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EXCAVATIONS AT CASTLE HILL

by

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EXCAVATIONS AT CASTLE HILL, NEWFOUNDLAND.

The Archaeological Investigation of
Fort Royal/Castle Graves, a 17th and 18th
Century French and English Fort at Placentia.

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ABSTRACT

This report deals with the archaeological excavation, description and analysis of Castle Hill, Newfoundland. Field work was carried out at the site, near Placentia, in 1965 and 1968. Castle Hill is the site of a redoubt built as one of the defences of Plaisance by the French in the late 17th century. Fort Royal was a small masonry redoubt begun in 1693 and completed about 1702. The French surrendered Placentia and its forts to the English in 1713. The British allowed the redoubt to decay for many years but rebuilt it when the military need arose, beginning construction in 1762. They erected a timber blockhouse and other structures on the remnant of the old French redoubt, naming the fort Castle Graves. The fort was used during the late 18th century, but had fallen into ruin again before its final abandonment about 1811.

As a remnant and symbol of this important period in the history of Newfoundland, Castle Hill is a significant historical site, now designated as a National Historic Park. Archaeological research was one phase of work carried out prior to and in association with site development.

In addition to research, a major aim of the excavations was to expose and stabilize structural remains of the site. Almost the entire redoubt has been excavated and the curtain

walls, three demi-bastions and the magazine bastion stabilized. In the interior of the fort all structures had collapsed long before the excavations began, but stratigraphically superimposed foundations were found in the course of the field work. All major French and English structures shown on historical plans of the fort have been identified. It is clear that the 1701 French and 1775 English plans of the fort are generally accurate although there are differences in detail and discrepancies in the as found dimensions of some structures.

Large quantities of specimens were recovered in the excavations. A good sample of French materials from stratigraphically sealed deposits in rampart fill is available for comparative study. A good sample of English material is also available from the site although from somewhat less reliable stratigraphic contexts. The samples from both periods of occupation cover the same general range of material.

The French ceramic complex is largely comprised of coarse earthenwares and Spanish olive jars, although faience and stoneware is also included. The English ceramic complex consists largely of white salt-glazed stoneware and cream coloured earthenware, but also includes a variety of wares such as tin-glazed earthenware, brown salt-glazed stoneware, Westerwald salt-glazed stoneware and

miscellaneous English earthenwares as well as a small quantity of porcelain.

White clay pipe fragments were common specimens and a variety of types based on fragmentary bowls were established for descriptive purposes. Both Dutch and English pipes are present, the former more common in the French period of occupation. Numerous stem decorations, mouthpiece forms, makers marks and other features are described and related to the two occupational periods. Dates derived from pipe stem bore diameters are used extensively in the evaluation of cultural identification of stratigraphic units; such dates correlate reasonably well with the known occupation dates.

Glass bottle sherds were common but the fragmentary nature of the specimens makes comparative study difficult. The already established and dated forms do correlate with the stratigraphic position of similar sherds in the site history. An analysis of the distribution of sherds by colour hue indicates that, although present in both occupations, greener coloured glass tends to be more common in the French period.

Numerous cannonballs and other fragments of military equipment were recovered and the stratigraphic distribution of these artifacts in the site allows the partial reconstruction of the armament probably mounted at the fort. Typological differences in gunflints of the French

and English periods are noted. Large quantities of tools and other utensils were also found. The association of masonry tools with the French period and woodworking implements with English excavation units, although not exclusive, does parallel the major construction modes of the two occupations.

Buttons from military uniforms were largely English although a few probable French types were identified. Some of the English buttons have been identified as being those of British regiments known to have been stationed in Newfoundland during the appropriate period of time.

Large quantities of structural iron artifacts such as timber braces and hangers and particularly nails of various sizes were recovered. Limited typological and size differences in the nails associated with the two occupations have been established. Other building materials include bricks and some distinct differences in French and English bricks have been found. French use of imported limestone for decorative stonework has been established.

Faunal remains from the site include shellfish, fish, bird and mammal remains. These data indicate that the French and English utilized the same types of food at the site but in significantly different proportions. The French appear to have exploited local natural resources more widely and more intensively than the English.

The concluding analysis of the site uses the concepts of form, use, function and meaning as a basis for comparison of both French and English archaeological and historical data. The function and use of the fort as an essential part of a defensive system for Placentia and the related fishery is virtually identical for both French and English. These factors can thus be held constant, an important advantage in the comparative analysis of the site.

The form of the fort varies, French construction being moderately elaborate masonry while the English merely made some masonry repairs and added buildings and defensive features of timber to the remains of the French fort. The form of the English fort was thus in part determined by the preceding French form, but the basic contrast is one of French architectural elaboration as opposed to an English pattern of building little more than necessary to achieve the desired use and function.

The level of meaning is probably impossible to reach with assurance and alternative hypotheses could doubtless be advanced. The one suggested here is that, since both use and function can be controlled constants, the variation in the form of the site may shed some light on its cultural meaning. It is thus suggested that the architectural elaboration of this small redoubt

reflects symbolic value for the French in contrast to the defensive practicality of the English. This may be coupled with the differences in subsistence patterns at the site; French emphasis on local resources contrasting with lesser English emphasis on wild food sources. Neither of these is an exclusive emphasis but similar differences in pattern have been noted at other French-English sites.

The final picture which emerges is one of archaeological evidence attesting a difference in French and English cultural patterns of adaptation to the New World.

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INTRODUCTION

Castle Hill is located on the Avalon Peninsula near Placentia, Newfoundland (Fig. 1). The site, on the top of a high hill overlooking Placentia Harbour (Fig. 2), combines a significant history with a magnificent scenic view and has great value for interpretive development as an historical park.

In the late 17th century the French built a redoubt named Fort Royal on the commanding location. The fortification, often called the Castle, fell into ruins after the French left Placentia in 1713. It was rebuilt and named Castle Graves by the English during the last half of the 18th century. In recent times the site has been called Castle Hill and the old French and English fort was a provincial park when the archaeological excavations were begun in 1965. The site was designated Castle Hill National Historic Park at the start of the 1968 field season when excavation was continued and stabilization was undertaken. Site development has continued since that time.

Historical Description of the Fort

Placentia, with its excellent harbour, nearby sources of fresh water and a wide beach for drying cod, began to assume importance as a fishing station in the 16th century and continued in this role for 300 years. During the 17th century, codfish from Newfoundland played a significant part in England's interests in the New World and during the same period Placentia developed as a French fishery (Innis 1954: 52,82). Protection of Plaisance was so important that between 1662 and 1714 the French erected numerous fortifications around the town (Proulx 1969: 15). When the English took possession after the Peace of Utrecht in 1713, they, too, fortified the area (Ingram 1964: 1). Remnants of both French and English fortifications may still be seen today. The best preserved of these sites is Castle Hill (Figs. 3,4,5).

Construction of the redoubt was begun in 1693 (Proulx 1969: 68) and it was ultimately abandoned in 1811 (Ingram 1964: 7). The major fortifications at Placentia during both the French and English periods were located on the beaches near the gut, the narrow entrance to the harbour. The significance of the Castle is its location 328 feet above sea level on a rocky bluff; both French and English recognized the importance of this commanding hill in the defence of the town (Richardson 1962: 7,9; Proulx 1969: 157).

The first hilltop redoubt constructed by the French was the Gaillardin in 1692 (Proulx 1969: 66,85), a nearby site now included in the park. Following an English attack on Placentia, the fortification on Castle