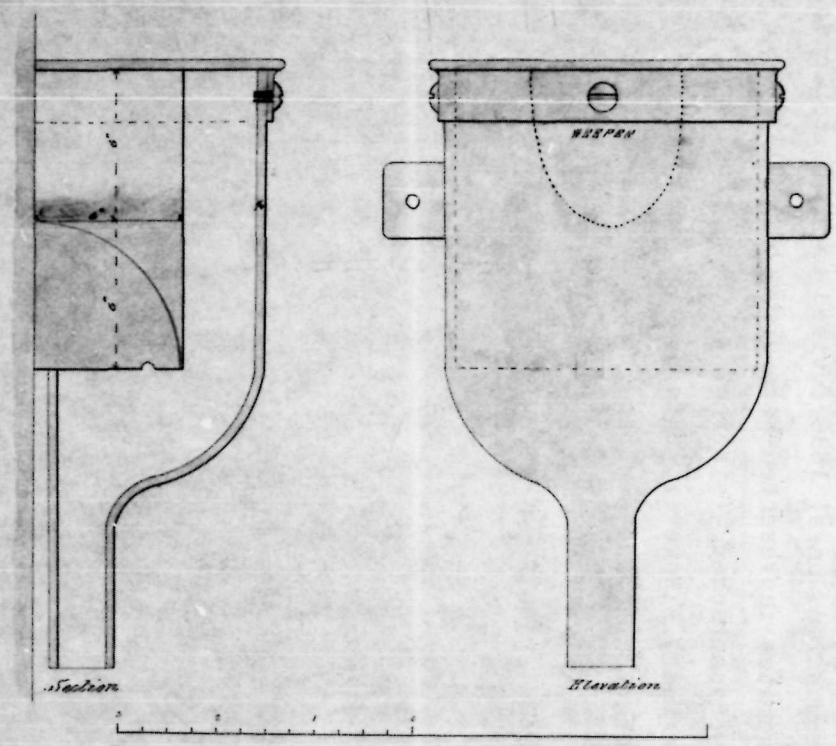
15 Calder's 1846 plan of the hopper heads which were placed beneath the gargoyles of the rampart drainage system. Many of these hopper heads are still intact on the Citadel walls. (PAC, MG12, WO55, Vol. 880, fol. 965.)

Item N° 2.

Elevation and Section of Proposed Hopper Heads to Enclose Wagons To accompany the Supplementary Estimate Dated 31st March 1846

Halifax Citadel Nova Scotia

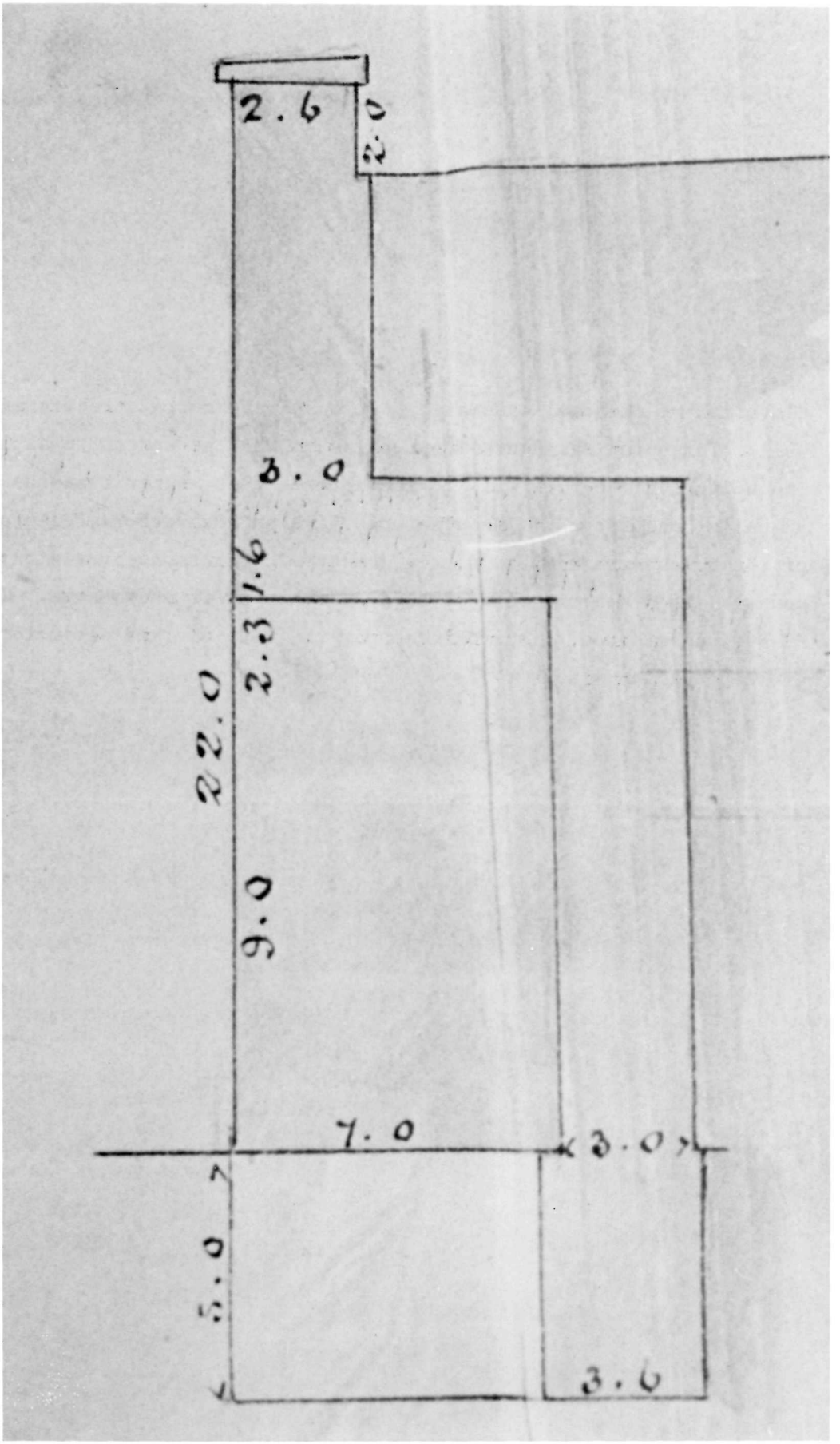
N° 9



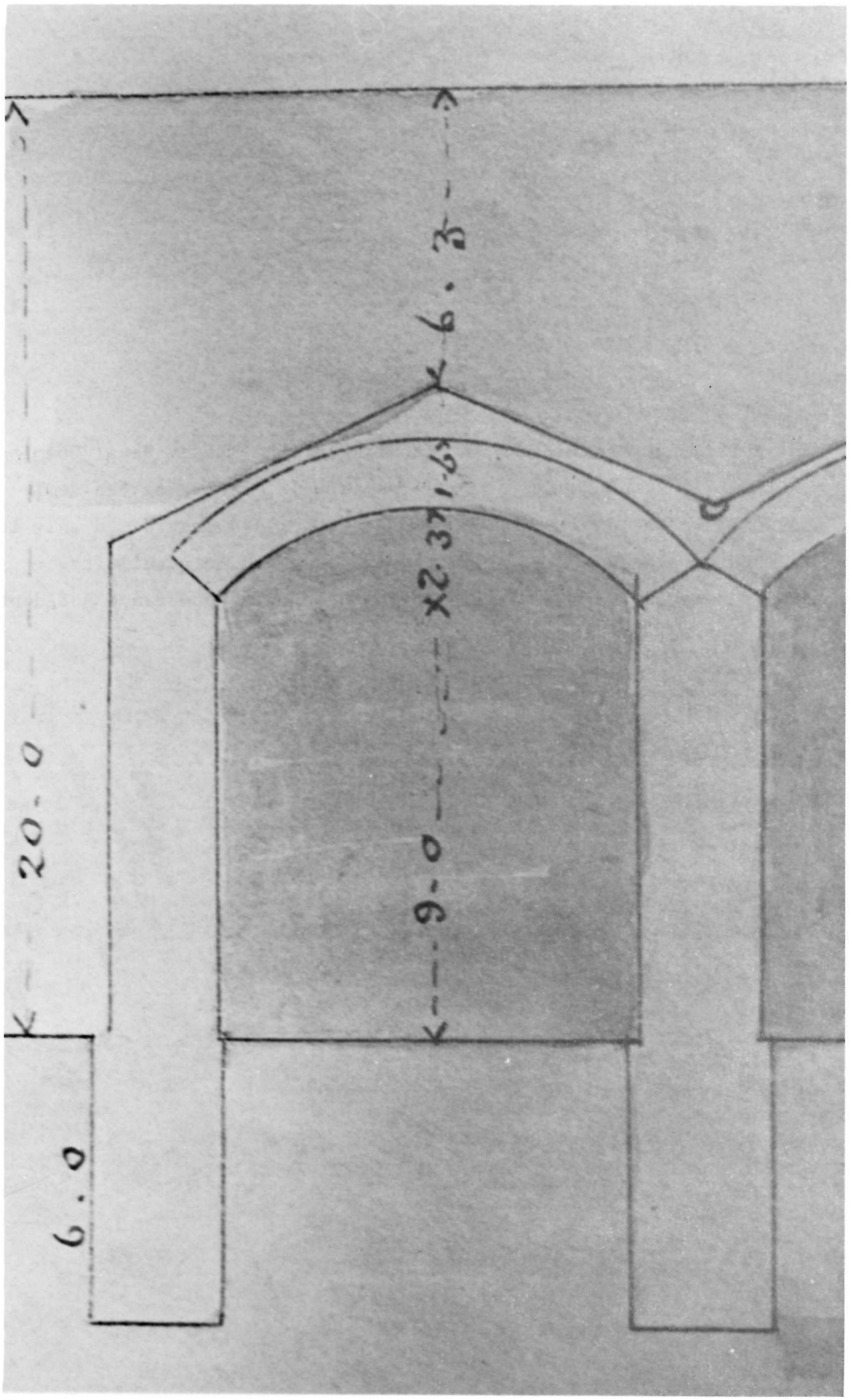
Scale 3 Inches to One Foot

Approved
Ordnance Office
31 March 1846

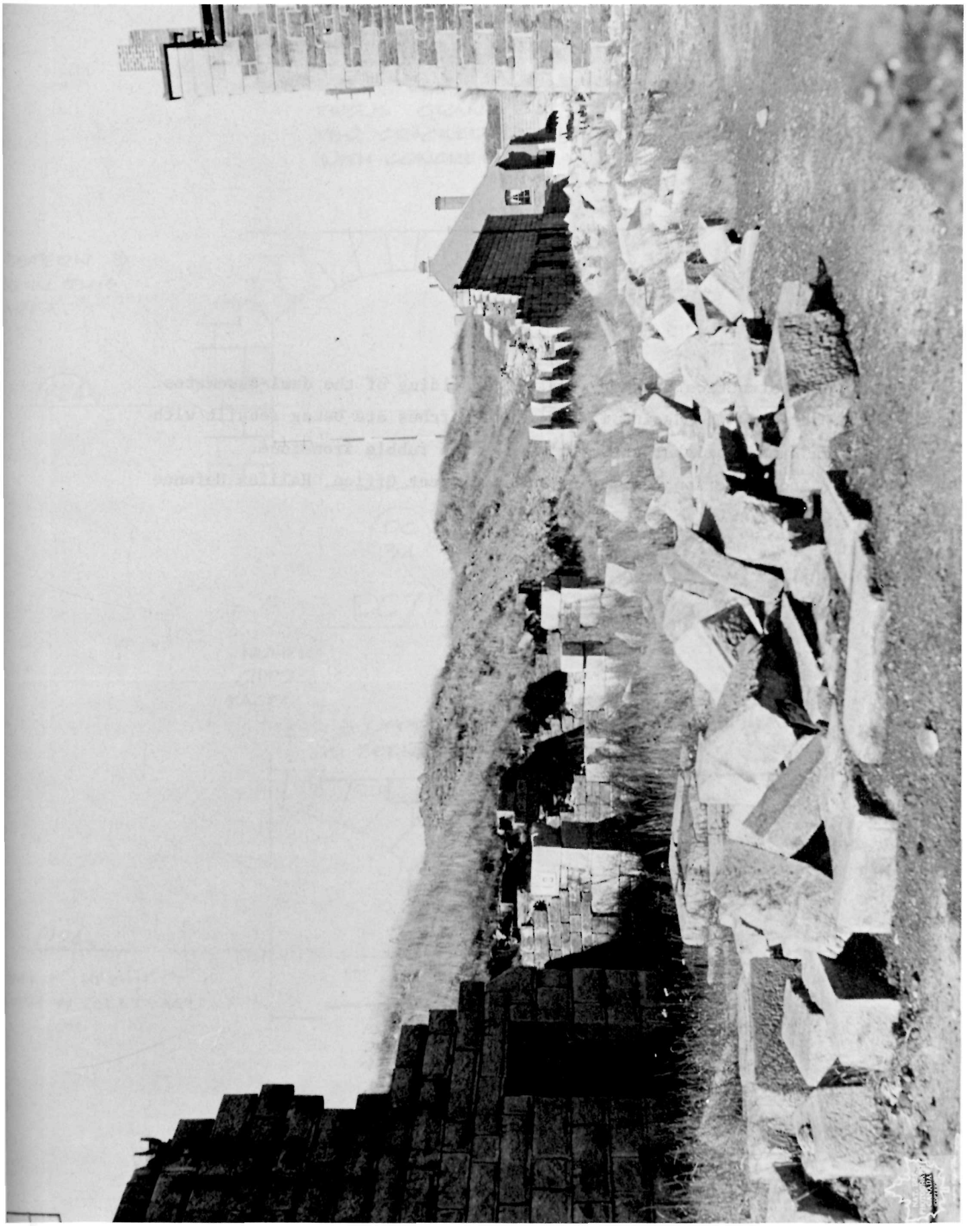
16 Section through the retaining wall at the demi-casemates. This plan accompanied Jones' 1836 revised estimate to London. The demi-casemates represented here are a bit taller than what was actually constructed, (six feet to the springing of the arch, not nine feet). However, this section does give an accurate representation of the depth of the demi-casemates, and the profile of the higher portion of the retaining wall. (PANS, RE 56, unpaginated, plan to accompany the 1836 revised estimate; close-up photo by author.)


2.6
2.0
3.0
1.6
2.3
22.0
9.0
7.0
3.0
5.0
3.6

17 Elevation of the demi-casemated portion of the curtain retaining wall. This plan was Jones' conception of what he wanted to build. The height of the pier wall is shown three feet higher than was actually constructed. The plan does give an accurate representation of the brick arch and dos d'anes above. There was no provision, however, to drain the valleys of the arches as is shown here. (PANS, RE 56, unpaginated, plan to accompany the 1836 revised estimate; close-up photo by author.)


20.0
6.0
9-0
x2 3"
6.3

18 The retaining wall in 1950, at the time of the Massey Royal Commission. In the 1950's the retaining wall was rebuilt, including the demi-casemates. The demi-casemates, however, were reconstructed only to a depth of six inches. In 1975, work was begun to rebuild the demi-casemates to conform with the 19th century appearance and depth. (National Defence Photo.)



19 Reconstruction drawing for the rebuilding of the demi-casemates. This work is ongoing in 1976. The arches are being rebuilt with hand made bricks, the pier walls with rubble ironstone. (Reconstruction drawing on file, Project Office, Halifax Defence Complex.)

UPPER PORTION OF GRANITE WALL HAS BEEN OMITTED FOR CLARITY

NUMEROUS GRANITE BLOCKS WHICH ARE CHIPPED, CRACKED, DRILLED, GOUGED OR FACED WITH CONCRETE WILL BE REPLACED.

POSTERN 3 IS IN THIS AREA.

224

DC 29 | DC 30 | DC 31 | DC 32 | DC 33 | DC 34 | DC 35

ELEVATION OF DEMI-CASEMATES DC1 TO DC7

SHOWING LOCATION OF GRANITE STONEWORK.

SCALE: 1/4" = 1'-0" (APPROX.)

NUMEROUS GRANITE BLOCKS WHICH ARE CHIPPED, CRACKED, DRILLED, GOUGED OR FACED WITH CONCRETE WILL BE REPLACED.

UPPER PORTION OF GRANITE WALL HAS BEEN OMITTED FOR CLARITY

POSTERN 4 IN THIS ARE

224

PRESENT HEIGHT OF EARTH IN COURTYARD

DC 36 | DC 37 | DC 38 | DC 39 | DC 40 | DC 41

Casemates of Defence: West Front

Summary:

The four casemates of defence in the west front (now numbered 9,10,11 and 12) were part of the original plan of the fortress devised by Colonel Nicolls in 1825. In traditional fortification theory, a casemate was any vaulted bombproof chamber under the ramparts of a fort. When intended for defensive purposes as were C-9, 10, 11, and 12, embrasures were cut through the escarp wall to allow the guns to fire grapeshot along the ditches of the fortress. The fire of the guns of these particular casemates swept the ditches on either side of the West Ravelin. The casemates were built in the period 1829-31. In 1847 the front or retaining wall of the four casemates was torn down and replaced, and some interior changes made. Thereafter the interiors of the casemates underwent periodic alterations as the appropriation and use of the casemates changed. The structure that remains, however, is basically that of 1829, with the obvious 1847 renewal.

Narrative:

In the original plans submitted to London in 1825, Colonel Nicolls had the four defence casemates in the curtain wall placed diagonally under the ramparts.[1] (See figure 20) This design had the advantage of allowing the guns to sit squarely in the middle of the casemate and would have provided the men servicing the guns with an optimum amount of space to do their job. Sometime before the initial construction began in 1829, however, Nicolls had changed his mind. The casemates were built as they now stand - sitting squarely under the rampart. Nicolls never explained his reason for this change. In order to maximize the distance available for the gun recoil, the embrasures had to be moved slightly off centre of the back wall of the casemates.[2] (See figure 23) This was small compensation, and the servicing and recoil of the 24 pounder guns seems to have been a cramped affair.

The casemates of defence were built by soldiers of the Corps of Sappers and Miners and tradesmen borrowed from other regiments of the line stationed at Halifax. A Company of Sappers and Miners was sent to Halifax from England in the spring of 1829 for the express purpose of providing a skilled labour force to help build the Citadel.[3] Local skilled tradesmen were expensive and in short supply during the building season at Halifax. Civilian contractors were hired to build the massive escarp walls, while the soldiers, both tradesmen and labourers were set to work on the more intricate work of building the casemates, sallyports, and counterscarp galleries. Soldiers worked in Purcell's Cove supplying ironstone and granite for the project.

The materials, like the manpower, were a mixture of local and foreign. Items which were inexpensive and in good supply locally - wood, stone, sand and lime - were obtained locally. Sophisticated manufactured materials - glass, tiles, bricks, wrought iron fitments and tools were shipped from English suppliers.[4]

Excavation of the west ditch and casemates was begun in the autumn of 1828. Construction was delayed until the mid-summer of 1829 because of the late arrival of the Corps of Sappers and Miners and the priority given to the construction of the West Ravelin and Cavalier building. The arch was carried, waterproof tiling laid, and earth loaded over casemates 9 and 10 in the following building season. Casemates 11 and 12 were completed to the springing of the arches in 1830 and finished off the next summer. The four casemates of defence were completed by late autumn 1831.

In December 1831 the problems associated with the collapse of the contract escarps virtually halted construction at the Citadel for eight years. The west curtain wall was complete and solid, as well as the casemates of defence. Sallyports 3 and 4, however, remained in an unfinished state, and the curtain retaining wall had not yet been begun. (See figure 11) It was not until Colonel Jones' revised estimate was approved in 1838, and work begun in 1839, that the west front, once declared a priority by Colonel Nicolls, began to take on its permanent appearance. Sallyport 4 and the men's privy (C-54) were finished in 1839. The NCOs' and women's privy (C-55) was finished by 1842. By 1843 the demi-casemates and retaining wall between the two sallyports were complete. The north and south sections of the retaining wall, and the two magazines, however, were not yet begun.

In March 1843 Colonel Calder submitted a series of plans and a supplementary estimate for the completion of the Citadel. This document, when given approval, in July, in London, finally fixed the main internal arrangements of the Citadel. Although just a preliminary estimate, (each item was to be brought forward again in the year it was to be constructed), the general principles laid down were followed closely. Calder asked and got approval for the construction of 16 new casemates.[6] Four of these were to be built under the ramparts of the west front (C-7, 8, 13, 14). It was not until 1846-47 that these casemates were brought forward in the Ordnance annual estimate.[7] In the same year that Colonel Calder proposed to build these four new casemates, he asked for approval to

tear down the front walls of the four casemates of defence, which he considered "perfectly rotten".[8] Those walls were constructed of ironstone, and Calder wanted to rebuild them with granite ashlar facing, and put the final touches to the west curtain retaining wall. At the same time, he wanted to tear up the old brick-on-edge paved flooring in the casemates of defence, raise the level of the floor 18 inches, and provide a better ventilation system. This rebuilding program was carried out in the summer of 1847. (See figure 21)

Once the 1847 renovation was complete, no major structural work was done on the four casemates of defence until the present day. The window and door arrangements underwent some change after 1870 (See chapter on retaining wall and figure 13). Each of the casemates has been considerably altered in the interior as the use of the casemate changed. For instance, casemate 9, intended by Colonel Nicolls as a gun-room became subsequently, a military provision store room (1854), temporary military prison (1856), soldiers' barracks (1891),and finally, by 1908, a latrine. Bars are still embedded in the gun port of this casemate from the period that it was a military prison. Evidence of brick and slate urinals was uncovered on the north wall in the autumn of 1976. In casemate 10, the front and rear walls and floor were completely removed to provide a rear exit to the fort. Casemate use, as far as research now knows was as follows:

	1831	1854	1856	1891
C-9	gun room (not mounted)	military prison, store room	temporary military prison	soldiers' room
	1908	1922	1951	
	latrines	latrines	latrines	
	1831	1854	1856	1891
C-10	gun room (not mounted)	military prison, store room	temporary military prison	soldiers' room
	1908	1922	1951	
	barbershop	-	-	

	1831	1854	1856	1891
C-11	gun room (not mounted	barrack master's storeroom	qtrs. 1 sgt. 19 NCOs and privates	soldiers' room
	1908	1922	1951	
	coal store	coal store	coal store	
	1831	1854	1856	1891
C-12	gun room (not mounted)	used by 1 sgt. and 1 corporal	qtrs. 1 sgt. 19 NCOs and privates	grocery bar
	1908	1922	1951	
	coal store	coal store	coal store	

Further identification of alterations in the casemates will have to wait the completion of the 1860-1906 and 1906-1950 structural studies.

Structural Analysis:

Foundations:

Little is known about the foundations for the casemates of defence. Colonel Nicolls' original estimates and plans were not sufficiently detailed to yield that information. They were built of rubble ironstone. Since Nicolls provided a foundation of only three foot depth for an escarp wall of 25 feet in height, it seems reasonable to conjecture that the foundations for the pier walls of the casemates of defence would be no deeper. The foundations were constructed six inches wider than the pier walls, to provide a sill for the floor. In 1976 workmen were able to uncover this sill in the northwest corner of casemate 9. The sills of casemate 10 are visible as one passes out through the rear exit of the Citadel.

Measurements of foundation

C-9 (South Wall) 45 feet x 3½ feet x 5 feet 6 inches

C-9&10 (Party Wall) 45 feet x 3½ feet x 5 feet 6 inches

C-10 (North Wall) 45 feet x 3½ feet x 5 feet 6 inches

C-11 (South Wall) 45 feet x 3½ feet x 5 feet 6 inches

C-11&12 (Party Wall) 45 feet x 3½ feet x 3 feet 6 inches

C-12 (North Wall) 45 feet x 3½ feet x 4 feet 4 inches[9]

Pier Walls:

Again, Colonel Nicolls provided no detailed information in his specifications on just what he wanted in the pier walls. Since these were built by the Sappers and Miners, there was no public advertisement, as was the case with the escarp walls. The walls that remain today are essentially those that were built by the soldiers in 1829-31. They have undergone many changes in external appearance, (cement parging applied, new openings made, and old openings blocked up), but the basic masonry structure remains unaltered. The side walls were five feet thick with rubble ironstone, the party walls three feet thick, and measured six feet from footing to the springing of the arch. The ironstone masonry has an almost field-stone look to it - varied sizes and rounded corners. The original mortar mix was lime, fresh water, and fine sand.

Openings in Walls:

Casemate 9:

South Wall: There were two openings in this wall, the central fireplace and a lamp recess near the escarp wall. (See figure 22) The original fireplace in this casemate was made of brick, both jambs and head, but may have had a granite hearth. Colonel Nicolls did not go into these specific details in his original estimates. When, in 1847, the front walls and floor were renewed in this casemate, Colonel Calder included in his estimate a provision for both a new foundation and new hearths for the fireplace. The new rubble foundation measured six feet by three feet, and one foot deep. The new front hearth, made of six inch chiselled granite, measured five feet by two feet. The back hearth, also renewed in 1847, was a piece of granite six inches deep by four feet long and one foot six inches in width.[10] The old fireplace must have seemed adequate to Calder for he did not order it rebuilt. The fireplace may have lost some of its height when the floor was raised 18 inches. The small round hole above the fireplace dates from the period when stoves were used in this

casemate and the fireplace abandoned. This date has not yet been ascertained.

The lamp recess in the south wall was also an original opening. These recesses were provided in all the gun rooms. In a state of siege, when the gun was being worked, a lantern was placed in this recess and the fire of the flame used to ignite the gun. Until the summer of 1976, this recess was covered by a thick cement parging. Its existence was known from plans, but until workmen removed the parging, its details were not known. The recess is formed of bricks and measures one foot one inch in height and one foot 6½ inches wide. After a four inch step, this opening narrows to one foot square. A further nine inches into the wall, the opening widens to one foot three inches in width, and three feet in length. Obviously the four inch step at the outside of the opening held a wooden frame to carry some sort of glass window.[11]

West Wall: There are three openings in this wall, all of them originally planned for defensive purposes - one large gun port in the centre, flanked by two musketry loopholes.(See figure 23) The gunport and loopholes are narrow on the inside, splayed outward as they emerge through the escarp wall. Each was framed in granite which was quarried, cut, and placed by masons of the Sappers and Miners in 1830. Iron ring bolts to handle the tackle of the 24 pounder guns were uncovered in 1976 when cement parging was removed from the wall. These openings were provided with window frames and sashes as early as 1832.[12] One of the hooks for the window covering the north loophole was found when parging was removed in 1976. (See "The West Curtain Wall" for location and detailed measurement of these openings.)

North Wall: Originally one opening in this wall - a doorway to casemate 10 near the front entrance. The original door near the retaining wall, which once provided access to casemate 9 from casemate 10, was bricked up at some period. At one time it measured six feet by three feet. (See figure 21) In Colonel Calder's 1846 estimate for renewing the floors of this casemate, he specified that the door should by "filled with rubble masonry to correspond with the

existing work."[13] It is not clear whether he meant that the door should be completely filled in, or just filled up to accommodate the new floor height. In any case, the brickwork certainly does not correspond to the existing rubble masonry.

East Wall: The original wall, built of ironstone by the Sappers and Miners in 1830, was torn down 16 years later by Colonel Calder. It seems, however, that the original wall had the same window and door arrangements as was built by Colonel Calder in 1847 - one door to the north end of the wall, one lower window, and one upper window. The only change in appearance that Calder effected was the provision of a granite ashlar facing, and two vent ports through the retaining wall.[14] These ventilation ports emerged on the inside of the casemate under the new floor that Calder built in 1847. They measured 12 x 9 inches and were supplied with ½ inch perforated ventilation grates. (See the chapter on the retaining wall for detailed measurements and locations of doors and windows.)

Casemate 10:

South Wall: There was originally one opening in this wall - a door communicating to casemate 9. The door described in the preceeding paragraph is now completely bricked in.

West Wall: Originally there were two musquetry loopholes and one gun port in this wall. This section of the escarp has now been totally removed to provide a construction access to the Citadel. These openings were described in detail in the "West Curtain Wall", and on the basis of that description and comparison with the three other casemates, restoration drawings have been completed. Like the gun ports and loopholes in casemate 9, these openings had windows on the inside from the very first years of construction.

North Wall: There were two openings in this wall - a central fireplace and a lamp recess near the north loophole. Both are similar in all respects to the lamp recess and fireplace described for casemate 9. In 1847, the hearth foundation and hearth were replaced. The size of the fireplace probably diminished with the raising of the floor at

that time. The fireplace is now completely bricked, but the lamp recess is open.

East Wall: This wall was similar in all respects to the east wall of casemate 9. The original disposition of door and windows was followed by Colonel Calder in 1847 when he replaced the wall. Two ventilation passages were cut through the retaining wall and emerged under the newly constructed floor.[15] After 1870, an extra lower window was provided in the casemate, like all of the other casemates in this front. This wall has been totally demolished to provide a rear exit from the Citadel.

Casemate 11:

South Wall: Originally two openings in this wall - one central fireplace and one lamp recess near the escarp wall. These are similar in all respects to those described for casemates 9 and 10.

West Wall: The original three openings in this wall, two musquetry loopholes flanking a central gun port, are still in place. Their function was purely defensive, to allow the guns inside to sweep the north ditch of the west ravelin. (See figure 24) These openings have been fully described in the report on the west curtain wall, and restoration drawings are completed. These openings had windows on the inside.

North Wall: There was one opening in this wall originally - a passageway to casemate 12 near the retaining wall. The doorway leading to casemate 12, originally measuring six feet by three feet was blocked up at some time. Whether this took place in 1847 when Calder renovated the casemate is not clear. From the evidence that exists, it appears that this door was simply framed in ironstone, not brick.

East Wall: In 1831 there were three openings in this wall - a door, a lower window, and a window in the arch. When Calder replaced this wall in 1847, he maintained the original measurements and disposition of the openings. He did, however, add two ventilation shafts under the new floor.[16] Sometime after 1870 an extra lower window was cut

through the retaining wall. This was accomplished by cutting the masonry away at the north end of the old window and providing a vertical granite jamb to separate the two.

Casemate 12:

South Wall: The original opening in this wall has now been completely bricked up. A doorway at the east end of the wall provided a passageway between the two gun rooms. This opening was described in the preceeding paragraph.

West Wall: The original three openings, a gun port and two loopholes framed in granite are still there, if shifted somewhat by the deterioration of the escarp wall. These openings have been described in the report on the west curtain wall, and restoration drawings are completed.

North Wall: Originally two openings in this wall, a third was eventually made in it. The central fireplace and lamp recess are duplicates of those described for the other three casemates. Sometime after 1891, a doorway was cut through this wall to provide a passage to casemate 13 (See figure 25) The exact date is unknown, but by 1908 both served as coal storage areas, and this may account for both the date and reason for the door. The door has now been entirely blocked up.

East Wall: Originally this wall was similar to the other casemates of defence - one door, one lower window, and one arch window. Calder's rebuilding program in 1847 replaced these with identical openings, and added the two ventilation shafts under the floor. An extra lower window was cut through this wall sometime after 1870.

Floors:

When the four casemates of defence were first built in 1829-31, Colonel Nicolls had the floors paved with brick on edge paving. At the same time, either by Nicolls' wish or through a surveying error, the floors were constructed 18 inches below the level of the parade. When Colonel Calder came to examine and reconstruct the floors in 1847,

he disliked both the brick paving and the low level of the floor. Unlike Nicolls, Calder believed that a wood floor could support the 24 pounder ordnance. Calder asked London and got approval to raise the floor level and substitute fir flooring for brick. In 1846-47, Calder had the old brick paving torn up and a further two feet of earth excavated to provide sufficient ventilation under the new wooden floor.[17] (See figure 21)

In order to build the wooden floor, Calder had to have dwarf walls built along the side wall and longitudinally through the centre of the casemate. These new side walls to carry the wall plates measured 12 x 9 inches. The centre dwarf wall, constructed either of brick or ironstone, measured 13½ x 12 inches. The fir wall plates were specified to be four inches by three inches and the fir joists to be 6¼ x 2½ inches on 12 inch centres. The flooring itself was two inch filleted deal fir, and was bordered by a cast iron skirting.[18]

Sometime in the last century these floors were taken out and replaced with cement in all of the casemates. In casemate 9, this was probably done when the casemate began to be used as a latrine (by 1908). For casemates 11 and 12, the cement flooring was probably poured before they became coal storage areas (by 1908). Casemate 10 remains a mystery.

Arches and Waterproofing:

Specifications for the vaults of the four casemates of defence were not provided in Colonel Nicolls' original plans and estimates. From his later correspondence, however, Nicolls evidently considered the brick available locally both inferior and too expensive. Nicolls preferred to rely on bricks purchased by the Ordnance office in London and sent to Halifax as ballast in His Majesty's ships. The red brick of those first shipments form the arches of the four casemates of defence. Each course was laid alternating headers and stretchers in the Flemish bond fashion, until the thickness of the arch reached three feet. The rise of the arch was three feet in a

fifteen foot width. The skew-backs apparently were either brick or ironstone.

Above the arch, rubble masonry was used to form the dos d'anes and red tiling, set in cement, was used as waterproofing. The tiles were unavailable locally and had to be shipped from manufacturers in England. Little is known of the details of Nicolls' waterproofing system. Gargoyles are not shown in the early plans so it can be assumed that Nicolls made no provision for draining the valleys between the casemates. Since the casemates were originally intended only for defensive purposes, the problem of adequate waterproofing may not have overly concerned Colonel Nicolls. By 1848, and probably before, this primitive system was proving problematic because it was causing structural damage to the retaining wall. In 1846-47 Calder replaced the retaining walls of the four casemates of defence and provided gargoyles to drain the valleys.[19]

In 1848 Lieutenant Burmester reported that the casemates 9 and 10 were tiled only, and both damp and unfit for troops. Six years later both were in use as military storerooms and considered suitable for accommodation. The intervening years had seen an agonizing series of trials, failures, and successes in staunching the casemates of the Citadel. Casemates 9 and 10 went through two stages of waterproofing. The first time, the earth was removed from the tops of the arches, (probably 1849) the tiles were removed, and the dos d'anes formed again with ironstone flagging. The valleys between the casemates were hipped with more flagging, and a down pipe provided in casemate 9 to run off the water that failed to pass through the gargoyles in the retaining wall. The earth was loaded and ramparts formed.

The second phase occurred sometime between 1851 and 1854 when the experiments with the use of asphalt were tried. Once again the earth was removed, cement poured over the flagging and hipped, and finally a 3/8 inch coating of the liquid tar was used to cover the entire roof area. The earth was replaced when the asphalt hardened. This system seems to have worked. The tops of these casemates

were uncovered in 1973 and the drainage system and waterproofing technique exposed.

Casemates 11 and 12 had a slightly different history of waterproofing. These casemates had already been tampered with by the time Burmester made his report in 1848. Calder had apparently removed the earth and tiling, and substituted ironstone flagging on the dos d'anes, and brick gutters to the gargoyles. In 1848 they were reported dry and fit for troops.[20] Calder never tried to hip the valleys or provide internal down pipes in these casemates. When the asphalting was laid on the casemates between 1851 and 1854, it appears that only the earth was removed. After a thin layer of concrete was poured over the flagging and rubble covering the drain, the asphalt was applied directly to this surface. Thus, the area between these casemates had a relatively flat covering of asphalt, (See figure 45) whereas between casemates 9 and 10, the asphalt fell from all four sides towards the central down pipe in casemate 9.[21]

Openings in the Arch:

The arches of the four casemates of defence were designed to have a solid arch with no openings, which must have created a very close atmosphere inside such a casemate after the discharge of a 24 pounder gun. No vents were provided in the vault for the dispersal of smoke. Casemates 9 and 10 at sometime had circular vent ports cut through the arch. For casemate 9 this would seem to have been associated with the conversion of the casemate to a privy (by 1891). Casemate 10 has a small circular opening through the vault near the escarp wall. This may have been associated with the installation of a stove at some point.

End Notes:

Casemates of Defence

1. PRO, London, WO 78, No. 1786, MR947, "Plan No. 1", Signed by Nicolls, 20 December 1825

2. As found drawings, Set C, casemates 9, 10, 11, 12. Project Office, Halifax Defence Complex.

3. PAC, MG12, WO55, Vol. 866, p. 492, Nicolls to Mann, 24 June 1829.

4. PANS, RE 54, pp. 17-20, Nicolls to Mann, 7 October 1828.

5. PRO, London, WO 78, No. 1667, MPH486, "Plan of Fort George, Citadel Hill, shewing the work in progress, approved, and those estimated for the year 1832", signed by Nicolls, 3 September 1832.

6. PANS, RE 56, "Estimate of the alterations and Renewals...", 22 May 1843.

7. Ibid., "Supplementary Report and Estimate...", 31 March 1846.

8. Ibid.

9. As found drawings, Set C, casemates 9, 11, Project Office, Halifax Defence Complex. The width of the original foundations was widened approximately a foot with the building of casemates 7 and 13.

10. PANS, RE 56, "Supplementary Report and Estimate...", March 31, 1846.

11. As found drawing, Set C, casemate 9, Project Office, Halifax Defence Complex.

12. PRO, London, WO 78, No. 1679, MPHH 205, "Elevation of the South West Bastion No. 7, Elevation of the North West Bastion No. 8", Colonel Boteler, 14 February 1832.

13. PANS, RE 56, "Supplementary Report and Estimate...", 31 March 1846.

14. PAC, MG12, WO55, Vol. 880, fol. 961, "Plan Elevation and Section of Retaining wall to be rebuilt to 4 casemates of Defence West Face...", Calder, 31 March 1846.

15. Ibid.

16. Ibid.

17. PANS, RE 56, "Supplementary Report and Estimate...", 31 March 1846.

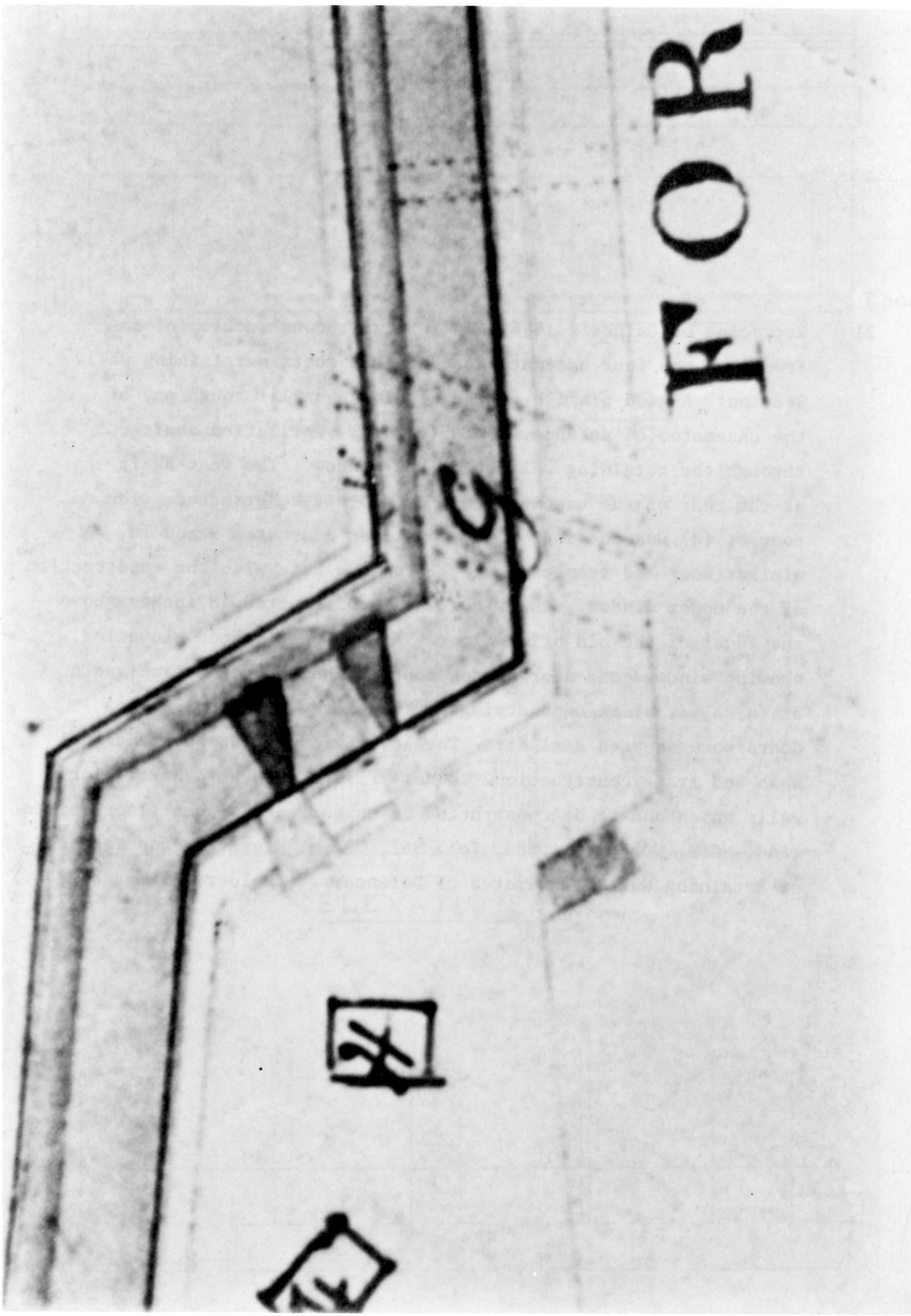
18. Ibid.

19. Ibid.

20. PAC, RG8, C Series, Vol. 1825, pp 108-19, report of Lt. Burmester, 30 November 1848.

21. Archaeological excavation by Caroline Parmenter, at Halifax Citadel, 1976.

20 Detail from "Plan No. 1" by Colonel Nicolls in 1825. The broken lines indicate the two casemates of defence (C-9, C-10), in the south end of the curtain wall. Note that Nicolls had intended to place them diagonally under the ramparts. This would have allowed an easier servicing of the guns. Sometime before construction began on these casemates in 1829, Colonel Nicolls had changed his mind. They were built to sit squarely under the rampart. This also meant an alteration to the gunport and musquetry loopholes, to allow a direct fire to be brought to the ditch of the west ravelin. (Public Record Office, London, WO78, No. 1786, MR947, "Plan No. 1", Nicolls, 20 December 1825; close-up photo by L. Friend, Atlantic Regional Office.)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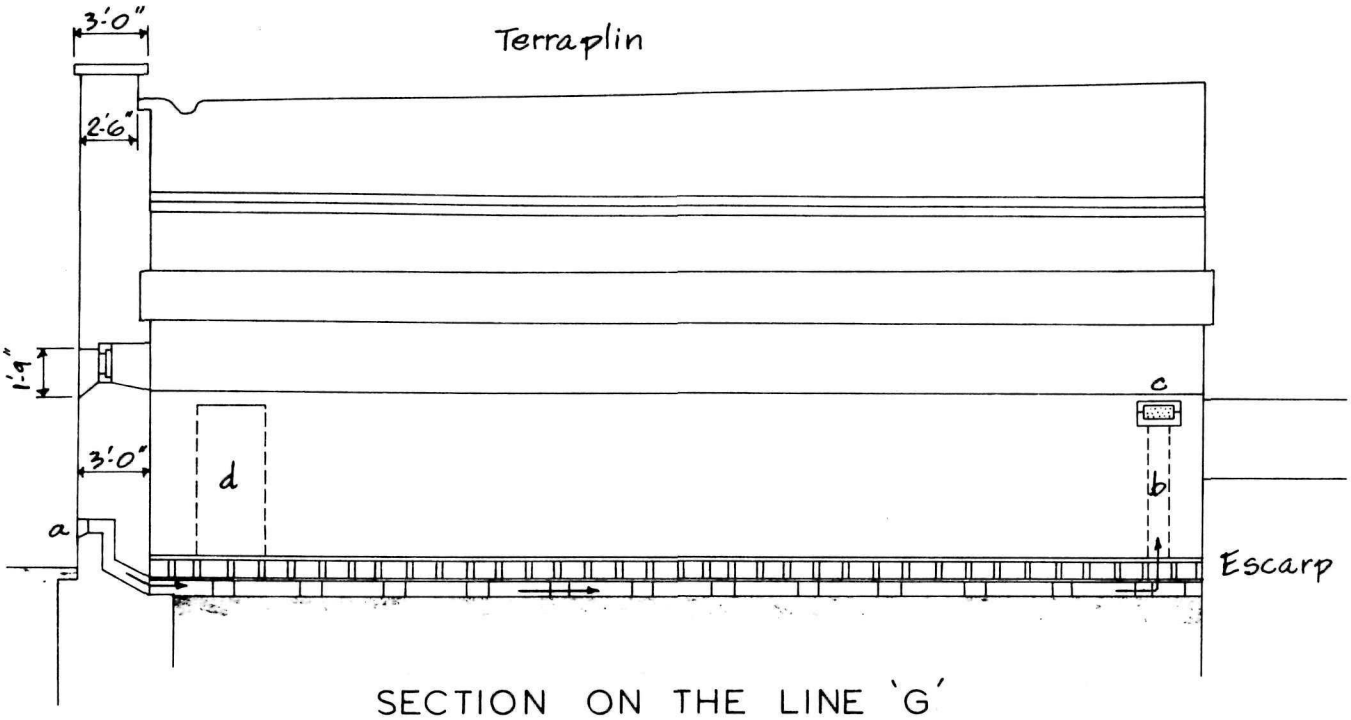
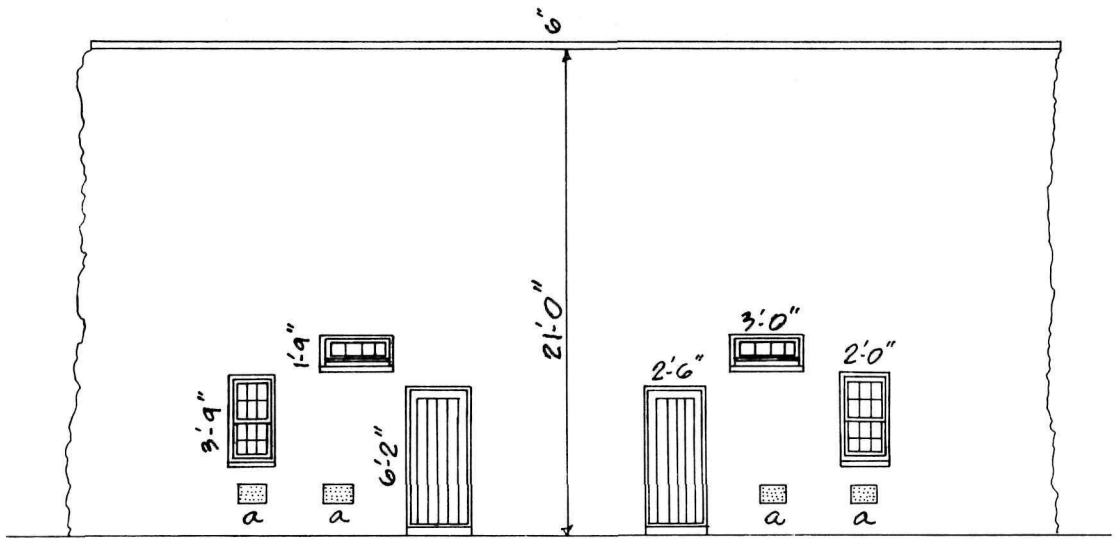
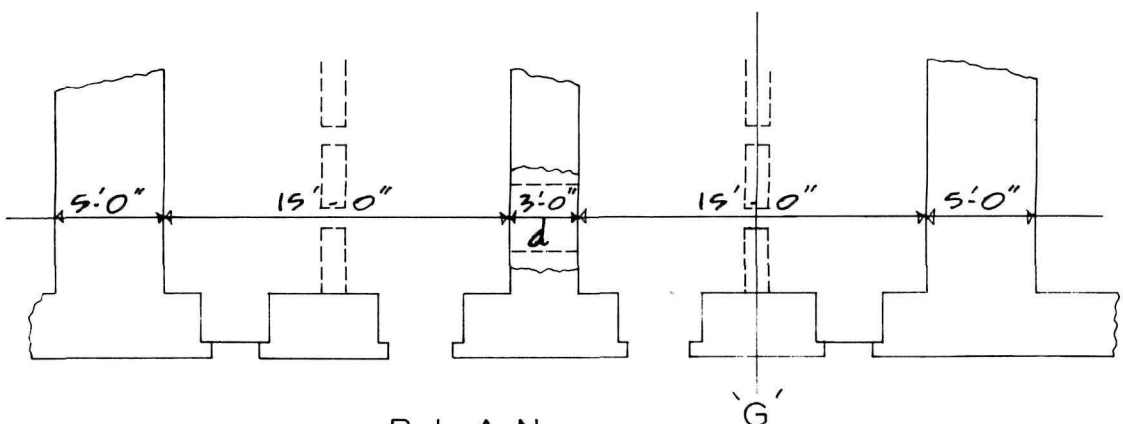
21 Retracing of Calder's 1846 plan for the reconstruction of the fronts of the four casemates of defence, curtain retaining wall. Section: A good profile of the retaining wall through one of the casemates of defence. Note (a), the ventilation shaft cut through the retaining wall below the window. The vent shaft at the rear of the casemate (b & c) was not constructed. The door at (d) was the door which connected casemates 9 and 10. A similar door led from casemate 11 to 12. Note also the construction of the upper window. The floor was reconstructed 18 inches above the level of the old brick floor. Elevation: A good elevation, showing windows and door arrangements. The four cast iron vents at (a, a, a, a) allowed drying air under the new floor. The doors were sheeted deal fir. The lower windows were conventional sash and frame construction. Plan: Plan shows the central pier walls which had to be constructed to support new wooden floor joists. (PAC, MG12, WO55, Vol. 880, fol. 961, "Plan, Elevation and Section of Retaining Wall...Casemates of Defence...", Calder, 31 March 1846.)



SECTION ON THE LINE 'G'

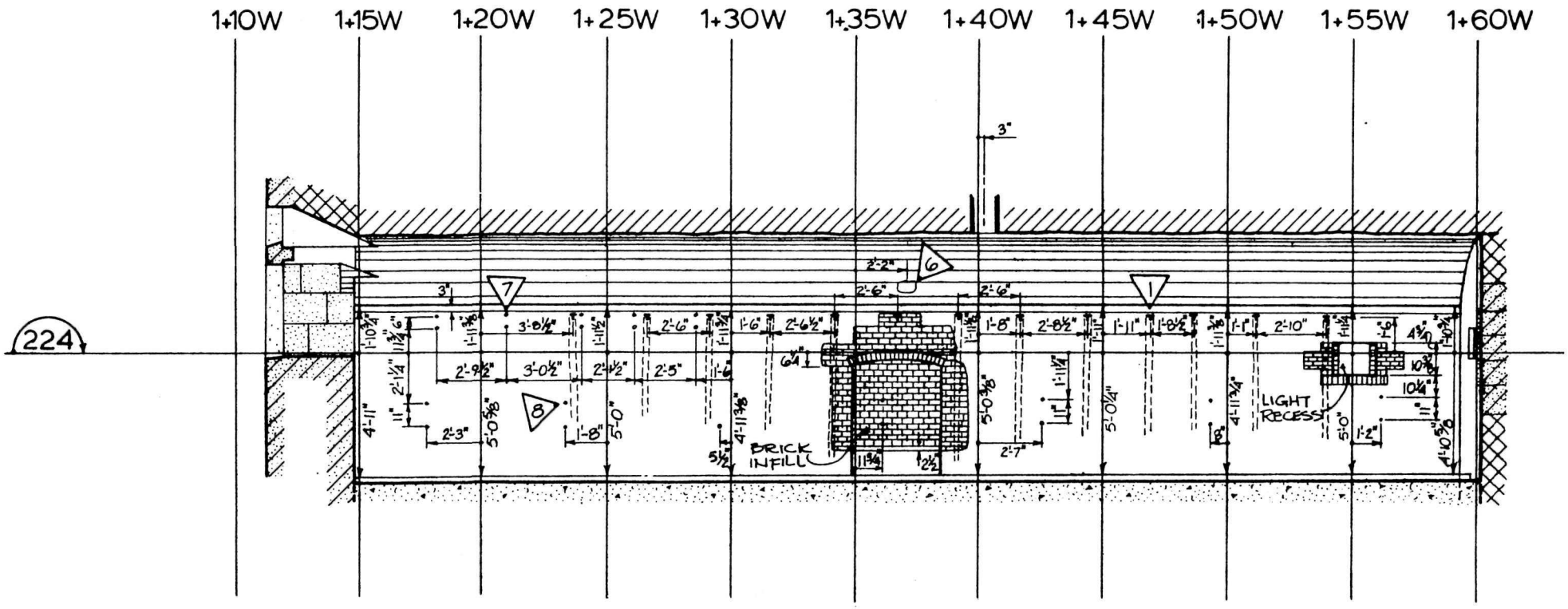


ELEVATION



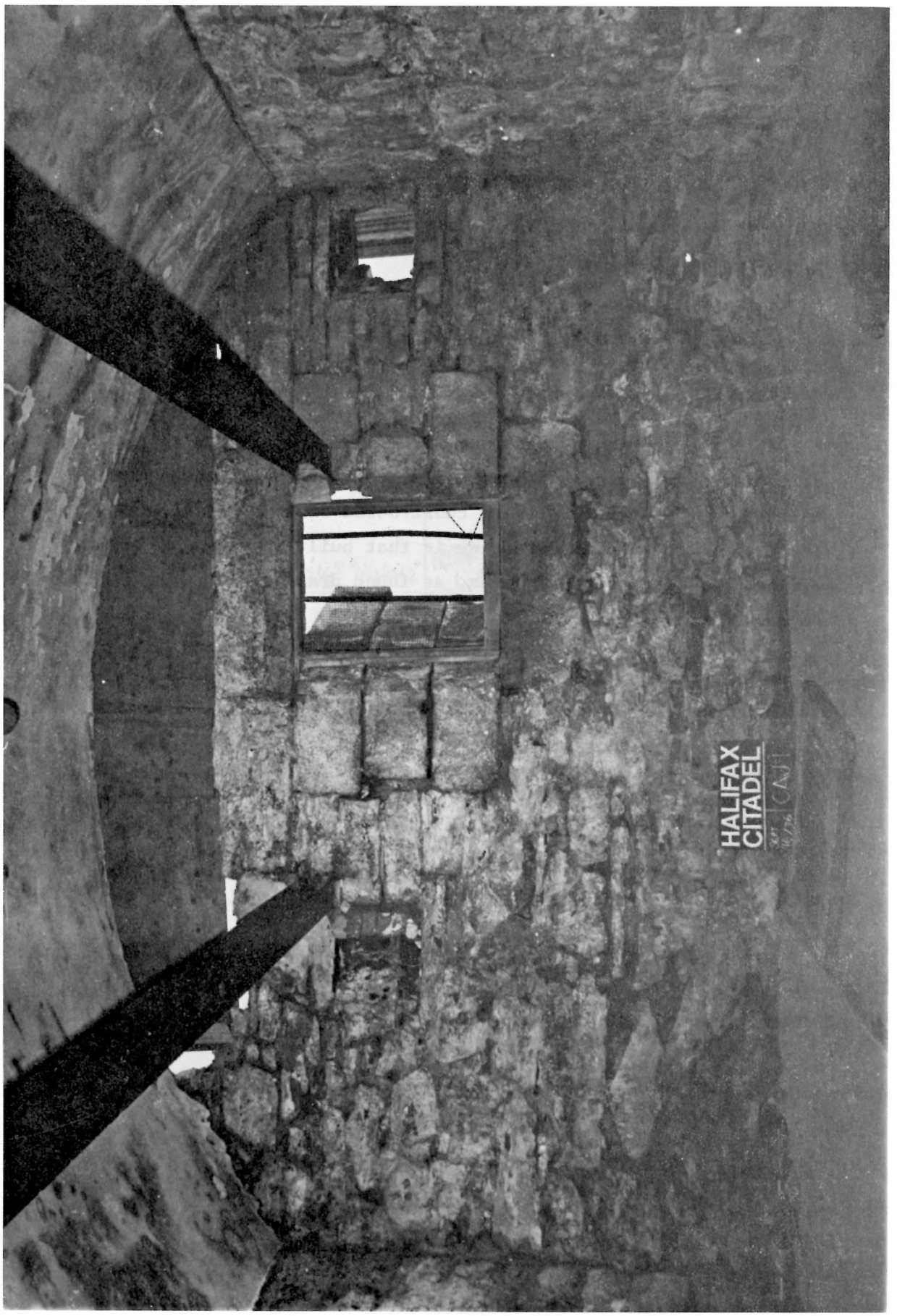
PLAN

22 Elevation of the south wall of casemate 9. This as found drawing records the fireplace and lamp recess uncovered in 1976. The small hole above the fireplace served a stovepipe sometime after stoves replaced the fireplaces as sources of heat. (Project Office, Halifax Defence Complex, as found record, Set C, elevation of the south wall of casemate 9.)

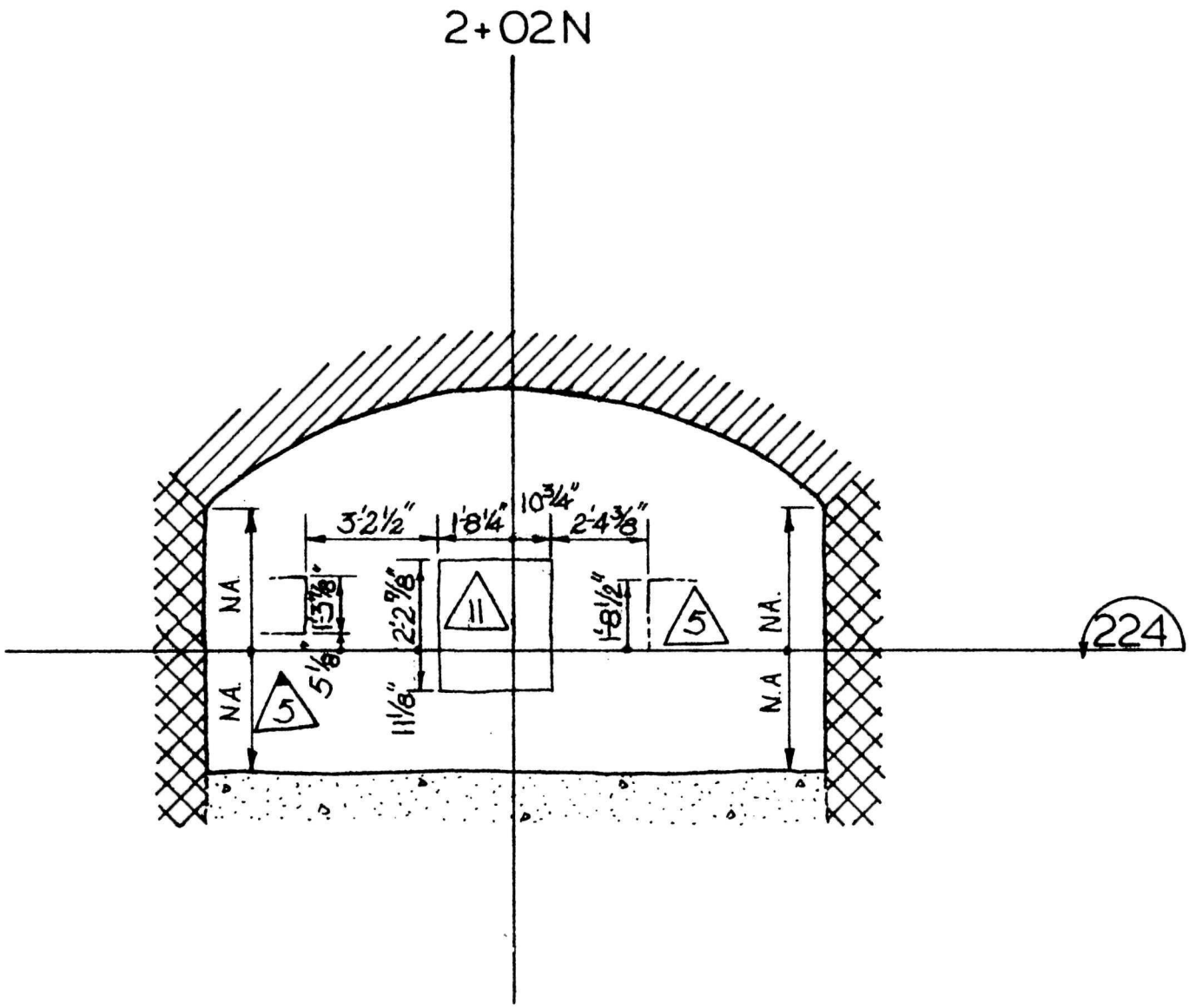


ELEVATION ℄ → 79S

23 Photo of the back wall of casemate 9 in 1976. This photo was taken after a one inch cement parging was removed by workmen. Note the three rings below the gun port. These rings held the tackle for the 24 pounder guns. They are cast iron, and solidly embedded in the ironstone wall. Note also the bars in the gunport. These date from 1856 when the casemate was used as a military prison. The curtain wall, gun port, and musketry loopholes are now being reconstructed. (Project Office, Halifax Defence Complex, as found team photo, on file.)


HALIFAX
CITADEL

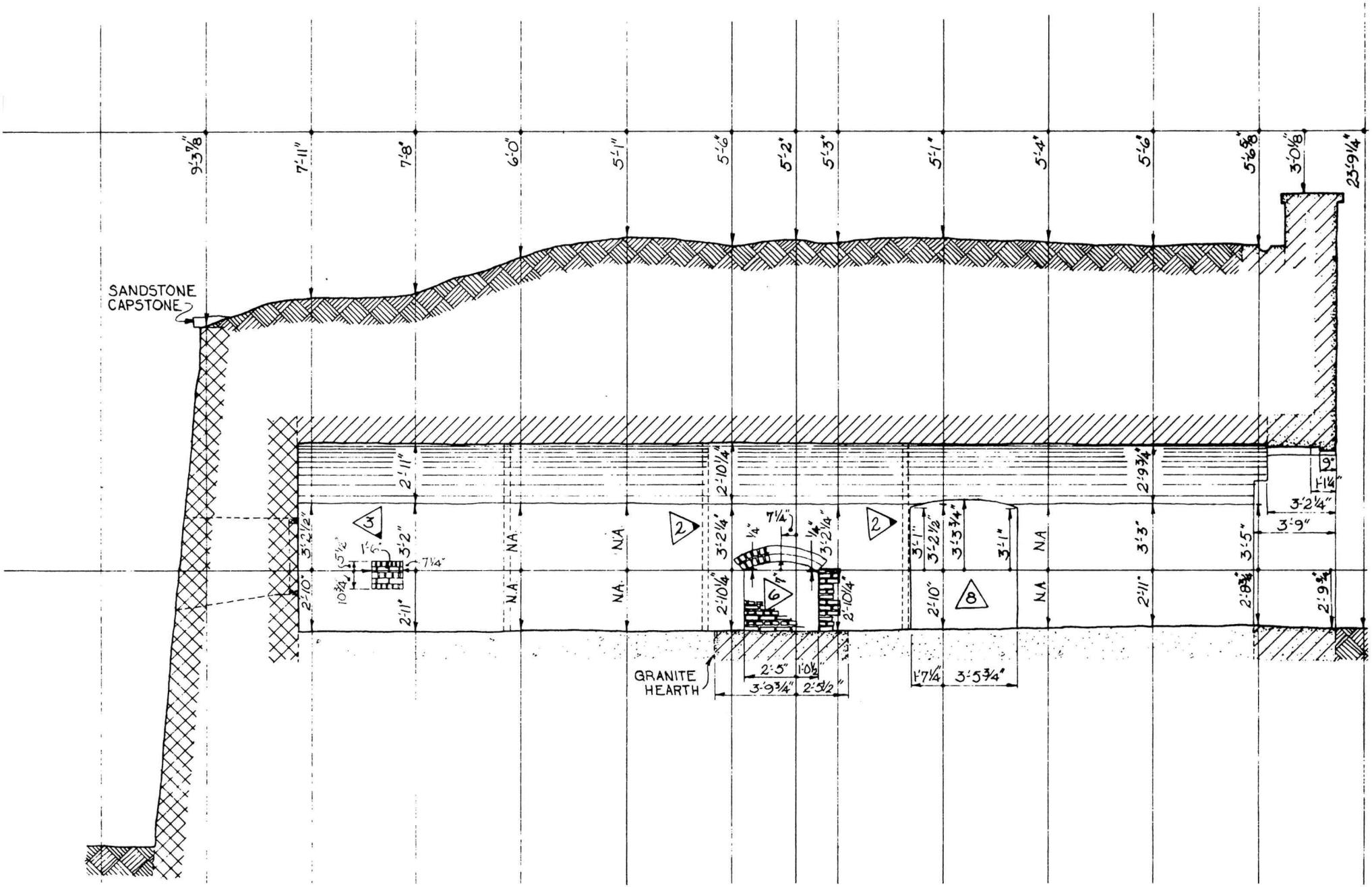
24 Elevation of section of casemate 11. This record shows the profile of the arch and height of pier walls. All of the casemates of defence in the west front were constructed on an identical pattern. The basic structure that remains is that built in 1830. (Project Office, Halifax Defence Complex, as found drawing, Set C, elevation of casemate 11.)



ELEVATION

1+60W → 1+65W

25 Elevation of the north wall of casemate 12. Similar in most respects to the south wall of casemate 9. (Project Office, Halifax Defence Complex, as found record, Set C, elevation of the north wall of casemate 12.)



SECTION C → 2+25N

Calder's Casemates West Front: 7, 8, 13, & 14

Narrative

In April 1843 Colonel Calder, the CRE at Halifax, wrote to the heads of the Artillery, Commissariat, and Barracks Departments and to the Ordnance Storekeeper.[1] The purpose of these letters was to elicit from the various department heads a statement of how much space each needed at the Citadel. The context of the question was how much space was needed in time of peace and how much would be needed for a theoretical siege of two months duration. Calder was in the final stage of preparing a supplementary estimate for the completion of Fort George and needed supporting documentation for the extra casemates he wished to build. The answers of heads of the departments supplied him with the justification for asking for 16 additional casemates. This request was inserted as item 1 of the 22 May 1843 estimate for the completion of the Citadel.[2]

Colonel Richard Calder had arrived in Halifax to take command of the engineering staff in March 1842. This was fourteen years after the initial construction at the Citadel had begun, and, as yet, the project was only half-completed. Calder examined Colonel Jones' estimates, supervised the construction planned in 1842, became familiar with the site and the problems, and in May 1843, in his plans and estimates outlined to London what he thought should be done to bring the Citadel project to a conclusion. Calder's proposals, besides asking for the 16 additional casemates, were essentially tidying-up exercises. The estimates dealt with drainage and water systems, shifting rooms for the magazines, old walls which needed rebuilding, and a number of other important details. The end of the project was obviously within sight, and if the inadequacies of the earlier plans could be corrected, the Citadel could be made ready for

the reception of troops. This general estimate was quickly approved in principle in London, on the understanding that each item would be examined again as the annual plans and estimates were sent to the home office.[3]

Calder did not submit the detailed estimates for the four new casemates on the west front wall until 1846. (See figure 26) At the same time as these proposals were sent to London, he suggested that the front walls of the four casemates of defence be renewed. This was typical of Calder's tidying-up attitude. The old walls of the casemates of defence were, he declared, "perfectly rotten", and composed of old ironstone work. If they could be replaced and faced with granite ashlar at the same time the new casemates were being built, the retaining wall of the west front would be complete.[4] Once declared by Nicolls to be a priority, the west front was, in fact, the last to be finished.

The new casemates and the front walls of the four casemates of defence were built 1846-47. At the time of building these four casemates, Calder was already concerned with the problem of inadequate waterproofing experienced in the older casemates. It appears from an 1848 report on the state of the casemates that Calder used the six new casemates he built in 1846-47 as test cases for his solution to the waterproofing problem.[5] He flagged, hipped, and piped the dos d'anes of these casemates and proceeded to argue in 1848 that this was the proper method of overcoming the leakage problem. London officials eventually won the argument, and the earth above all the casemates in the Citadel was eventually removed, and Seyssel Asphalt applied over the various waterproofing techniques.[6]

The four casemates underwent some alterations in windows and doors and internal arrangements as the use and appropriation of them changed gradually over the next hundred years. By 1854, casemate 7 had become an artillery side arms store and remained so for the entire British tenure at the fort. In the twentieth century it was also used as a storeroom by Canadian troops. Casemate 8, had become a soldiers' quarters by 1856 and remained so until 1906, when it was

converted to a storeroom by the Canadian Command. Casemate 13, originally a soldiers' quarters, had become a barroom by 1891 and was used for coal storage in the Canadian period. Casemate 14 was a canteen in 1854, but in 1891 had become a latrine and remained so during the Canadian forces' occupation of the fort.[7] Each of the casemates has structural idiosyncracies reflecting the changing usage.

The casemates were well built and well maintained. Today the original fabric, except for the floors, is in quite a good condition. Structurally they appear sound.

Structural Analysis:

Foundations:

Calder was quite specific about the foundations he wanted under the four new casemates. The back wall foundation was to be ten feet deep and five feet thick. The side walls and party walls were to be of the same dimensions.[8] He made no mention of the two party walls with the casemates of defence, but it appears from as found recording that he added one foor in thickness to the south wall of casemate 9 and six inches to the north wall of casemate 12.[9] (See figure 30) The foundation under the front or retaining wall was not covered in the 1846 estimate because Calder considered the money available in item 16 of the revised estimate of 1836 sufficient to cover the cost. Jones had planned this foundation to be six feet deep and three feet six inches wide.[10] Whether Calder carried the foundation of the retaining wall to the 10 feet depth of the side and back walls is not known.

Pier Walls:

Calder did not go into any great detail for the specifications of the pier walls in his 1846 estimate. They were built to a height of six feet from footing to the springing of the arch, and were composed of rubble ironstone masonry. Obviously a six inch footing had to be left to carry the wall plates, so the pier walls average thickness would be

four feet. Again, the party walls with the casemates of defence, 9 and 12, would have required only an additional one foot thickness. The back walls of the casemates may have been a full five feet in thickness. The surface of the masonry walls was lined with 4½ inches of brick work. Every fourth course was to be headers bonded into the wall.[11] Bricks at this time were still being sent from England, but the Engineer department had found some local suppliers both in Halifax and St. John, New Brunswick. Both the walls and arch of the four casemates are lined with red brick.

Openings in Walls:

Casemate 7:

South Wall: Originally this wall was solidly constructed with no openings. By 1860, however, after having been in use for six years as an artillery side arms store, the constant problem of water leakage needed a solution. The problem was caused by the lack of adequate drainage of the rampway leading to the southwest demi-bastion. Included in the ordnance annual estimate of 1860-61, was a plan for an area wall under the ramp to run parallel to the south wall of the casemate. The creation of this area wall left an air space one foot six inches between the two walls. A drain at the base of the walls would carry off any seepage into the courtyard. As a further precaution, three ventilation shafts were to be cut through the south wall of casemate 9, allowing some circulation of air to the small passageway. These three openings were placed four feet above floor level, one at each end, and one in the middle.[12] Cast iron ventilation grates were mortared into these openings. (See figure 29) They are still in place to this day. No other openings were cut in this wall.

West Wall: There were originally four openings in this wall, all of them Calder's ventilation system. Two of the nine inch by twelve inch openings were located below floor level - two of them high up on the back wall. Open shafts in the masonry connected the bottom and top openings. All four openings were framed in granite, and had

perforated cast iron ventilating plates installed in them.[13]
North Wall: There was one opening in this wall - the fireplace. This fireplace was situated in the middle of the north wall, and almost back to back with the fireplace for casemate 8. Although Calder did not detail specifications for the fireplaces in the 1846 estimates, they were built identical to the fireplaces of the seven casemates on the right face of the northeast salient which were included in the ordnance estimates of 1844-45.[14] (See figure 27) (See "fireplaces")
East Wall: There were originally five openings in this front wall - the door, one lower window, one upper window, and two ventilation ports. (See the chapter on the retaining wall for a full description and measurement of these openings.) The two vent ports which began two feet above parade level on the outside, emerged under floor level of the casemate on the inside. (See figure 21) Each of the five openings was framed by plain chisel dressed granite work. The rest of this wall, like the other walls, was lined with brick. The one major change in the east wall of this casemate was the addition of an extra lower window sometime after 1870. This extra window was made simply by cutting out the granite north of the existing window and placing a vertical granite jamb in the middle.[15]

Casemate 8:
South Wall: There was only one opening in this wall, the central fireplace. This fireplace was placed slightly off-centre of the fireplace of casemate 7, and the flues of the two chimneys joined above the pier wall. (See paragraph on "fireplaces")
West Wall: The back wall of casemate 8 had five openings, all intended for ventilation purposes. Like the other four casemates, this wall was provided with two ventilation shafts in the rear wall, with two openings below floor level and two in the arch. These openings were framed in granite and supplied with perforated cast iron ventilation plates. The fifth opening was also a vent port, located squarely in the middle of the back wall. (See figure 28) This opening formed a narrow slit which passed through the back wall

of the casemate, out through the escarp of the flank of the southwest demi-bastion. The slit was framed in granite at both inside and outside openings, and the shaft was brick lined.[16] Why Calder felt this extra vent was necessary is not clear.

North Wall: There were no openings originally, or now.

East Wall: Like the other three casemates, number 8 had five openings through the retaining wall - a door, two windows, and two ventilation holes. An extra lower window was cut into this wall after 1870, using the same method as described for casemate 7.

Casemate 13:

South Wall: Originally this was a solid, brick-lined wall with no openings. Sometime after 1890 a doorway was cut between casemates 12 and 13.[17] The reason for this is not known. Since both casemates had become coal storage areas by 1908, there may have been some reason to provide an internal communication between them. The doorway is now bricked up.

West Wall: The back wall of this casemate was similar to that of casemate 8 - five openings, all for ventilation purposes. There were, however, some small differences. The four vent ports, two below the floor, and two in the arch, were similar to the other three casemates, but because the back wall of this casemate was for the most part, the curtain escarp, Calder evidently tried to improve the ventilation system by connecting the two shafts at the top, and burrowing a hole out through the escarp wall.[18] (See figure 30) The flow of drying air could then travel from the parade square, down under the floor, and up and out through the escarp wall into the west ditch. The fifth hole in this wall was another vent port, brick-lined, which went directly through the escarp wall. Like casemate 8, this opening was located squarely in the centre of the back wall, and was probably equipped with a small window.

North Wall: Originally there was only one opening in this wall - the fireplace. Similar in all respects to the other casemate fireplaces. (See section on "fireplaces") A second opening was cut through this

wall, a doorway to casemate 14, sometine after 1870. (See figure 31) Without documentation, it is difficult to know why this door was made. By 1891, however, casemate 13 was a barroom, and casemate 14 had become a latrine, and the reason for the door, at this point, seems obvious.[19]

East Wall: Originally this wall had five openings in it - one door, one lower window, one upper window, and two vent ports below floor level. These have been described in the chapter on the retaining wall. Like the other casemates on this front, an extra window was cut into this wall sometime after 1870. This casemate has for some time been used as a garage, and all doors and windows have disappeared to make way for a vehicular entrance.

Casemate 14:

South Wall: Originally there was only one opening in this wall - the central fireplace. This fireplace was back to back with the fireplace of casemate 13. The chimneys of the two casemates joined above the pier wall, and emerged on the western slope of the ramparts. (See "fireplaces") A second opening in this wall was made sometime after 1870 when a doorway was cut through to casemate 13. This doorway is now bricked up.

West Wall: Four openings are located in this wall - parts of Calder's floor ventilation system. Two 9 inch by 12 inch holes are below floor level, and two are in the arch. Two shafts in the masonry connect the lower and higher openings. Perforated cast iron ventilation plates were mortared into the granite framed openings.

North Wall: No openings were cut in this wall originally, or at the present time.

East Wall: The front or retaining wall of casemate 14 was constructed similarly to the other three casemates - one door, one lower window, one upper window, and two ventilation ports below floor level. Sometime after 1870 a second lower window was cut into this casemate. Unlike the other casemates on this front, this second window was quite large and extended high enough to incorporate the original upper window.[20] (See figure 13) No other alterations seem to have

been made at any time to this wall. (See section on "retaining wall" for description of original doors and windows.)

Fireplaces:

For some reason Colonel Calder did not include the fireplaces and chimneys in his estimates for the four new casemates in 1846. This may have been a copyist's error in the document at the Engineer's office, or Calder may simply have forgot. In any case, the fireplaces were built identically to the fireplaces constructed in the seven casemates in the northeast salient in 1844-45. Using the Ordnance annual estimate for 1844, and as found drawings, some information about the fireplaces can be extracted. There was a foundation laid below the chimney hearths measuring six feet by two feet and one foot two inches deep. Above this foundation, the back hearth measured four feet by one foot nine inches of solid 4 inch chiselled granite. The front hearth was also four inch chiselled granite and measured five feet by two feet. The chimney jambs measured three feet six inches by one foot nine inches, and were one foot deep. The chimney head measured six feet by one foot and was one foot long. All three pieces were of solid chiselled granite. The fire box was laid with fire brick and mortared with fire clay. The chimney openings and flues were composed of brick. A gently sloping brick arch was built above the granite chimney head.[21] The flues of the chimneys joined somewhere above the party wall and emerged on the western slope of the rampart.

Floors:

The floors of all the casemates were meant to be identical. Calder had originally planned that the casemates intended for stores be laid with brick on edge paving, but obviously changed his mind before the final estimates were submitted in 1846-47. For some reason, perhaps a copyist's error, this detail was not included in the 1846 estimates. From the documentation for the seven casemates in the northeast salient built a year earlier, and the floors of the casemates of defence built in 1847, details of the floors of the new casemates

can be established with some certainty.

Calder provided for a central dwarf wall running londitudinally to give support to the floor joists. These centre dwarf walls were one foot six inches wide by one foot deep. Three fir wall plates, each measuring six by four inches, were placed below the joists. The joists were eight inches by 2½ inches of rough pine, and placed 12 inches apart. The flooring was simply two inch planed tongue and groove filleted deal flooring. A four inch chiselled granite skirting was imbedded in the four walls just above this floor level.[22] (See figure 27)

Arches and Waterproofing:

The arches of the four casemates were laid three bricks thick and set in lime mortar. This arch began on granite skew-back abutments embedded in the pier wall. The arch, when finished, was grouted with hot lime. The arches of these casemates rose five feet in the 15 foot width.[23]

Above the arch, the dos d'ane was formed by ironstone flagging laid in mortar and pointed with Roman cement. This flagging was placed on a rubble ironstone fill which was also mortared. Brick gutters were built into the valleys between the casemates to carry the water out through the gargoyles of the retaining wall. These gutters were lined with sheets of milled lead. (See figure 45)

When Calder began experimenting with waterproofing techniques, these four new casemates were amongst the first to receive his attention. By 1848 all four casemates had been counter-flagged with granite slabs, and both ends hipped to prevent leakage where the arch joined the escarp and retaining wall. Down pipes were provided in the centre wall of casemates 7 and 13 to carry the water away when the gargoyles froze in winter. Calder was already preparing a plan for solving the waterproofing problem in 1846, and may have flagged, hipped, and piped these casemates as they were being built.[24] When the experiments with asphalting were carried out in 1851-54, this original system was simply covered with a 3/8

inch layer of asphalt as a further guarantee of waterproofing.

Openings in the Arches:

The arches were originally designed to have no openings in the vault. Three of them still do not, but casemate 14 now has a round hole in the east end of its vault. This round chimney was probably cut through the arch at the time the casemate was used as a latrine (1891). The casemate is now used as a blacksmith's shop, and the chimney is used to take care of smoke from his coal fire.

Fittings:

It is impossible at this time to account for the eccentricities of each of these casemates. For instance, the cement wall that is raised six inches from the north brick wall of casemate 14 is probably covering the bases for the brick and slate latrines which were there in 1891. An exact date for when the latrines were built or when they were covered over with cement has not been established. The steel T-bar frame at the back of casemate 14 probably held a water tank to flush the toilets and latrines, but when it was placed there, or when the tank was removed, is a mystery. When the casemate use study is completed, and when the structural histories of the Citadel for the periods after 1860 are finished, most of these problems will have been solved. Included below is a preliminary casemate use statement for the four casemates. This will give some indication of how varied were the uses, and how complex the small details of internal arrangements are to deal with.[25]

Casemate use:

Imperial Period

Casemate No.	1848	1854	1856	1891
C-7	(dry, no floor)	artillery store	artillery side arms store	R. A.
C-8	(dry, no floor)	temp. engineers' carpentry shop	qtrs: 1 sgt., 19 privates	soldiers' room

Casemate No.	1848	1854	1856	1891
C-13	(dry)	engineer timber store (temp.)	qtrs: 1 sgt., 19 NCOs and privates	barroom
C-14	stores	canteen	canteen	latrines

Canadian Period:

	1908	1922	1940	1951
C-7	R. A. stores	store	-	store
C-8	E. L. store	store	-	store
C-13	coal stores	coal stores	-	coal stores
C-14	latrines	latrines	-	latrines

End Notes

Calder's Casemates' West Front: 7, 8, 13, & 14

1. PANS, RE 31, Calder to Hewitson, 24 April 1843.

2. PAC, MG12, WO55, Vol. 878, pp. 514-22, "Estimate of alterations and renewals...", 22 May 1843.

3. PANS, RE 56, unpaginated, No. 628, Matson to Calder, 18 July 1843.

4. PAC, MG12, WO55, Vol. 880, pp. 932-4, Calder to IGF, 31 March 1846.

5. PAC, RG8, C Series, Vol. 1825, pp. 108-19, Lt. Burmester to Col. Savage, 30 November 1848.

6. See Greenough, J. J. The Halifax Citadel, 1825-60, A Narrative and Structural History, Vol. 1, "The necessity of remedying the leakage", for a general description of the application of this asphalt. Manuscript Report Series No. 154, Parks Canada, Ottawa, 1974.

7. The casemate use statement is based on "Casemate use (Preliminary)", John Johnston & Richard Young, November 1976, manuscript on file, Halifax Defence Complex Project Office.

8. PANS, RE 56, unpaginated, "Report and Estimate of Works to be carried on at the Citadel, Halifax, Nova Scotia. For the year 1846-7".

9. as found drawings, Set C, Casemates 9 and 12, Project Office, Halifax Defence Complex.

10. PANS, RE 56, unpaginated, plans to accompany the revised estimate, 1 February 1836.

11. PANS, RE 56, "Report and Estimate...for the year 1846-7"

12. PAC, RG8, C series, Vol. 1653A, p. 172, "Plan and section of Proposed Drainage of the Ramp in the Citadel in order to the Prevention of Dampness in the Artillery Store Adjoining". "Fortifications A. E. 1860-61, Item 3", November 1859.

13. PANS, RE 56, unpaginated, "Report and Estimate...for the year 1846-7". n. d.

14. PANS, RE 56, unpaginated, "Report and Estimates of Works and Repairs to be carried out in the R. E. Department...1844-45", Item 1. n.d.

15. Personal observation of masonry around window by author.

16. This vent shaft was not included in the estimates for the casemates, but was obviously constructed when the casemate was being built.

17. PAC, National Map Collection, "Halifax, N. S., The Citadel on Fort George, Block Plan", Dalton, April 1908. This plan shows casemate usage, and the door connecting the two casemates.

18. As found drawings, Set C, Casemate 13, Project Office, Halifax Defence Complex.

19. PAC, National Map Collection, "Halifax, N. S., The Citadel on Fort George, Block Plan", Hill, 21 November 1891. This plan shows the doorway connecting the two casemates, and details the casemate usage.

20. As found drawings, Set C, Casemate 14, Project Office, Halifax Defence Complex.

21. PANS, RE 56, unpaginated, "Report Estimate of Work and Repairs... 1844-45", n.d.

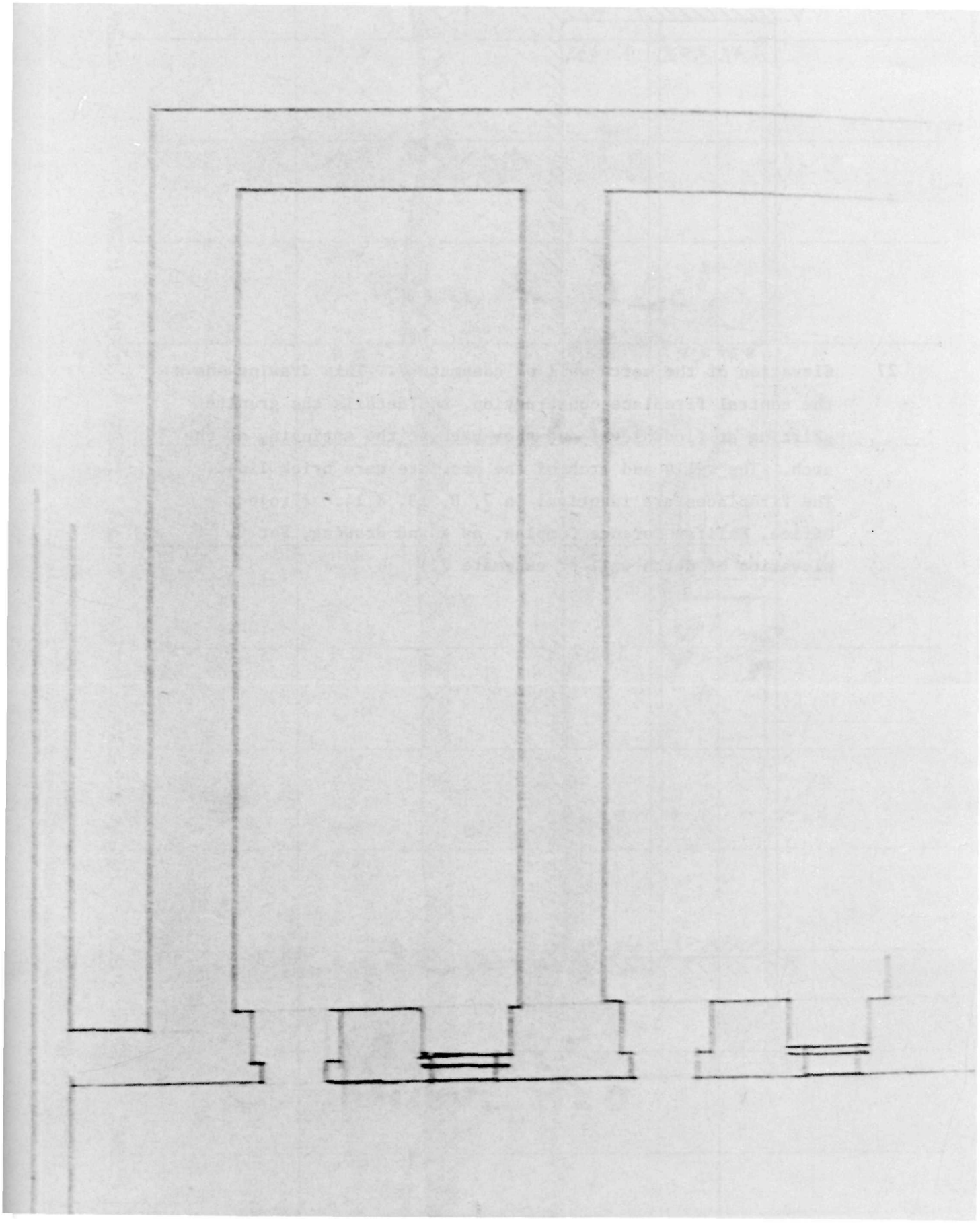
22. Ibid; and later in the same document, "Report and Estimate for Works and Repairs...1846-7", n.d.

23. Ibid.

24. PAC, RG8, C Series, Vol. 1825, pp. 108-19, report of Lt. Burmester, 30 November 1848. Burmester's report indicates that casemates 7, 8, 13, and 14 were flagged, hipped and piped.

25. This casemate use statement is derived from "Casemate use, (Preliminary)", compiled by J. Johnston and R. Young, November 1976, Manuscript on file, Project Office, Halifax Defence Complex.

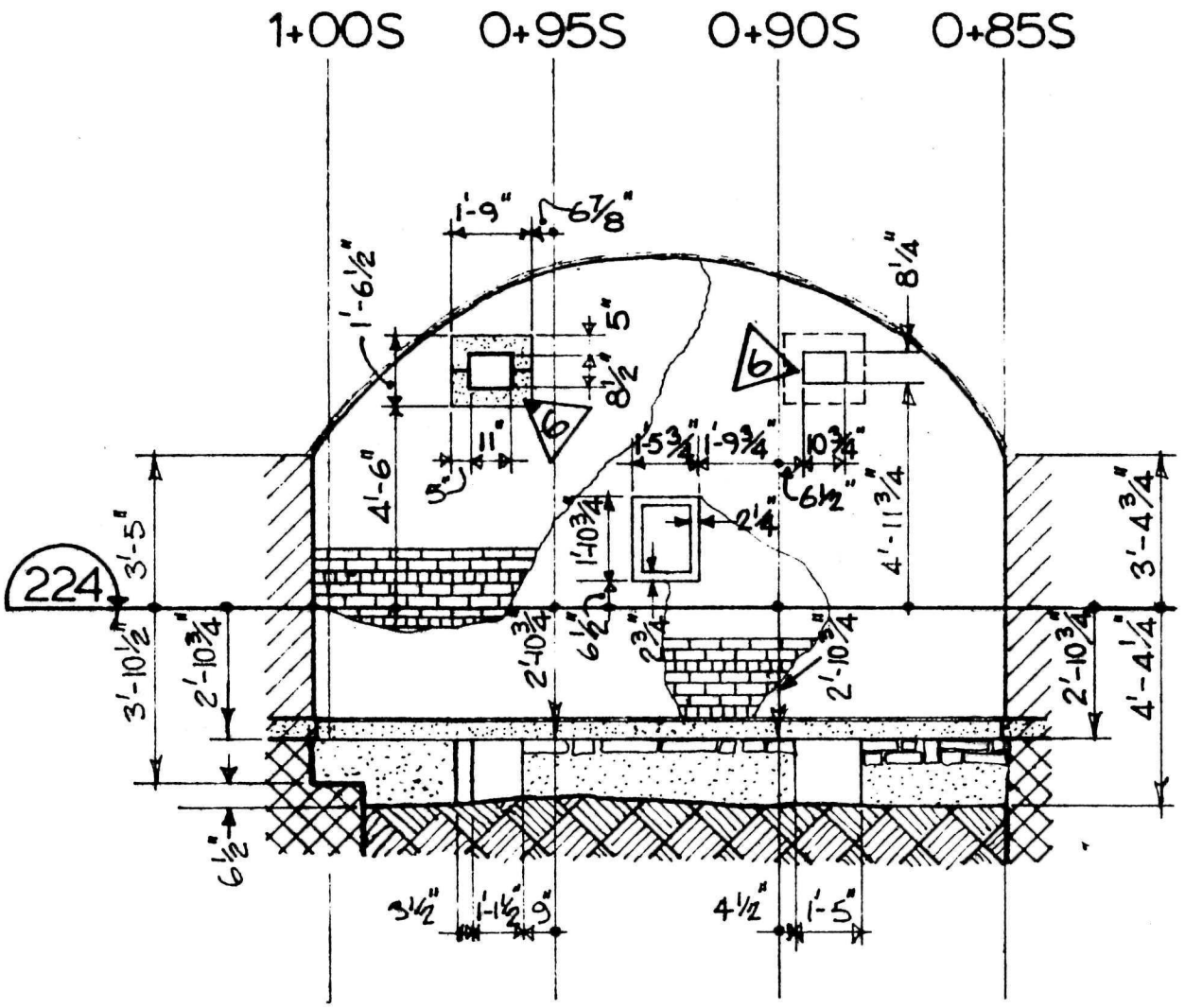
26 Photo of Calder's 1846 plan of the two casemates 7 & 8, at the south end of the retaining wall. Note that the door and window locations are different from the casemates of defence built in the same year. The south wall of casemate 7 was later altered to provide better ventilation for the artillery stores kept there. (PANS, RE 56, plan to accompany supplementary estimate, 1843. Close-up photo by author.)



27 Elevation of the north wall of casemate 7. This drawing shows the central fireplace construction, and details the granite skirting at floor level and skew-back at the springing of the arch. The walls and arch of the casemate were brick lined. The fireplaces are identical in 7, 8, 13, & 14. (Project Office, Halifax Defence Complex, as found drawing, Set C, elevation of north wall of casemate 7.)

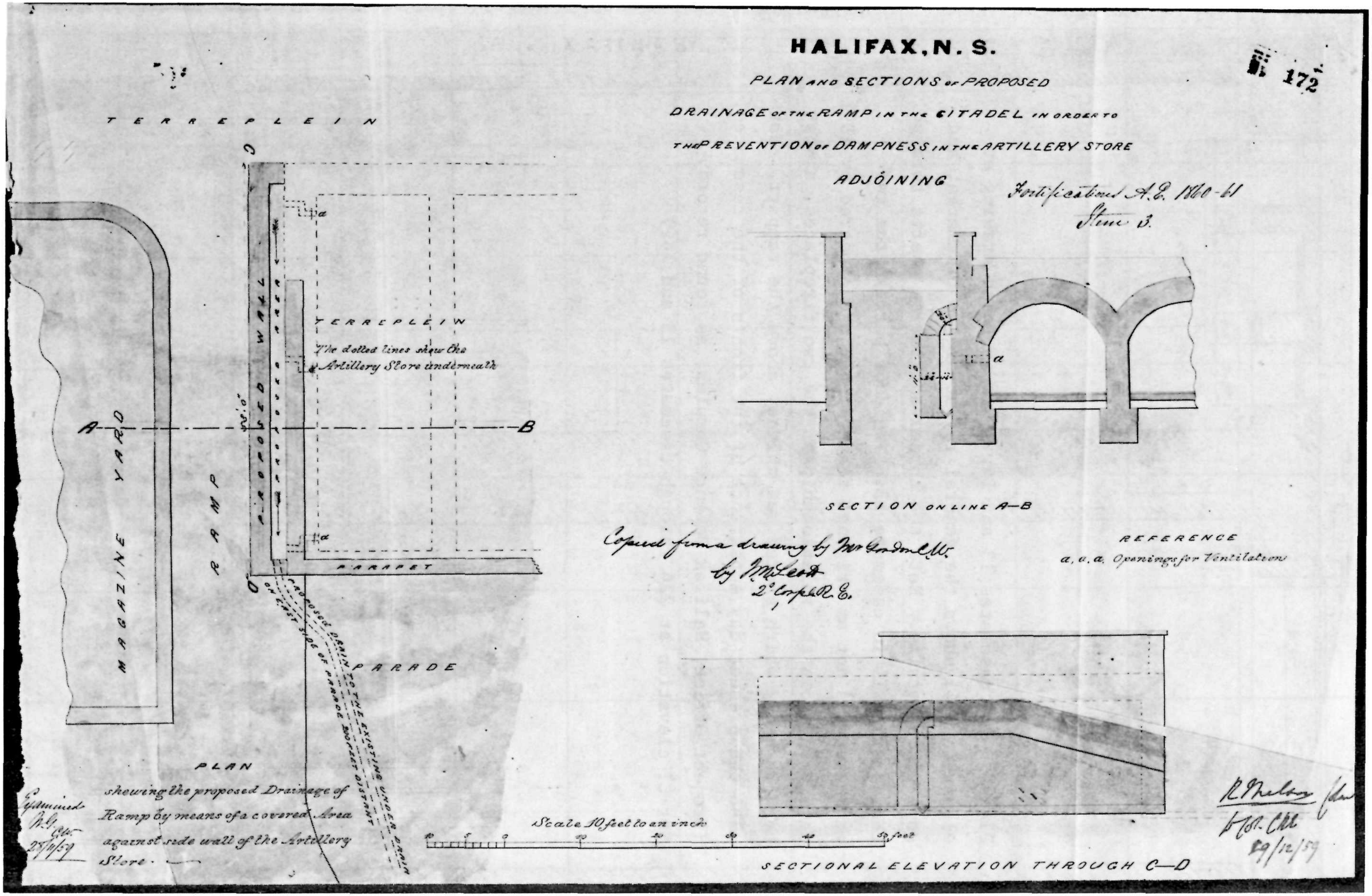
1+70W
1+65W
1+60W
1+55W
1+50W
1+45W
1+40W
1+35W
1+30W
1+25W
1+20W
1+15W
6'-4"
6'-5"
6'-4"
6'-2"
6'-2"
5'-2"
5'-11"
5'-11"
5'-2"
5'-5"
6'-7"
5'-11"
5'-7"
7'-9¼"
6"
7'-9¼"
7'-9½"
7'-9¾"
3'-5¾"
2'-9¼"
1'-8¼"
2'-9"
3'-5¾"
1'-8¼"
2'-9½"
3'-6"
2'-9¼"
3'-5¾"
3'-7¼"
7"
1½"
2'-5½"
4'-2"
1
2
3

28 Elevation of casemate 8. This drawing details arch and pier walls common to the four casemates 7, 8, 13 & 14. Note the four holes for ventilation in the back walls. Two shafts behind the brick lining allowed air to flow up from under the floor to the arch of the casemate. In this casemate a central flue through the escarp wall was created by Calder for additional ventilation. (Project Office, Halifax Defence Complex, as found record, Set C, elevation of casemate 8.)

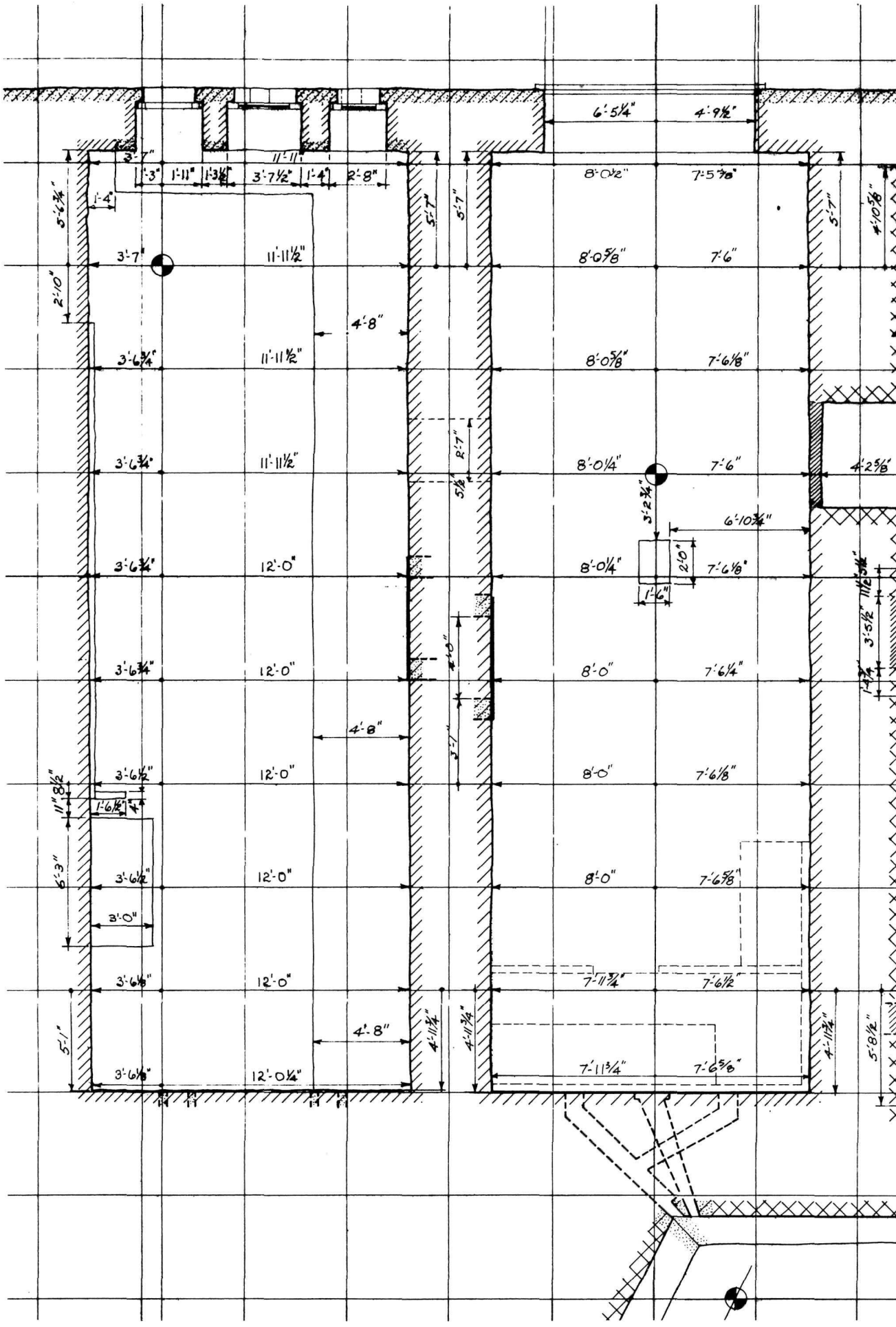


ELEV. 1+55W → 1+60W

29 Plan of attempt to provide extra ventilation for casemate 7 in 1860. The casemate was used as a store for artillery supplies, and reported constantly damp. The main problem was that there was no proper drainage of the ramp beside it. The solution proposed involved creating an area wall under the ramp, to the south of casemate 7. This area created between the two walls was provided with a drain to the courtyard. As an extra precaution, three ventilation shafts were cut through the south wall of casemate 7. These shafts were covered with perforated cast iron ventilation grates. This work was carried out in 1860. (PAC, RG8, C. Series, Vol. 1653A, p. 172, "...Plan and sections of Proposed Drainage of Ramp in the Citadel...Prevention of Dampness in the Artillery Store Adjoining", November 1859.)


HALIFAX, N. S.
PLAN AND SECTIONS OF PROPOSED
DRAINAGE OF THE RAMP IN THE CITADEL IN ORDER TO
THE PREVENTION OF DAMPNESS IN THE ARTILLERY STORE
ADJOINING
172
Fortifications A.E. 1860-61
Item 3.
TERREPLEIN
TERREPLEIN
The dotted lines shew the Artillery Store underneath
MAGAZINE YARD
RAMP
PROPOSED WALL
PARAPET
PARADE
PROPOSED DRAIN TO THE EXISTING UNDER DRAIN ON EAST SIDE OF PARADE 80 FEET DISTANT
A
B
C
D
a
SECTION ON LINE A—B
REFERENCE
a, a, a, Openings for Ventilation
Copied from a drawing by Mr Gordon C.W.
by J. McLeod
2d Corpl R.E.
PLAN
showing the proposed Drainage of Ramp by means of a covered Area against side wall of the Artillery Store.
Examined
Scale 10 feet to an inch
10 5 0 10 20 30 40 50 feet
SECTIONAL ELEVATION THROUGH C—D
29/12/59

30 Plan for the casemates 13 and 14. This as found drawing at elevation 224, shows the general layout of the casemates, and some minor details. Note the three ventilation shafts through the escarp wall in casemate 13. The door between the two casemates was not an original feature, but had appeared by 1891. This plan shows the relationship of the two fireplaces, almost back to back, which shared one chimney above the rampart. Note also the present day appearance of the fronts of the casemates. (Project Office, Halifax Defence Complex, as found record, Set C, elevation at 224 through casemates 13 and 14.)


6'-5¼"
4'-9½"
11'-11"
3'-7"
1'-3"
1'-11"
1'-3⅛"
3'-7½"
1'-4"
2'-8"
8'-0½"
7'-5⅞"
5'-6¾"
5'-7"
4'-10⅝"
1'-4"
3'-7"
11'-11½"
8'-0⅝"
7'-6"
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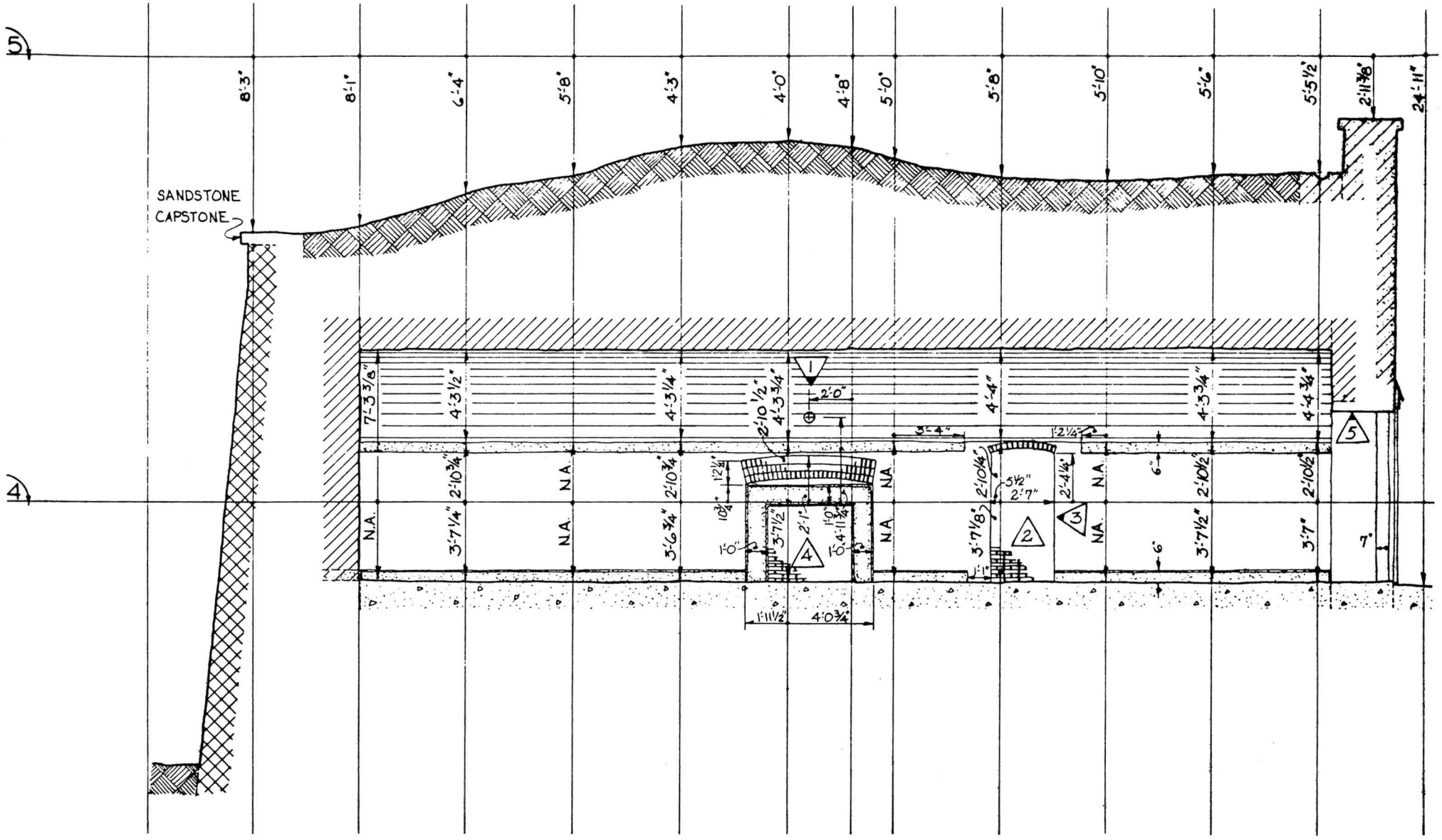
7'-6½"
5'-1"
4'-11¾"
4'-8"
4'-11¾"
4'-11¾"
3'-6⅛"
12'-0¼"
7'-11¾"
7'-6⅝"
5'-8½"

31 Elevation of the North wall of casemate 13. The elevation shows the location and measurements of the fireplace. The door to the right of the fireplace was not an original feature. By 1891, this door was providing the soldiers with a communication between the barroom (casemate 13) and a new latrine (casemate 14). Both fireplace and door opening have been bricked up flush with the wall face.



SECTION ℄ → 2+45N

Privies West Front

Narrative

Colonel Nicolls had given no indication in his 1825 plans, nor made provision in his general estimates, for the construction of privies or drainage at the Citadel. When, in 1832, Colonel Boteler criticized the original plans for this omission, Nicolls could safely argue from Quebec, that privies and a main drain were, of course, intended, and would have been brought forward in due time.[1] It was yet another instance of the inadequacy of the general estimate and the lack of specific detailing in the plans, which eventually led to the enormous increase in the cost of the project. Nicolls probably intended to place privies in the north and south cavaliers, and to have a main drain constructed out through the eastern front.

Both Colonel Boteler and Captain Peake included estimates for privies in their proposals for the completion of the Citadel. Boteler seems to have concerned himself with only the officers' privy - a proposal to build a new casemate 15 feet by 10 feet to serve the officers' needs.[2] Captain Peake, on the other hand, left out any proposal for an officers' privy, and in item 13 of his estimate, asked for £150 to build a privy for the men.[3] Although some details of Peake's and Boteler's proposals did find their way into Colonel Jones' plans, none of the eight general estimates provided by the two Royal Engineers were accepted in London. Colonel Rice Jones arrived in Halifax in 1834, with instructions to submit a comprehensive, detailed plan and estimate for the completion of the Citadel.

Although Colonel Jones included a proposal for a men's privy in item 4 of his revised estimates of 1836, he was maddeningly frugal with the details. Jones thought the privy should go in the west front, near the cavalier, but did not specify exactly where. The estimate

provided for only one privy measuring 19 by 20 feet.[4] Jones' revised estimate was finally approved in March 1838, and work at the Citadel resumed the following year on a much larger scale.[5]

Temporary privies on the hill were provided during the whole construction period, until 1840, but their location has not been identified. In the excavation for the west curtain wall museum, a small ironstone pier wall was unearthed behind the present casemate 54.[6] It seems possible that this may have been one of the walls of the temporary privies. The octagonal blockhouse which dates from the American Revolutionary war period (1775-1783), was located on the present west curtain wall area, but this small pier wall is much too deep to possibly have been the foundation for this structure. The second possibility is the underground magazines which date from the period of the third Citadel 1796-1828. The problem here is that the underground magazines were located in the two western bastions, which were approximately in the same position as the present day demi-bastions. Some sort of temporary privy system was provided until 1840, possibly behind casemate 54. Archaeology may be able to determine this.

The temporary privies, wherever they were located, were producing some nuisance, because Colonel Jones received a complaint from the commanding officer in Halifax, Colonel Snodgrass, in early 1840. The complaints must have come from the regular troops requisitioned from the regiments stationed in Halifax to work in the Citadel. Jones reported back to Colonel Snodgrass in July of 1840, that "the permanent privies for the Soldiers Barracks in the Citadel are in the course of erection and shall be completed as soon as possible...".[7] Jones here uses the plural "privies", though he provided for only one privy in his general estimate. By the time he began to construct the privies, Jones may have been planning to build two. These must have been the two that were located on either side of sallyport 4, C-54 and C-55.

Whether both privies were constructed in 1840 is still open to question. In May 1844, Colonel Calder had entered in the engineer's book official comments on a progress report for 1843 which he had sent

to London early in the year. The comments on the letter were, "I have compared the drawing of the soldiers privy with the original in the Estimate for 1842-3, and notice a difference worth pointing out".[8] Two plans were obviously prepared for the London office, one for the ordnance annual estimate for 1843, the other included in the progress report submitted by Calder in January 1844. Two possibilities exist. Either Jones built both privies in 1840, and submitted the estimates and plan, after the fact, in 1842, or Jones built one casemated privy in 1840, and then submitted an estimate for the second one in 1842-43. Calder may then have prepared a second plan of the new privy, to be sent with his progress report of 1843. In any case, both privies were completed by 1843.

The next mention of the privies in the Engineers' correspondence was in 1848. In that year, soldiers first occupied the casemate barracks of the Citadel, and began using the privies. There must have been some kind of complaint because on the 6th of November, Colonel Savage wrote to the Commander in Chief's Military Secretary, Captain Bourke, that orders had been given to improve the ventilation of the privies.[9] What was involved in this renovation is not described. It may have been the provision of an extra window, but more likely was the cutting of two ventilation ports, one in each privy, through to sallyport 4. These vent ports are located to the west of each of the doors that led into the privies.[10] Each was provided with perforated cast iron ventilation grates, similar to the system used to ventilate under the floor of the casemates built by Calder.

The original means of emptying the soil pit under the privies was by flushing them into the main drain which ran under the ditch of the west and north front, and eventually out of the salient in front of the redan. (See figure 32) At some point after emerging in front of the redan, the drain connected to the main city drain on Buckingham Street, which flowed into the harbour near the ordnance wharf. It seems that the soil pits were flushed once a month and the foul nuisance this business created in the Ordnance Yard neighbourhood caused such an outcry that the city authorities ordered the officers to discontinue

the practice.[11] Thereafter, until 1856, the night soil was collected by a civilian contractor, loaded into carts, and hauled across the parade square, out through the main arch of the Citadel, and thence through the city streets to some dumping point in the harbour. Complaints about this method were frequent, both from the soldiers at the fort, and from the inhabitants of the streets through which passed the contractor, with the horse and its fragrant burden.[12]

By December 1854, the complaints became acute enough to have Colonel Stotherd, the CRE, order one of his officers, Captain Grain, to make an investigation. Grain concluded that the pits were stinking so badly because they were not frequently emptied. To avoid the complaints about the horse and cart method, Grain suggested that a cess pit be dug in the west ditch, with a drain leading down the sally-port, and an overflow drain constructed to meet with the existing drain in the north ditch of the west ravelin. The proposal would cost £30 - for constructing a 12 inch brick drain and a 20 foot deep, 6 feet in diameter cess pit.[13] This work was begun in the spring of 1855, and finished during the summer. (See figures 33 and 34)

Very soon after completion of this project, it became obvious that it would be quite inadequate. The 20 foot cess pit had been dug into a solid stiff clay, which seemed to predominate on the western side of the Citadel, and absorbed nothing of the fluid matter. The drains were constructed too shallow, and were affected by frost. Stotherd could see only one solution - the construction of three cess pits on the glacis, with deeper drains, and renovations to the privies to allow a freer flow of material. He considered the matter troublesome and urgent enough to go ahead with approval of the local commander of the forces but without waiting for approval from London.

In 1856, Colonel Stotherd submitted a plan, estimate, and description of the work he had done. (See figure 35) The first item was the alteration of the soil pits of the privies. Three sides were sloped in each privy and bottoms were sloped to allow the flow of material to the sallyport drain. (See figure 36) Two sluices were provided, one in the sallyport and one outside C-54, to allow easier

flushing procedures. The drain west of the 1855 cess pit was deepened, and finally, three cess pits were constructed on the west glacis, about 100 feet from the salient of the west ravelin.[14] This work seemed to put an end to the 13 years of complaints about the privies. In 1862, the system was again connected to the city sewers.

Many alterations have been made to these privies in the course of the last century. None of them have yet been documented. By 1891, two casemates (9 and 14) had become latrines. By this time it appears that the two original privies had been converted to simple urinals. The soil pits underneath, and the outside extension of C-54, were filled in and given a concrete floor. The fluid from the urinals was drained away to the main citadel system by means of a 4 inch tile drain. Access to the privies was also changed by this time. A door was cut through the north wall of demi-casemate 41 to provide access to C-54. The north door of C-54 was at this time blocked up.[15] (See figure 37) The original partition of C-55, with NCOs on one side, and women on the north side, was altered later. The north window was converted to a door, and the original door was filled up to make a window.[16] At some point these latrines were abandoned in favour of more modern ones.

In 1976, excavation of the floor of the north privy, C-55, by an archaeologist took place. Underneath a 2 foot section of cement and a 4 foot depth of mortared rubble, the 1856 sloped walls of the soil pit were found. At the south end, in front of the door, a brick hollow pillar with a tooled sandstone cap was found. A tile drain pipe led from this brick pit out to sallyport 4. This feature must have been installed when the privies were converted to urinals, and the soil pits filled in, probably by 1891. It was not possible to excavate C-54 because it is filled solid with mortared rubble, dating from the 1950's when the retaining wall and demi-casemates were reconstructed using a bin wall method.

The outside cess pit, with steps leading to the bottom of it, was uncovered by the archaeologist in 1976. The underground passage to the soil pit under C-54 was blocked by ashlar masonry, probably at the time the soil pits were filled in with rubble. (See figure 38)

Trenches in sallyport 4 failed to find the brick drain leading to the cess pit. (See figure 34) But between the doors of C-54 and C-55 in the sallyport, the beginning of an ironstone drain in a V-shape was unearthed

Structural Analysis

Foundations:

Little is known about the foundations of the privies below the soil pits. The width of the retaining wall section was three feet six inches, but the depth is unknown. The foundations were constructed of rubble ironstone laid in horizontal beds. If the foundation below the other casemates of this front are used as an example (10 feet), the depth of the masonry below the soil pit is probably four feet. (See figure 36) This would make the depth of the foundations of the casemates and soil pits equal.

Soil Pits:

The soil pits measured 19 by 15 feet (C-54) and 15 by 15 feet (C-55). The original depth of the pits is unknown, but it was probably six feet, the depth they are now. They were originally constructed with vertical ironstone walls. The floor was either a simple earth floor, or may have been covered with slates of ironstone. In 1856, when the system of drainage built by Stotherd in 1855 proved inadequate, the once vertical walls of the soil pits were sloped to facilitate the flushing of the mass of night soil. The three walls of the soil pits were built up with rubble masonry and the slope covered with slates of ironstone.[17] (See figure 36) The night soil was helped to the sallyport drain by force of gravity. Sometime before 1891 these soil pits were filled with rubble masonry, and covered with a layer of concrete.

Openings in Soil Pit Walls:

C-55: There was only one opening in this pit, located in the south wall, leading to the sallyport drain. This opening measured, in 1856, four feet high by two feet wide.[18] (See figures 36 and 35) This hole was bricked up in 1891.

C-54: There were originally two openings in this soil pit, one through the north wall to the sallyport, and one on the east or retaining wall. The opening which allowed the night soil to flow to the sallyport drain was similar to C-55 - an arched opening two feet wide and approximately four feet high. (See figure 35 and 36) The opening in the east wall, which led to the cess pit in the parade square behind the cavalier, measured three feet by five feet - enough to allow a man to enter.[19] This opening was blocked with ironstone ashlar masonry sometime before 1891. (See figure 38)

Outside Soil Pit C-54:

This pit which measured 10 feet by 4 feet wide, by six feet deep, was originally connected to the main drain, Later when a contract was let for cleaning the pits, steps were constructed in the northern end of it to allow men, presumeably equipped with buckets, to step down to the soil pits, enter and empty them. The three walls of this pit were constructed of ironstone. The pit seems to have been a combination ash pit and soil pit. Ashes and straw were thrown into it to keep the odor contained. The pit was probably covered with a wooden top which could be lifted when throwing ashes in, or removing the night soil. (See figure 38) After the conversion of the soil pits in 1856, this pit may have served as some kind of sluice. The flushing water was poured into this outside pit to speed the sewer to the cess pits in the west front.[20] The pit was uncovered by an archaeologist in 1976 and, although the area was greatly disturbed with modern drains and backfill, the basic structure was found three feet below the parade level, including three of the original steps.

Pier Walls of the Privies:

All four of these were party walls shared with other structures. The north wall of C-55 shared a wall with casemate 11, the south wall with the pier of sallyport 4. In C-54 the north pier wall was shared with sallyport 4, the south wall with demi-casemate 41. The walls were constructed of ironstone rubble masonry, which almost approached ashlar in its regularity.

Openings in the Pier Walls:

C-54: South Wall: Originally this was a solid ironstone wall with no openings. Some time before 1891, when the privy was converted to a urinal, a door was constructed in this wall, measurements unknown, through to demi-casemate 41. (See figure 37) Since demi-casemate 41 was also a urinal, the reasons for an entranceway here was obvious.[21] The door from sallyport 4 may have been filled in at this time.
North Wall: Originally there was only one opening in this wall - the entrance to the privy from sallyport 4. This opening measured six feet six inches by two feet ten inches wide. (See figure 41) The doorstep, door jambs, and head of the doorway were framed in granite. There is no documentation available on what kind of door was placed here. If the door was constructed like the doors of the casemates, on the west front, it would have been fir, sheeted in front, with a herring boned back, and held in place with cast iron T-straps. A second hole was cut through this wall, a nine by twelve inch ventilation hole, provided with a perforated iron grate in response to a complaint in 1848, that the privies were not properly vented.[22] The hole carried through the wall directly to sallyport 4.
C-55: South Wall: Originally there was but one opening in this wall, the doorway to sallyport 4. It resembled in every way the door in C-54, six feet six inches high and two feet ten inches wide, framed in granite. A second opening in this wall, a ventilation port to the sallyport, was probably cut through the wall in 1848. It had cast iron ventilating grates embedded at either end of the shaft.
North Wall: No openings in this ironstone wall at any time.

Front and Back Walls - Privies:

C-54: Back Wall: A solid ironstone wall, with no openings. The arch rose three feet in the 19 foot length.
Front Wall: An ironstone wall, faced on the outside with granite ashlar. This wall formed part of the retaining wall. The three original window openings in this wall are now completely blocked. (See figure 13) This may have been done in the 1950s when the central

portion of the retaining wall was rebuilt, and the privy filled with rubble mortar. The three window locations and dimensions are given in the chapter on the retaining wall.

C-55: Back Wall: This solid ironstone wall, with no openings, is now a common wall with the lamp passage to the shell store, built sometime after 1870.

Front Wall: This wall formed part of the west curtain retaining wall. It was three feet thick, faced with granite ashlar on the outside. The opening for doors and windows were framed in granite, simply dressed. The door and window arrangements have been much altered. (See chapter on the retaining wall for a fuller description of the openings). (See figure 13)

Floors of the Privies:

The original specifications for the two privies have not been located, yet. The alteration of the soil pits in 1856 did not involve the rebuilding of the floors. The plan that accompanied the estimates for the renewals, however, did detail some of the floor. The joists ran east to west, and numbered 14 in C-54, and 10 in C-55. The archaeological investigation in 1976 located the seats of the joists at the base of the north wall in C-55 and the footing on the east wall.[23] The flooring was not described in the 1856 plan. The floors were probably planked with two inch deal fir flooring, like the casemates of the west front.

Partitions and Seating Arrangements:

C-54: The original seating arrangement in this privy, based on the 1847 ground plan of the Citadel, was along the east and west walls. (See figure 32) Sometime before 1856, however, the wooden toilet seats were moved to the centre of the privy, and the soldiers sat back to back, facing either the front or rear walls of the casemate.[24] (See figure 35 and 36) These floors and seating arrangements disappeared sometime before 1891, when the privy was converted to a simple urinal. (See figure 37)

C-55: The original seating arrangements which seemed to survive the

1856 pit alterations, were different in the two sections of the privy. A partition was placed in the centre of the casemate, running east to west. In the south side, the NCOs sat along the west wall. On the north side of the casemate, the women and children sat along the west wall and along the north wall. The women and children entered by means of a central door, just north of the wooden partition.[25] Whether the partition carried up to the crown of the arch is uncertain.

Arches and Above:

The arches of the privies were composed of brick, probably three feet thick. The bricks were laid alternating headers and stretchers. In C-55 the original vault is still intact, though separated badly from the retaining wall. The joint between the arch and retaining wall in C-54 was destroyed when the retaining wall and demi-casemates were reconstructed in the 1950s.

Above the arch, rubble masonry was used to form the dos d'anes, and duchess slates, laid in cement, were used as waterproofing. When the asphalt was applied to the Citadel casemates after 1851, the privies were probably covered at that time. The water from the valleys of the privy arches passed out through the retaining wall gargoyles.

End Notes

Privies West Front

1. PAC, MG12, WO44, Vol. 227, pp 232-7, "Observations on Lt. Col. Boteler's letter dated...12 February 1832," Nicolls, 21 July 1832.

2. PAC, MG12, WO44, Vol. 227, pp. 287-309, "Colonel Boteler's Estimate No. 1, Item 3", signed by Peake, 12 June 1833.

3. PAC, MG12, WO44, Vol. 227, pp. 339-56, Item 13, Peake's 1st Estimate, 12 June 1833.

4. PAC, MG12, WO55, Vol. 873, pp. 703-26, revised estimate, item 4, 1 February 1836.

5. PANS, RE 25, unpaginated, No. 436, Fanshawe to Jones, 4 April 1838.

6. As found drawings, Set C, elevation through the curtain wall, Project Office, Halifax Defence Complex.

7. PANS, RE 41, pp. 42-3, Jones to Lt. Col. Snodgrass, 3 July 1840.

8. PANS, RE 56, unpaginated, "Examination of Nova Scotia Progress report to 31st December 1843", initialed by S.H.H. and SBN, 16 March 1844, and signed by Calder 1st May 1844.

9. PANS, RE 41, p. 335, Savage to Capt. Bourke, A. Mil. Sect'y, 6 November 1848.

10. As found drawing, Set C, Section through Sallyport 4, Project Office, Halifax Defence Complex.

11. PANS, RE 43, pp. 218-223, "Observations on Dr. Bell's report, 29 June 1855 on the Sanitary Conditions of barracks", Stotherd to Respective Officers, 3 July 1855.

12. Ibid.

13. PANS, RE 38, unpaginated, Captain Grain to Col. Stotherd, 1 December 1854.

14. PAC, MG12, WO55, Vol. 887, fol. 659, "Plan and Sections showing the work described in improving the soil pits at the Soldiers Privies", Stotherd, 1 January 1856.

15. PAC, National Map Collection, "Halifax, N. S., The Citadel on Fort George, Block Plan", Hill, 21 November 1891.

16. As found drawing, Set C, elevation through C-55, Project Office, Halifax Defence Complex.

17. PAC, MG12, WO55, Vol. 887, fol. 659, "Plan...improving the Soil Pits...", Stotherd, 1 January 1856.

18. Ibid.

19. Ibid.

20. Ibid.

21. PAC, National Map Collection, 1891 Block Plan of Citadel, op. cit.

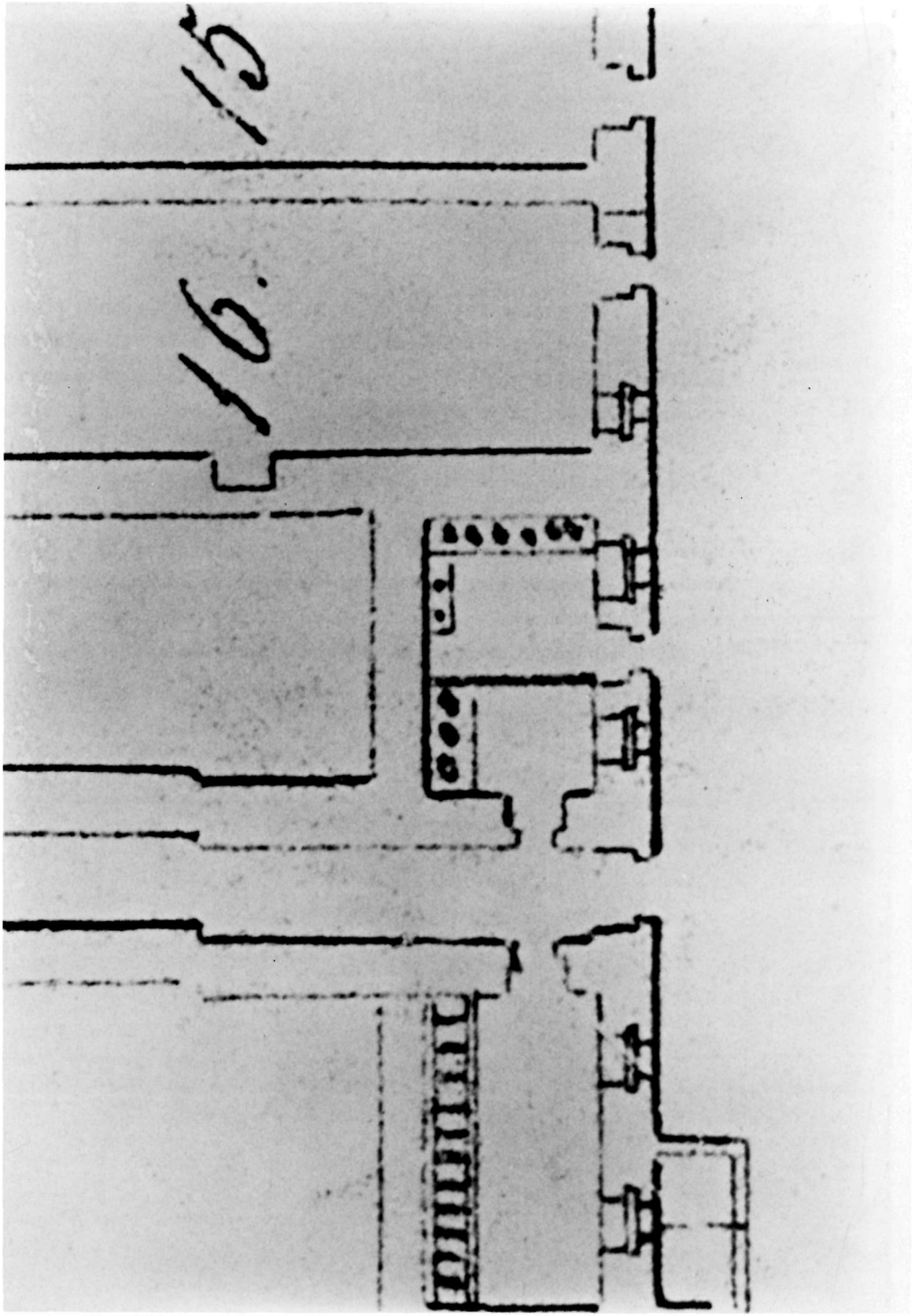
22. PANS, RE 41, p. 335, Savage to Capt. Bourke.

23. PAC, MG12, WO55, Vol. 887, fol. 659, "Plan ...for improving the Soil Pits...", Stotherd, 1 January 1856.

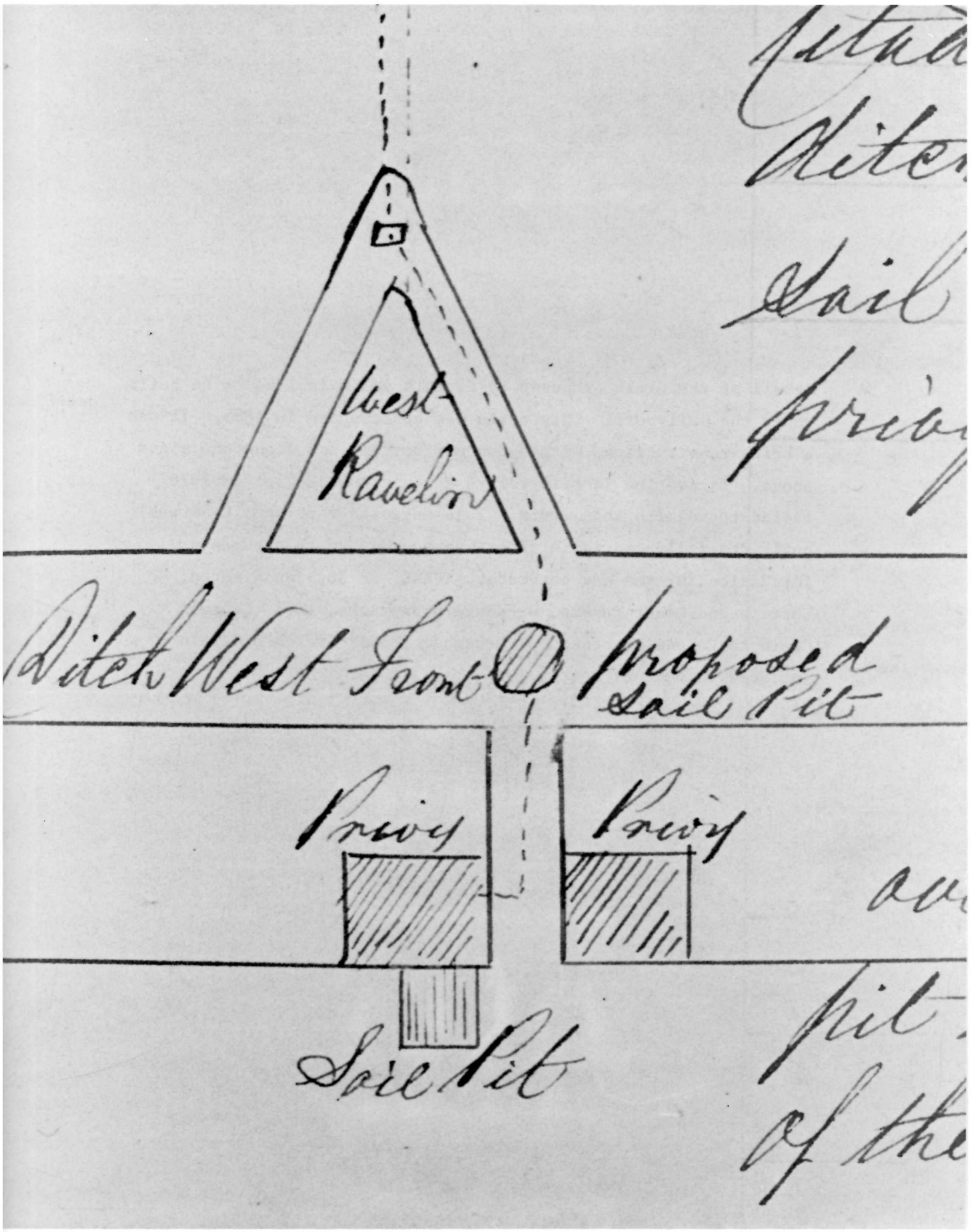
24. Ibid.

25. Ibid.

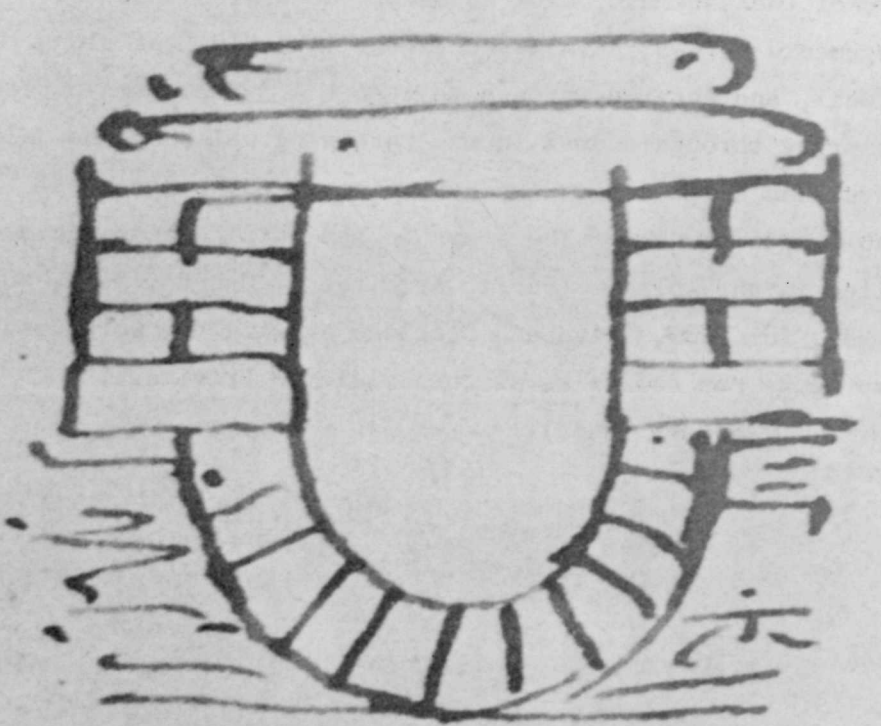
32 1849 plan of the privies. This plan provides a pre-1856 illustration of the privies and seating arrangements. Note that in the soldiers' privy (C-54), the soldiers sat along the back wall of the casemate. The extension to C-54, outside the retaining wall was the means of emptying the soil pits. The wooden covers to this cess pit were removed, and the night soil carried to carts. Steps on the north side of the pit allowed men to enter under C-54 to finish their work. (PAC, MG12, WO55, Vol. 883, fol. 856, "Ground Plan, Fort George on the Citadel...", Savage, 30 April 1849. This plan accompanied Colonel Savage's proposals for staunching the casemates at the Citadel.


15
16.

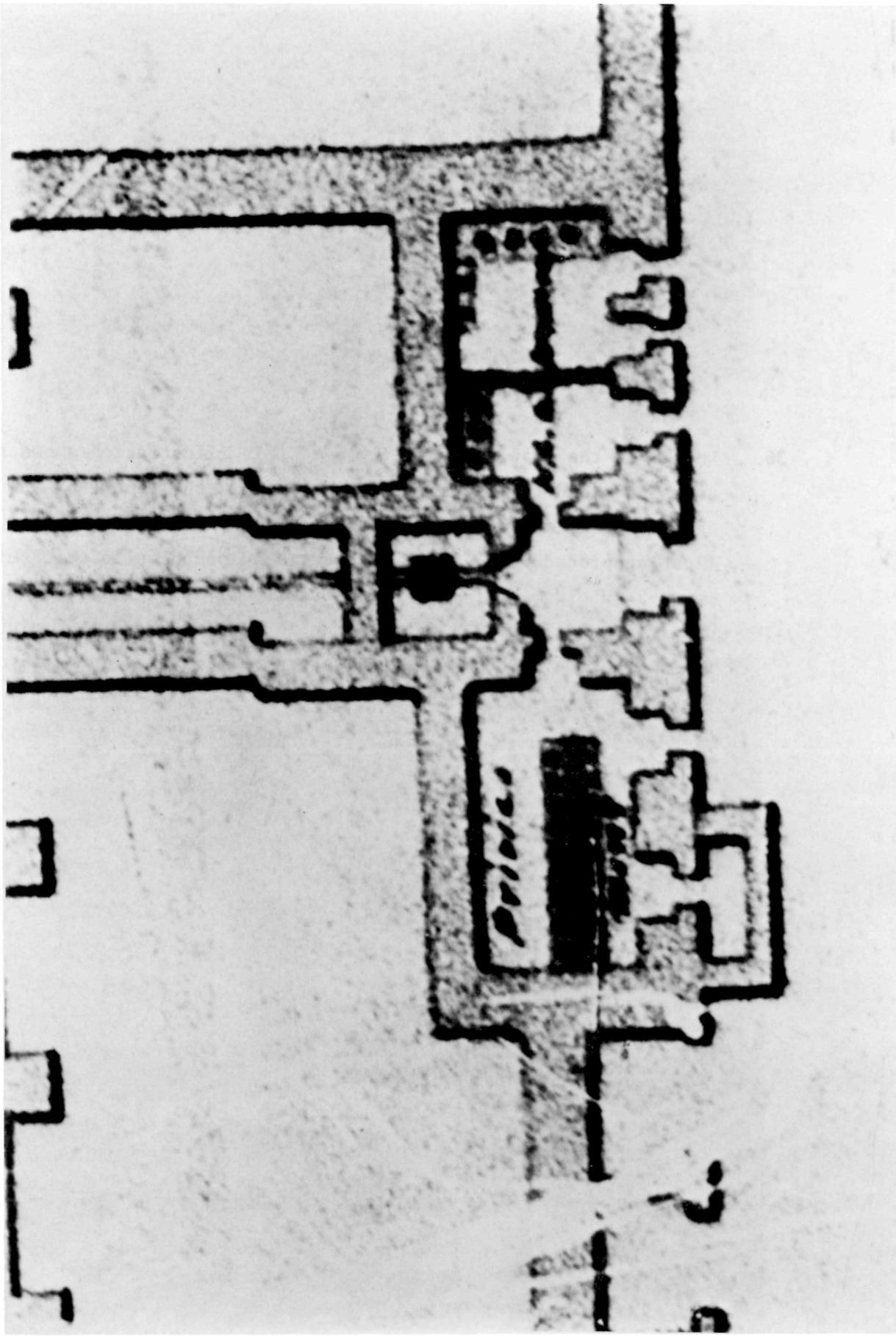
33 Stotherd's 1854 plan for the solution of the privy stench problem. Until 1855, the soil pits were emptied by the soil pit outside the soldiers' privy (C-54). The horse and cart method proved such a nuisance that Stotherd proposed to dig a 20 foot cess pit in the west ditch. Any overflow would be directed down Colonel Nicolls' old drain in the north ditch of the west ravelin. Unfortunately, the earth in the west ditch proved to be a very solid clay which refused to absorb any of the fluid matter. Later in 1855, Stotherd renovated the soil pits of the privies, and provided a deeper drain and cess pits on the western slope of the glacis. (PANS, RE 43, p. 92, Stotherd to Respective Officers, 2 December 1854. Sketch in text of letter.)


West
Ravelin
Ditch
West
Face
Proposed
Sall Pit
Privy
Privy
Sale Pit

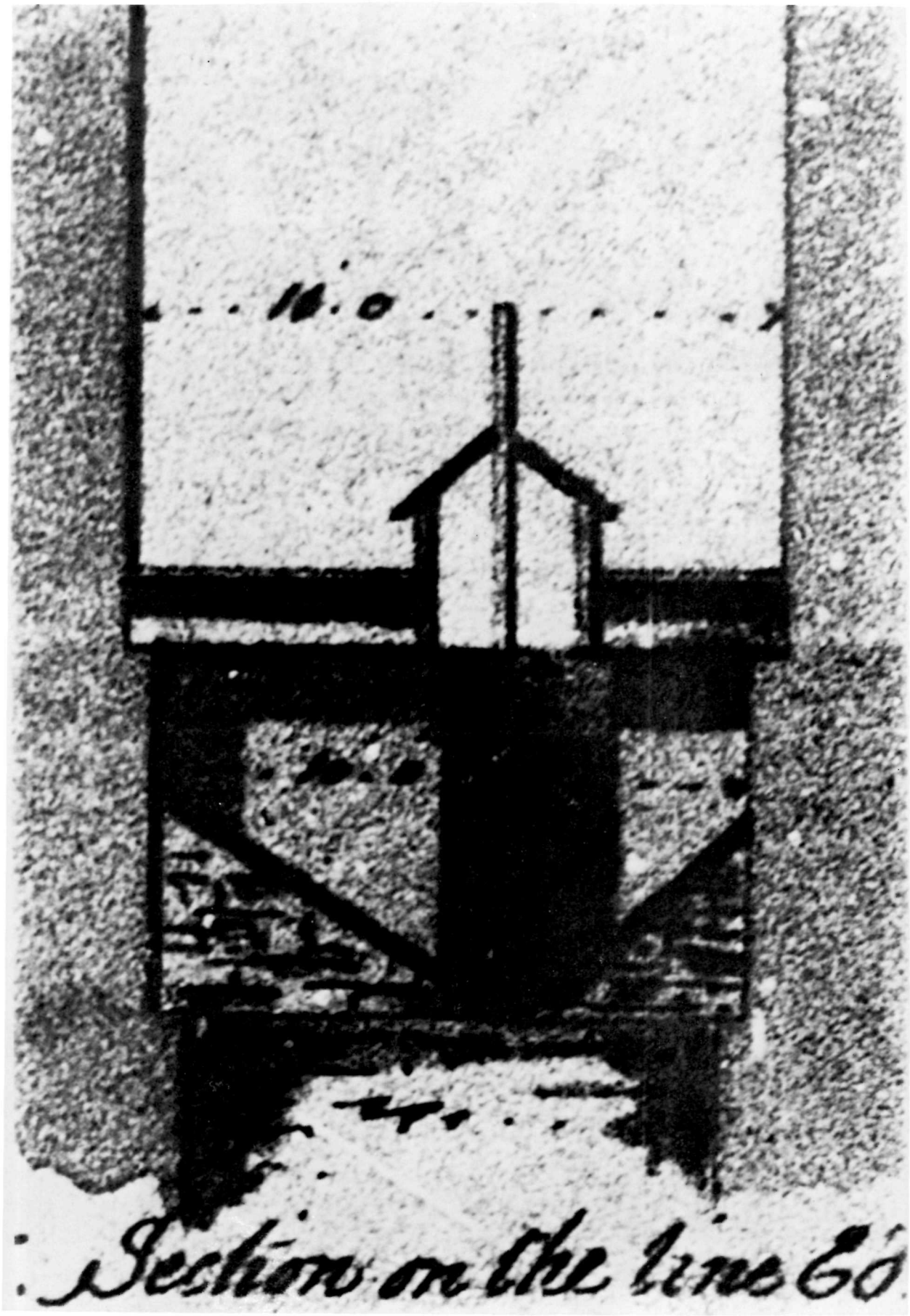
34 Detail of the drain proposed by Captain Grain in 1854 to be built under the sallyport. This drain was constructed in 1855. It was a brick construction, with a concave bottom, and ironstone slabs above. Excavation in sallyport 4 by an archaeologist in 1976 failed to unearth this drain. This suggests that when C-56 was built the sallyport earth floor was dug deeper to provide a foundation for the new casemate. (PANS, RE 38, unpaginated, Letters and Other Papers, Ordnance & Barracks, 1854, Captain Grain to Colonel Stotherd, 1 December 1854. Sketch of drain included in text of letter.)



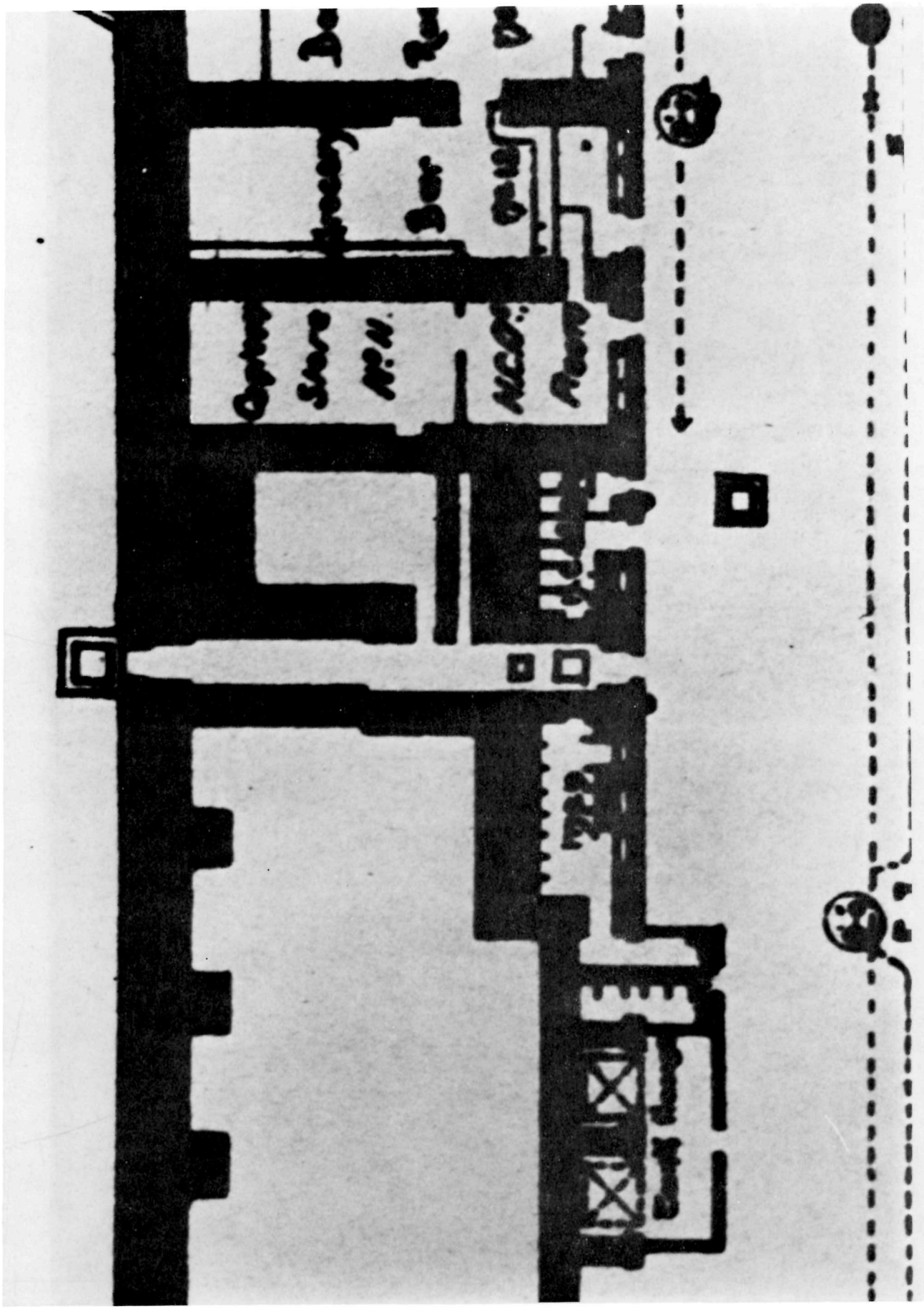
35 Floor plan of the privies after the 1856 renovation. Note that the seating arrangements in the soldiers' privy are now in the centre of the casemate, back to back. Note also that the arrangements in C-55 have not changed. The NCOs sat along the west wall, and entered through sallyport 4. The women entered their privy through a door in the retaining wall, and sat along the west and north wall. The partition in the centre was probably made of wood. The steps to the outside cess pit are detailed in this plan. (Public Archives of Canada, MG12, WO55, Vol. 887, fol. 659, "Plan and Sections showing the work described in improving the soil pits at the Soldiers' Privies...", Stotherd, 1 January 1856.)



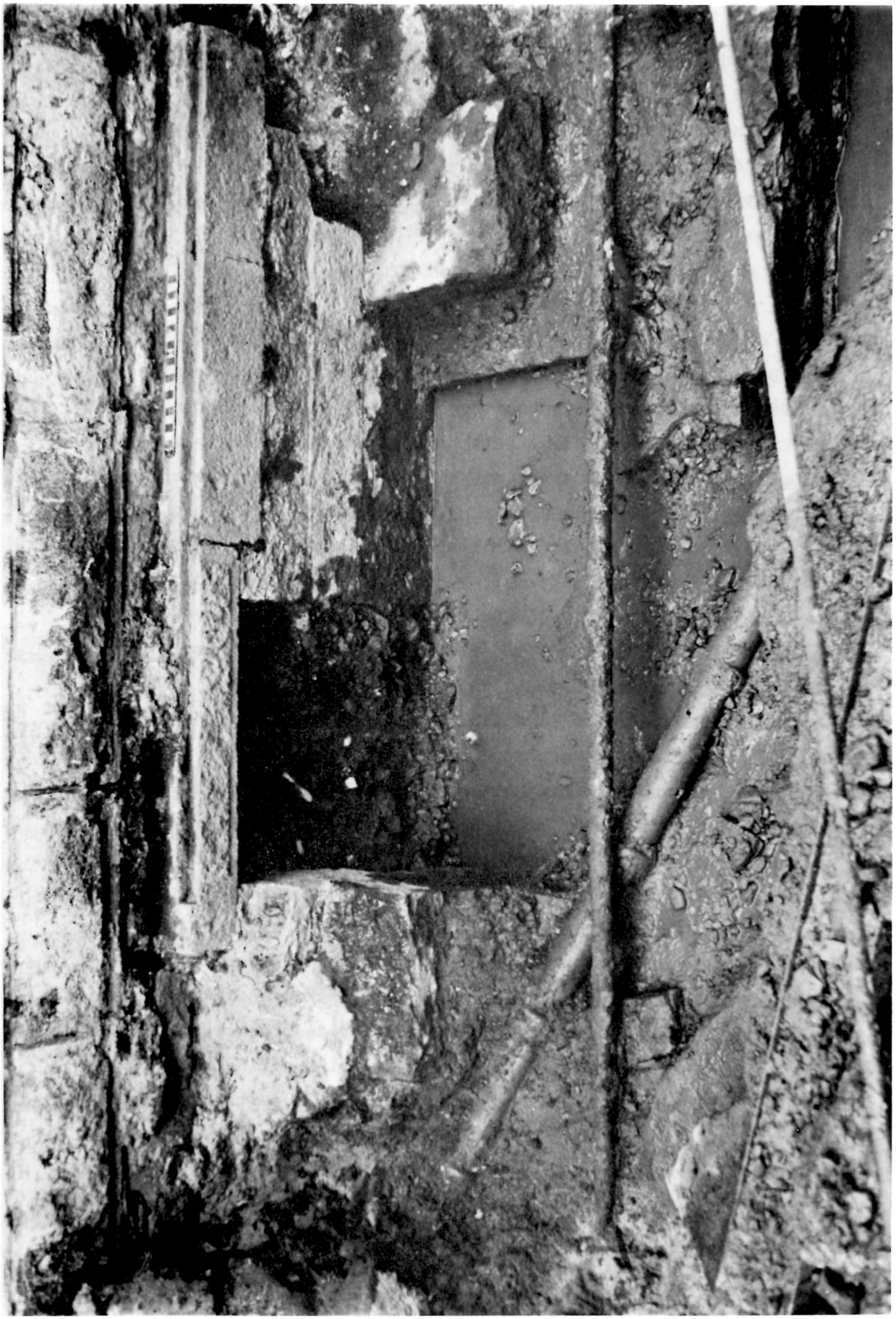
36 Detail of the 1856 plan of privies. This illustration shows the seats provided for the soldiers in C-54, in the centre of the casemate. Note also the method used in the soil pits to help the flushing procedures. The east, west, and south walls were built up with rubble masonry, and covered with ironstone slabs. This provided the night soil with an inclination towards the drain in sallyport 4. Both soil pits were sloped in this manner. (Public Archives of Canada, MG12, WO55, Vol. 887, fol. 659, "Plan...at the Soldiers' Privy...", Stotherd, 1 January 1856.)


Section on the line 60

37 The privies in 1891. By this time both privies were simply latrines. Note the new door from demi-casemate 41 into the soldiers' privy, C-54. By 1891, the old door to sallyport 4 was filled in. Also by this time, the soil pits were filled in, and covered with a concrete floor. In C-55, the entrance to the sallyport was closed, and a new door cut through the retaining wall. Note the location of the urinals in both privies. (Public Archives of Canada, National Map Collection, "Halifax, N.S., The Citadel or Fort George, Block Plan", Hill, 1 November 1891.)



38 Photo of the soil pit outside C-54, after archaeology in October 1976. Note the tooled granite sill at base of retaining wall which held the wooden covers of the soil pit. Note steps at the north end, and the entrance to C-54, now blocked with ironstone rubble. (Project Office, Halifax Defence Complex, as found photo record of archaeology, 1976.)



Cartridge Stores No. 1 and No. 2, West Front

Narrative

The date of construction of these two casemates (C-53 and C-56) has not yet been definitively established. They were built sometime after 1860 and before 1891, when they first appear on a ground plan of the Citadel. Because the casemates were intended solely as cartridge storage areas for the new rifled ordnance being mounted at the Citadel, it is probable that they were constructed in the early 1870's when that changeover was taking place.[1] The building of the casemates must have been difficult because each was bounded on three sides by existing structures. The ramparts had to be removed, the earth excavated to a depth of 18 or 20 feet, and the labourers would have had to work in a confining, mud filled hole.

These casemates were essentially two new magazines for the Citadel. A cartridge was a case containing the propellant of an explosive rifled ordnance projectile. Cartridge and shells were usually stored in different areas, and assembled just before the artilleryman wanted to fire the gun. Since the cartridge contained an explosive element, strict precautions were taken in their storage and handling. The construction of these casemates reflects these safety requirements. First of all, no flame was allowed in the storage area - illumination had to be provided from an outside source. In these casemates, a brick partition wall divided the casemate into a large storage area and a lamp passage, or illumination room in front. A small square window was cut through this partition wall. Whenever light was needed in the casemate, a lantern with specially designed reflectors was placed in the cubicle to provide illumination. (See figure 39) The small passageway also acted as a shifting room, where the men who were handling the explosives changed into special

spark-proof clothes and footwear. Two thick doors, four feet apart, were installed in both the lamp passage and storage area. (See figures 40 and 41) Waterproofing the storage area must have been critical, but little is known of the procedures for these two casemates. In C-53, the north wall is a hollow-wall construction with a four inch air-vapour space behind it. This construction technique kept the moisture away from the inside of the casemate. It may be that all four walls in each casemate were constructed in this manner. Above the casemate, an asphalt surface, similar to that used on the other casemates of the Citadel, was used as a waterproofing technique.

The casemates continued in use as cartridge stores until at least 1908. There is very little information on their subsequent history. Since the casemates were constructed for a specific purpose, and used as cartridge stores for 40 years, little, if any, alteration took place. Today the casemates and lamp passages appear structurally sound, and the original bricks in good shape.

Structural Analysis:[2]

Foundations:

C-53:

No plans are yet available concerning the construction of this casemate, so little can be said concerning the foundations. All walls except the back wall are party walls to structures that were already existing - i. e. sallyport 3, retaining wall, and casemate 10. Each of the three existing foundations for these structures had a different depth and width. Presumably the engineers would have designed a foundation for the casemates of a uniform depth and width.

C-56:

Three of the foundations in this casemate are party walls to existing earlier structures - i. e. west curtain wall, casemate 11, and

casemate 55, the north privy. The south wall foundation borders sallyport 4. Presumably a uniform foundation was built for the superstructure of this casemate, but nothing can be known until the plans are found or excavation takes place.

Walls: (See figures 40 and 41)

C-53:

South Wall: This wall formed a party wall with casemate 10, and was six feet thick, six feet in height, and 18 feet 6 inches in length. Since the original north wall of casemate 10 was five feet thick with ironstone, this wall of casemate 53 was probably formed simply by laying a one foot lining of brick against the old wall of casemate 10.

West Wall: This wall was 16 feet six inches in length, six feet in height (exclusive of the arch), and an average of one foot thick. The construction seems to have been entirely of brick. Behind this rear wall are two massive buttresses four feet square, running up the entire height of the casemate. Presumably, the engineers thought that, with these huge buttresses, and the earth fill behind, the wall thickness could be minimized.

North Wall: This wall was 18 feet six inches long, six feet in height, and four feet nine inches thick. The south wall of sallyport 3 was three feet three inches of ironstone. The north wall of this casemate was formed by building a one foot six inch layer of brick to the old sallyport wall. Included in this thickness was a four inch space, to act as a vapour barrier.

East Wall: (Forming lamp passage) This wall was a brick partition wall 16 feet six inches in length, and averaging a one foot thickness. Construction of this wall provided a two foot six inch lamp passage and illumination room for the store.

East Wall: (Retaining Wall) This wall measured nine feet in thickness, three feet six inches of which formed the old retaining wall. Whether masonry or earth fill was placed behind the brick lining is unknown.

C-56:

South Wall: This wall was four feet six inches in thickness, three feet of which was formed by the old sallyport wall. Like the north wall of C-53, this wall was built simply by adding a one foot six inch lining of brick. Whether, like C-53, there was a six inch vapour space created behind this wall is unknown. The wall was six feet in height, 24 feet in length.

West Wall: This wall measured six feet in height (to the springing of the arch) and 13 feet in width. The thickness through to the escarp wall was seven feet six inches. What is behind the brick lining is unknown. Perhaps, like C-53, there are two buttresses, perhaps just earth or masonry fill. On top of the casemate, the asphalted arch carried all the way back to the west curtain wall masonry.

North Wall: This was the party wall to casemate 11. Presumeably this was constructed, like C-53, simply with a one foot lining of brick over the old ironstone pier wall of casemate 11. The wall measures 24 feet in length, six feet in height.

East Wall: (Lamp passage wall) This wall was a simple partition wall, one foot three inches in thickness, which created the lamp passage and illumination room for the cartridge store.

East Wall: (party wall with C-55) This wall formed a party wall with the north privy. It measured only three feet in thickness, which suggests that it was formed only by a thin veneer of brick over the old ironstone privy wall.

Openings in Walls:

C-53:

North Wall: There were two openings in this wall, both entrances from sallyport 3. The cartridge store had a doorway three feet six inches in width, six feet in height. There were obviously two doors in this entranceway, an outside and an inside. A six inch step in the pier wall of sallyport 3 formed the frame for the first door, and a 6¼ inch

step in the north wall of casemate 53 provided a space to hang the interior door. Nothing is known of the door construction.

The second opening provided a doorway to the lamp passage. There were, again, two doors to the lamp room. Each door measured six feet in height and two feet six inches in width. A six inch step in the pier wall of sallyport 3 provided a door frame for the exterior door. Four feet further on, another step was cut into the brick work to hang the interior door. (See detail of door openings in figures 40 and 41.) There is no documentation available on the construction of the doors.

East Wall: (lamp passage wall) There was one opening in this wall which provided a lamp recess for the illumination of the casemate. The recess measured two feet six inches square on the inside (cartridge store side), and one foot six inches square on the lamp passage side. This opening was framed in wood, and presumably each side would have been glass covered.

C-56:

South Wall: There were two openings in this wall, each serving as a doorway, one to the shell store, one to the lamp passage. The cartridge store doorway measured three feet six inches by six feet in height. The lamp passage entrance measured two feet six inches in width, and six feet in height. As with C-53, two doors were provided in each of these entranceways.

East Wall: (lamp passage partition wall) There was one opening in this wall, providing a lamp recess for the illumination of the casemate. It measured two feet six inches square on the cartridge store side, and narrowed to two feet square on the lamp passage side. Wooden frames held glass windows on each side. No details of the lamps or the glass are available. (See figure 41)

Floors:

Nothing is known of the construction of the original floors. The floors of both casemates are now concrete over earth. There may have been

asphalt floors originally.

Vaults:

The vaults, like the walls, were formed of brick. The numerous steps in each of these vaults held some kind of timber framing for the cartridge storage racks. Above the vaults ironstone rubble was used to form the dos d'anes, and asphalt was used as a water-proofing. There were no openings originally, or presently, in the arches of these casemates.

End Notes:

Cartridge Store No. 1 and No. 2, West Front

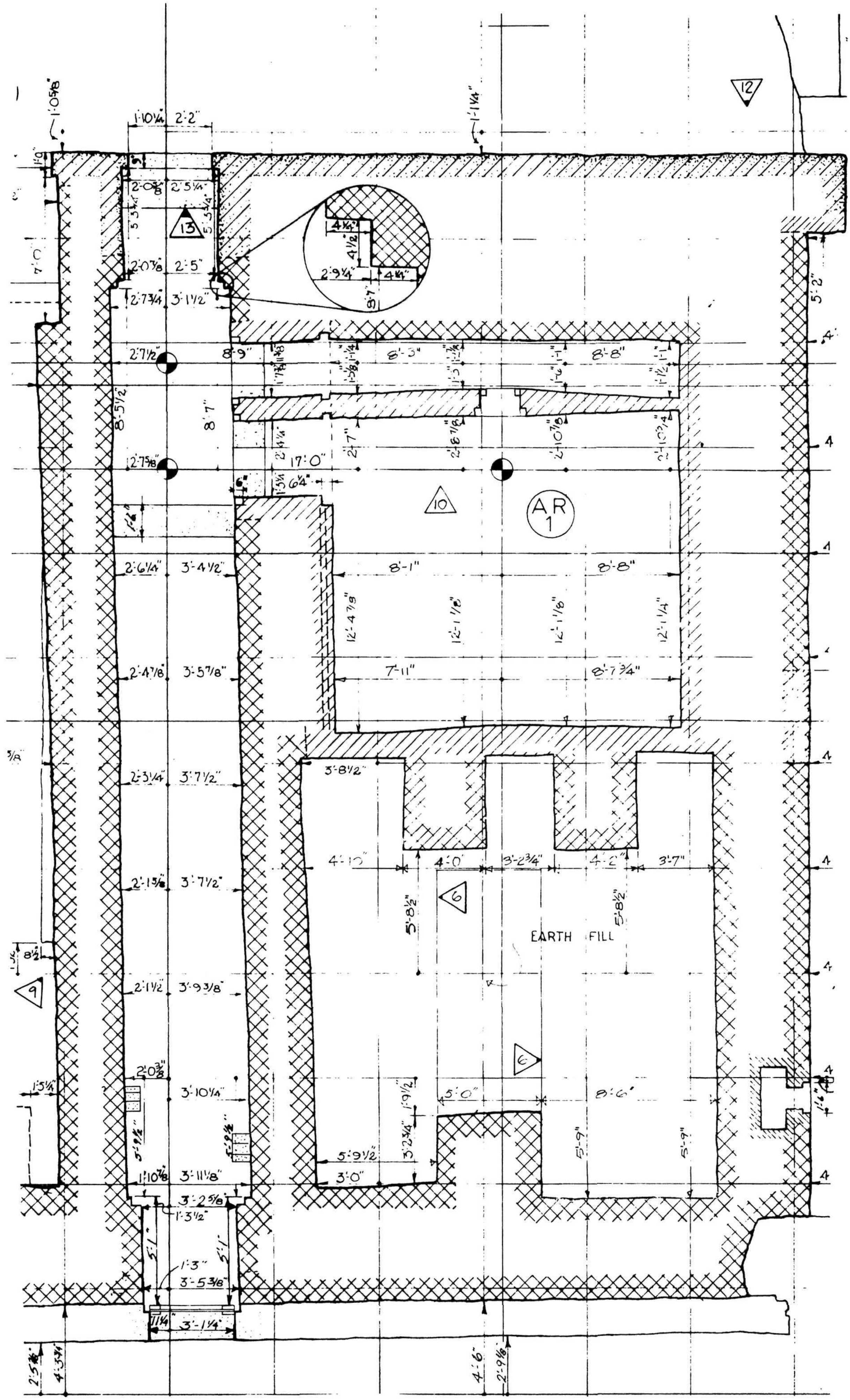
1. The casemates first appear on the 1891 Ground Plan of the Citadel.

2. The whole of the structural analysis is based on as found records at the Project Office of the Halifax Defence Complex.

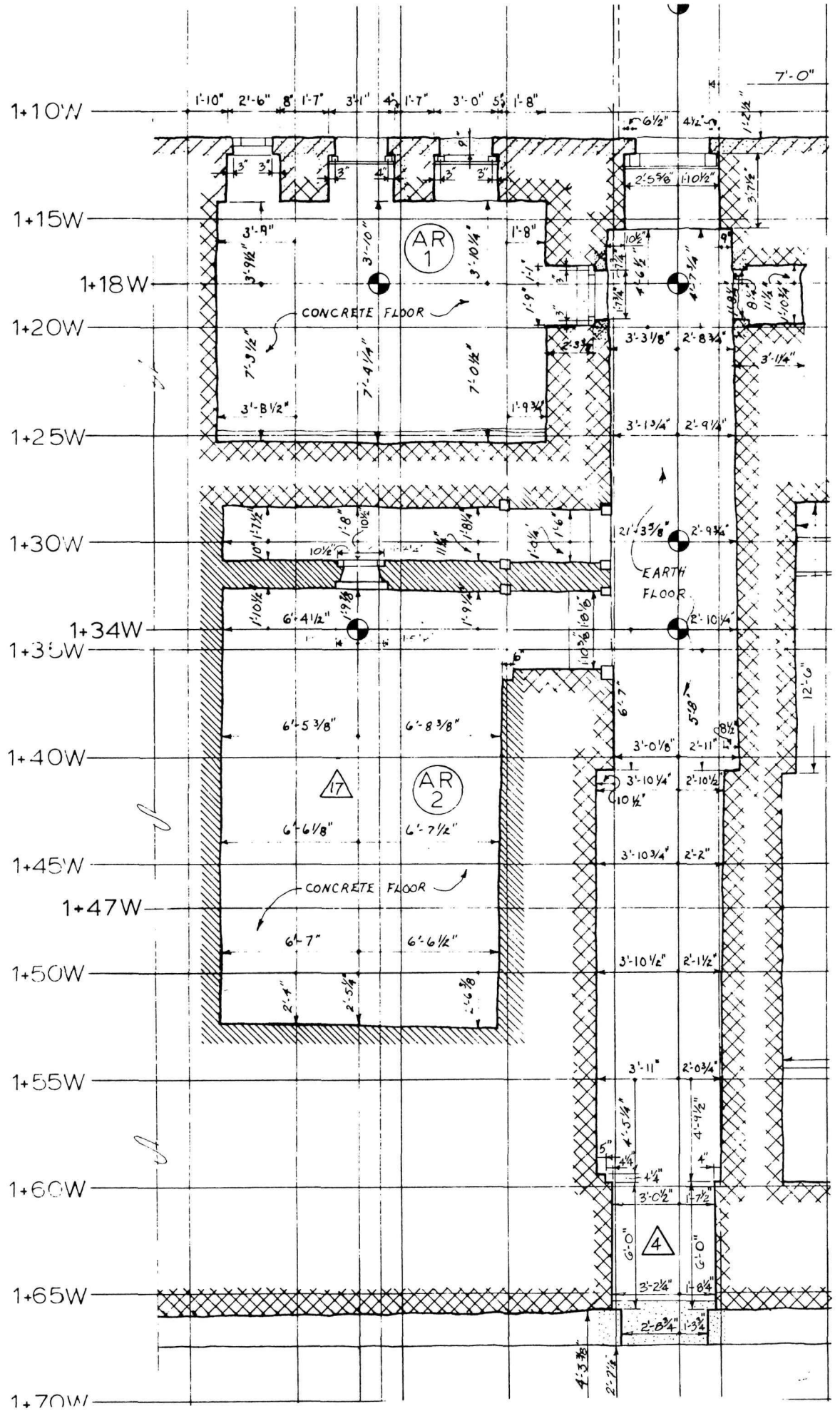
39 Photo of the east partition wall, cartridge store No. 1, C-53. This photo illustrates the size and location of the lamp recess in the partition wall. Note the wooden frame around the opening. When illumination was needed in the casemate, a reflector lantern was placed in this recess. The cartridge store side of the opening would have been covered with glass. Steps in the ceiling held racks for storage of the cartridges. (Project Office, Halifax Defence Complex, as found photo record, casemate 53.)


HALIFAX
CITADEL
CQ5

40 Plan through the curtain wall at level 224. The as found drawing illustrates the relationship of C-53, sallyport 3, and casemate 10. Note the hollow wall on the north side of casemate 53. Also note the thinness of the rear wall, and the massive buttresses behind. This casemate was divided into a main storage area, and a narrow lamp passage to the east. Note checks for two doors in each of the entrances. (Project Office, Halifax Defence Complex, as found record, Set C, plan through the curtain wall at elevation 224.)


12
13
10
AR
1
6
EARTH FILL
9
1'-10¼"
2'-2"
2'-5¼"
2'-5"
2'-7¾"
3'-1½"
2'-7½"
8'-9"
8'-3"
8'-8"
8'-7"
8'-5½"
2'-7⅝"
17'-0"
6¼"
2'-6¼"
3'-4½"
8'-1"
2'-4⅞"
3'-5⅞"
7'-11"
8'-7¾"
2'-3¼"
3'-7½"
3'-8½"
4'-10"
4'-0"
3'-2¾"
4'-2"
3'-7"
2'-1⅝"
5'-8½"
2'-1½"
3'-9⅜"
3'-10¼"
5'-0"
8'-6"
5'-9½"
3'-0"
5'-9"
1'-10⅞"
3'-11⅛"
3'-2⅝"
1'-3½"
5'-1"
1'-3"
3'-5⅜"
11¼"
3'-1¼"
4'-6"
2'-9⅛"
8½"
1'-5¼"
1'-1¼"
5'-2"

41 Plan through the curtain wall at elevation 224. This plan details C-56, and the relationship to C-55, casemate 11, and sallyport 4. Doors and lamp recess are similar to C-53. The casemates were built by forming a very thin veneer of brick over the pier walls of existing structures. It is not known if there are buttresses behind C-56, like those behind C-53. (Project Office, Halifax Defence Complex, as found record, Set C, plan through the curtain wall at elevation 224.)


1+10W
1+15W
1+18W
1+20W
1+25W
1+30W
1+34W
1+35W
1+40W
1+45W
1+47W
1+50W
1+55W
1+60W
1+65W
1+70W
AR 1
AR 2
CONCRETE FLOOR
EARTH FLOOR
CONCRETE FLOOR
17
4
7'-0"
7'-5½"
7'-4¼"
7'-0½"
6'-4½"
6'-5 3/8"
6'-8 3/8"
6'-6⅛"
6'-7½"
6'-7"
6'-6½"
12'-6"
6'-0"
6'-0"

Rampart Profile: Chimneys, West Curtain Wall

Narrative:

Although not originally intended to be part of this study, a note on the chimneys and rampart profile has been included, to the extent of the available documentation, because of the design needs for the curtain wall exhibit area. A more detailed individual study of the rampart profile is now in preparation.

Structural Analysis:

Chimneys:

An analysis of the chimneys of the west front is a difficult matter, because none of the engineers provided detailed plans of their construction. Calder, in 1846-47, did not even include an estimate for the new chimneys he was planning above the four new casemates built in those years.

Colonel Nicolls, in his original plans of the Citadel, provided no cross-sections of the casemates of defence he intended to build. It seems probable, however, that when the four casemates of defence in the curtain wall were completed in 1831, there were four chimneys servicing four fireplaces. The flues of the chimneys, when they emerged out of the pier walls of the casemates, angled sharply towards the escarp wall. Nine feet from the escarp wall, just below the level of the coping, the slope of the flue ended, and it began a vertical course up through the western slope of the ramparts.[1] (See figure 42) The top of these chimneys was about level with the top of the rampart.

From 1831 until 1846-47, there were four chimneys above the curtain wall, each was located directly above the pier walls of the four casemates approximately nine feet from the outer edge of the

escarp. In casemate 9 the chimney was above the south pier wall; in casemate 10 above the north. Likewise, in casemate 11, the chimney was above the south wall; and in casemate 12 above the north pier wall. (See figure 43) The chimneys and flues were constructed of brick, and may have had some kind of masonry support along the slope under the ramparts.

The construction of the four new casemates on the west front in 1846-47 complicated the chimney system. Unfortunately Colonel Calder did not provide either a plan or a description of what he intended to build. From the as found drawings and from scant historical documentation,[2] this is what seems to have happened.

The original chimneys of casemates 9, 11, and 12 were torn out, or blocked up; the chimney of casemate 10 was left intact. When Colonel Calder had finished his work on casemates 7 and 8, there was only one chimney servicing three casemates (7, 8, & 9). The three new flues of the individual fireplaces, joined over casemate 9, and fed into one chimney located over the south pier wall of casemate 9.[3] The location of the new chimney was practically the same as the old. In casemate 10, the original chimney was left intact. (See figure 43)

On the north end of the curtain wall, a little different process ensued. The two existing chimneys were torn out or filled in. When Calder had finished building the new casemates, 13 and 14, three entirely new chimneys appear above the curtain wall. In casemate 11, the flue of the old fireplace was re-routed slightly. The flue went directly up from the fireplace, and only after it had reached the top of the rubble arch, did it begin its course under the rampart to emerge on the western slope. The new chimney sat more or less in the position of the old chimney. The flue of the fireplace of casemate 12 underwent a similar reconstruction, with the new chimney standing slightly south of the old location. The flues of the fireplaces of casemates 13 and 14 joined above the common pier wall, curved gently under the ramparts, until, nine feet from the escarp wall the chimney emerged on the western slope of the rampart. (See figure 44) In 1847, a total of five chimneys served the eight fireplaces of the casemates

on the west front.[4] (See figures 43 and 44)

The only alteration to this system was the asphalt waterproofing applied to the chimneys 1851-54. This involved no change of location. The process was a simple one - each flue and chimney was given an extra layer of brick on the outside. The bricks of this lining were laid with asphalt, not cement. After the construction was complete, a further layer of asphalt was applied to the outsides of the new linings, with careful emphasis placed on those points where the flues emerged from the rubble arch.[5] (See figure 45)

Calder went to all this trouble for the same reason that Nicolls had designed his chimneys with the complicated flue system - the chimneys had to emerge on the western slope of the rampart. If the flues were carried directly up from the central fireplaces, the chimneys would have sat fairly in the middle of the banquette, and greatly interfered with the movement of troops and guns in time of a siege. Later, when the third system of chimneys was installed, some time after 1870, this concern for the defences of the fort was not important. The Citadel, after the introduction of rifled ordnance, had ceased to be a viable defence structure. In the third system, the chimneys were located directly above the fireplaces, on the banquette.

The date of the change to the third, central chimney system has not been established. It was probably undertaken during the conversion of the armament of the Citadel to rifled ordnance, in the early 1870's. At the time of the change, the tops of five chimneys of Calder's system were knocked off, and a granite cap placed over them. In the post 1870 system, there were again five chimneys for eight casemates. One was above the fireplace of casemate 9, serving three fireplaces (7, 8, & 9). One was located directly above the fireplace of casemate 10.[6] (See figure 43)

The original chimney of 1831, however, seems not to have been torn down. A photograph in the Nova Scotia Museum, shows the chimney still intact in the 1890's. (See figure 46) There was one chimney above the fireplace in casemate 11, one directly above casemate 12, and,

finally one above the common wall of casemates 13 and 14, serving both fireplaces.[7] (See figure 44)

End Notes

Chimneys and Rampart Profile

1. As found drawing, Set C, elevation of the North Wall of Casemate 10, Project Office, Halifax Defence Complex. Excavation for the exhibit area of the West Curtain Wall uncovered the details of the construction of this 1830 chimney. Presumeably the chimneys of the three other defence casemates were constructed in this manner.

2. Even the 1852 record plan of the Citadel provides no details of the chimney disposition.

3. PAC, National Map Collection, A/202, 1862, "Fort George, on the Citadel, Halifax, N. S." n.d. This surface plan of the ramparts, indicates one chimney for the three casemates 7, 8, 9. The chimney for casemate 10, however, is not shown.

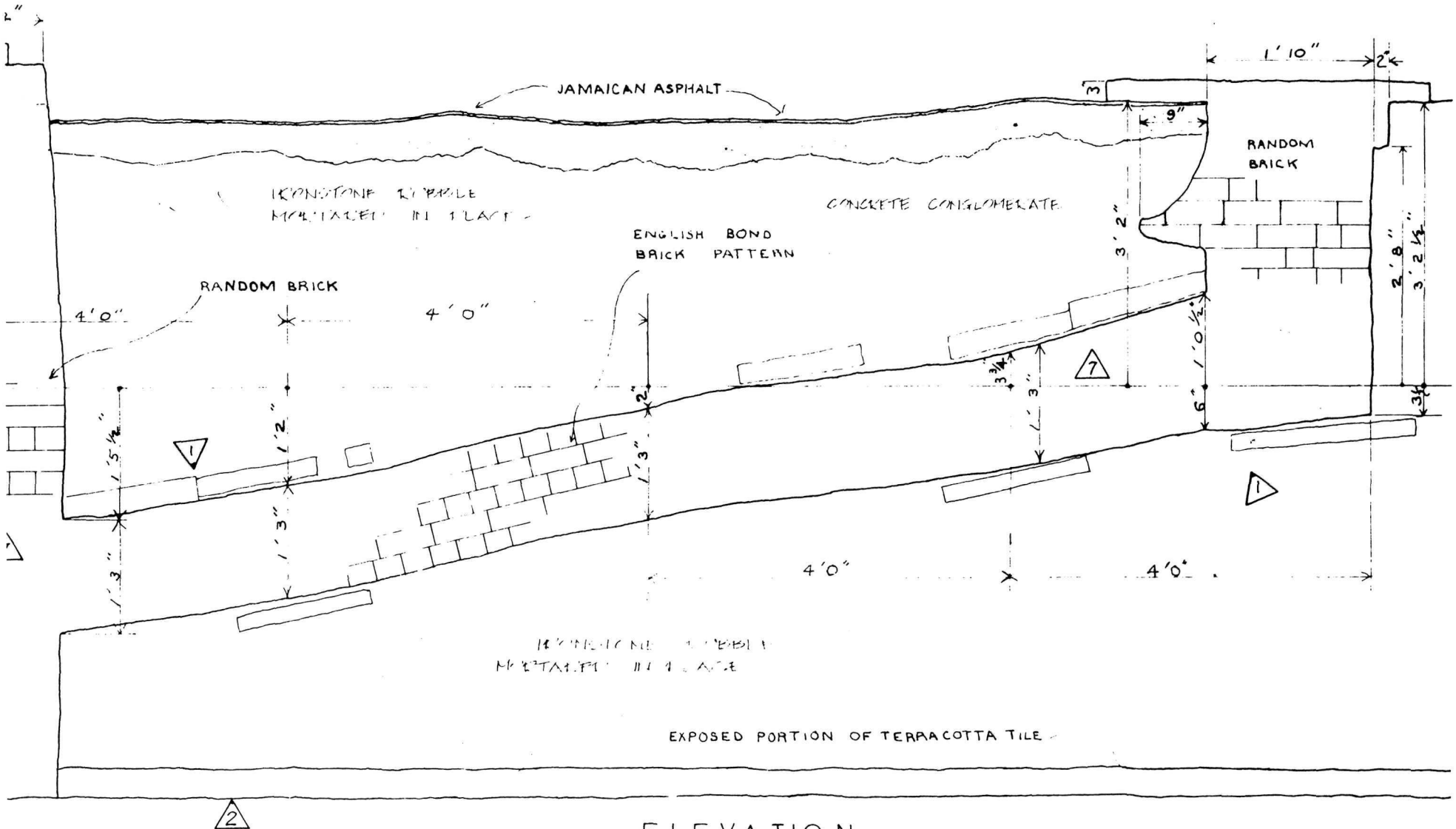
4. Ibid. These descriptions are based on the 1862 surface plan, as found drawings, and personal observations of the archaeologist's trenches above the casemates in October 1976.

5. PANS, RE 12, pp. 498-502, report of Lt. Parsons, 13 February 1854. This report did not detail the work done on the chimneys, but is a general statement on the use of asphalt at the Citadel. Examination of the chimneys still extant above the curtain wall shows that this method was used.

6. Project Office, Halifax Defence Complex, as found drawings, Set C, top of wall, west curtain wall area.

7. Ibid.

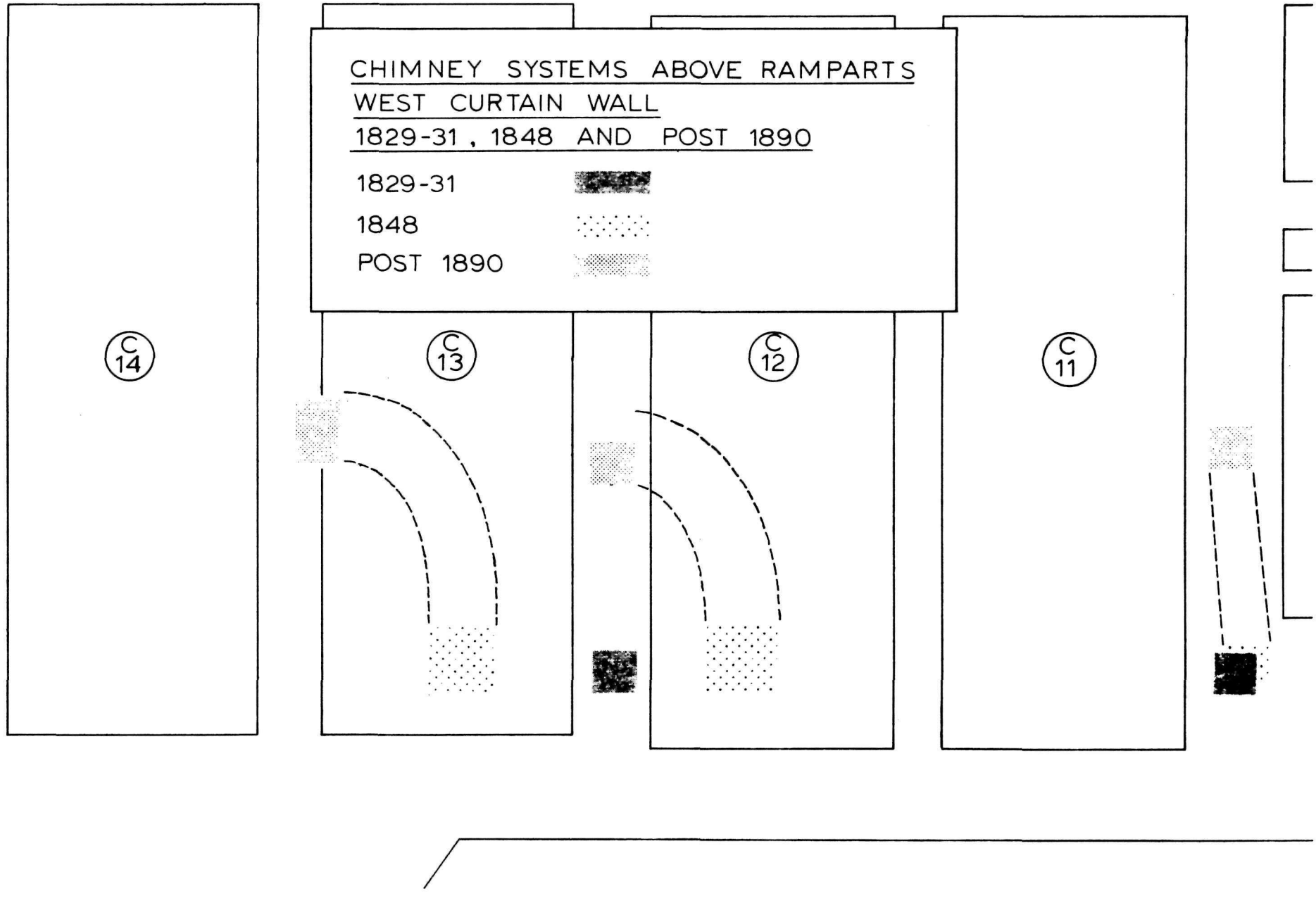
42 Details of the exterior of the 1829 flue and chimney of casemate 10. This system was uncovered when the curtain wall area was excavated in 1973. In 1831 there were four chimneys of this description through the curtain rampart. Three of the chimneys (C-9, C-11, & C-12) were destroyed when Calder built casemates 7, 8, 13, & 14 in 1846-7. The original chimney survived until the 20th century. (Project Office, Halifax Defence Complex, as found record, Set C, elevation of north exterior wall, casemate 10.)



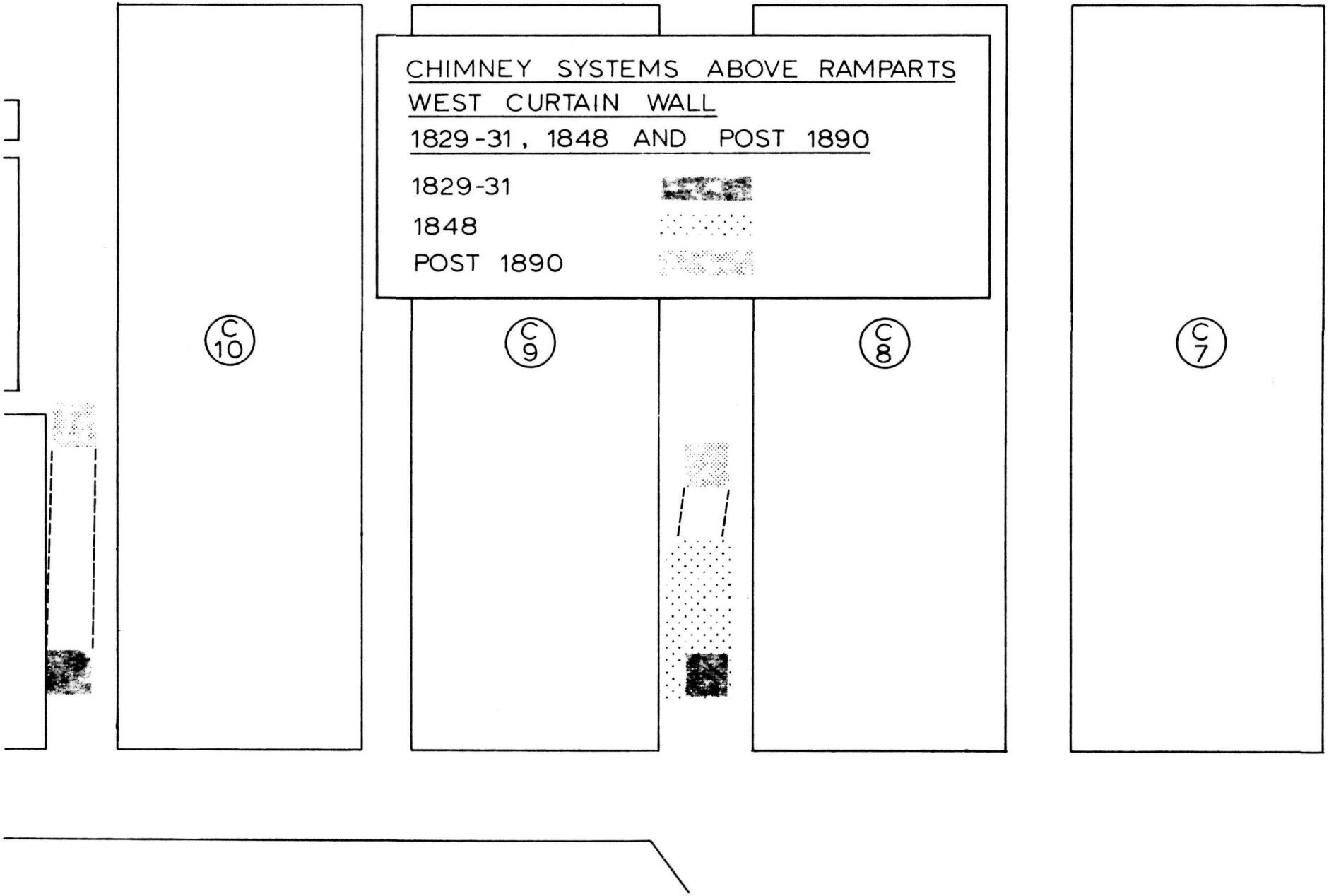
ELEVATION

NOTES

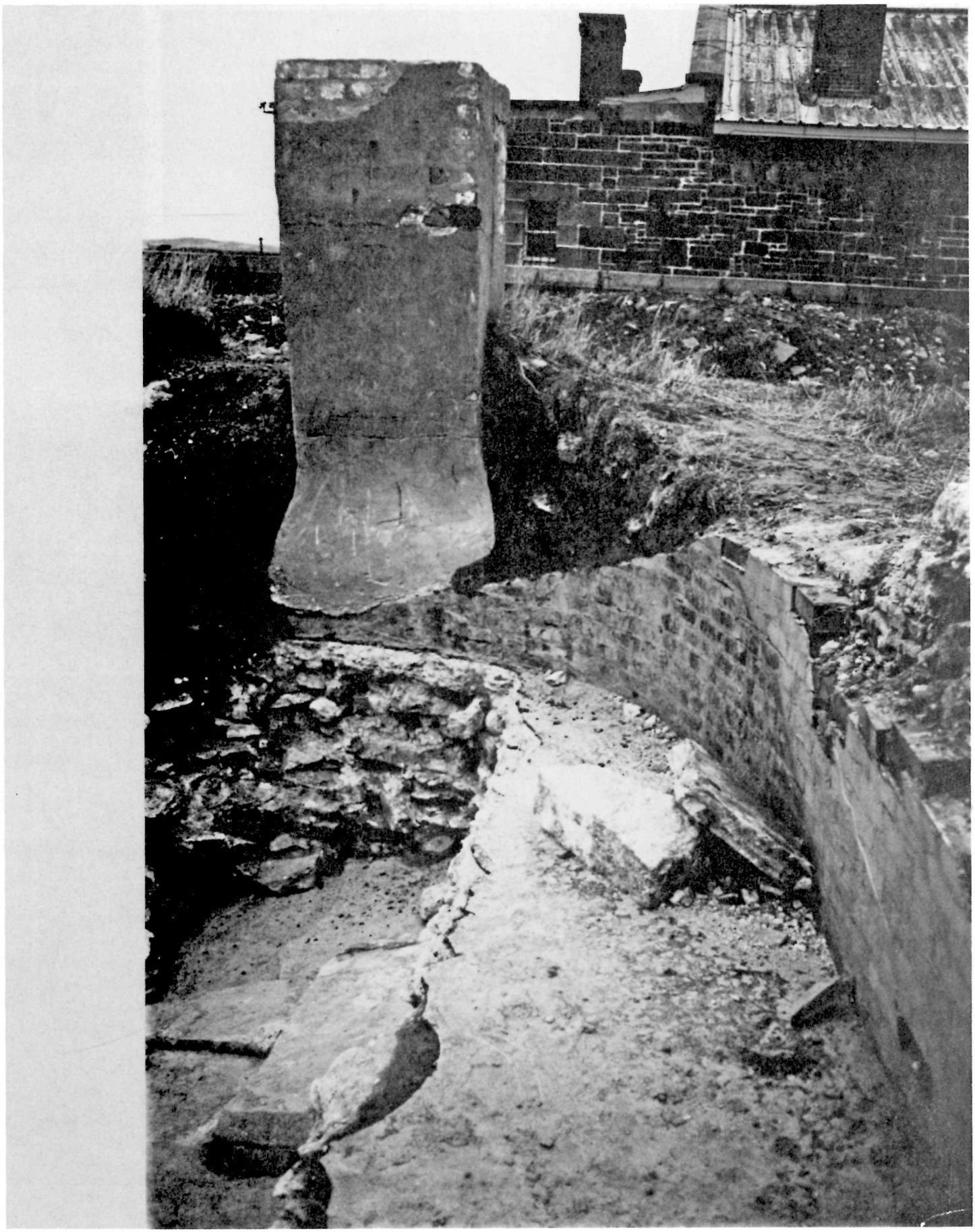
43 Composite drawing of chimney systems above casemates 11, 12, 13, & 14. One chimney services C-13 & 14. (See caption figure 41). (Project Office, Halifax Defence Complex, drawing by Greg Corkum; as found record, archaeology trenches 1976, and various historical plans.


CHIMNEY SYSTEMS ABOVE RAMPARTS
WEST CURTAIN WALL
1829-31 , 1848 AND POST 1890
1829-31
1848
POST 1890
C 14
C 13
C 12
C 11

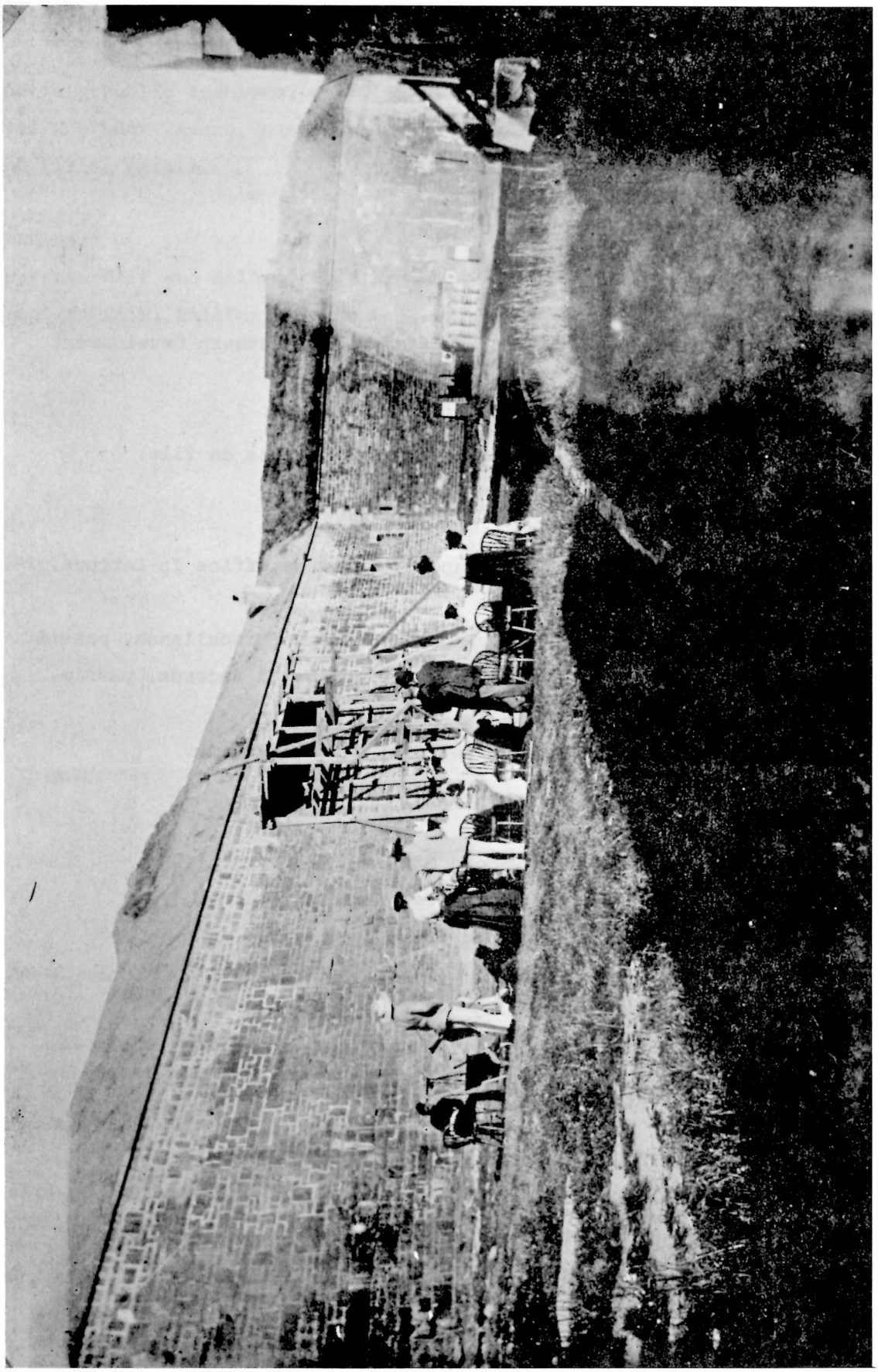
44 Composite drawing of the three chimney systems on the curtain rampart. In 1831 there were four chimneys, one above the pier walls of each of the casemates of defence. The details of these flues and chimneys are found in figure 41. In 1847, three of the old chimneys were torn down, and replaced with a new flue system under the rampart. While the chimney to casemate 10 was left intact, four new chimney systems appeared in 1847. One chimney above casemate 9, servicing casemates 7, 8 and 9. New chimneys were built above C-11 and C-12. At the same time a new chimney servicing C-13 and C-14 appeared over the party wall between the two casemates. Sometime after 1870, a third chimney system appeared, behind the rampart. The 1847 chimneys were covered with granite caps, and five new chimneys were built directly over the central fireplaces of C-9, C-10, C-11, C-12 and C-13. (Project Office, Halifax Defence Complex, as found record, Set C, top of curtain wall plan; also, archaeology trenches, curtain wall ramparts, 1976; also, Public Archives of Canada, National Map Collection, A/202, 1862, "Fort George, or the Citadel, Halifax, N.S.". n.d.)


CHIMNEY SYSTEMS ABOVE RAMPARTS
WEST CURTAIN WALL
1829-31, 1848 AND POST 1890
1829-31
1848
POST 1890
C 10
C 9
C 8
C 7

45 Photo of chimneys above casemate 12, showing ironstone flagging, and lead gutter. This photo gives a three-dimensional idea of the 1847 and post 1870 chimneys of casemate 12. The curved, asphalted, brick chimney flue to the right of the photo is the 1847 chimney. All of the 1847 chimneys curved in this manner above the arch of the casemate. Note asphalting over the original brick. The chimney in the background is the third, post 1870 chimney of the casemate, which rose directly over the fireplace, and emerged behind the rampart. In the centre foreground note the ironstone flagging sloping toward a lead gutter between casemates 12 and 13. This was the first attempt to waterproof the casemate. Later, asphalt was added. Note here, however, that the asphalt was laid over the rubble, level with the top of the arch. Unlike the tops of the casemates on the south end of the curtain wall, this casemate valley was not hipped. (Project Office, Halifax Defence Complex, as found photo record of Caroline Parmenter's archaeology trench above casemate 12, October 1976.)



46 Photo of party in ditch. This photo of a rifle shoting party in the west ditch, circa 1890, shows the original chimney of casemate 10, built in 1831. (Nova Scotia Museum.)



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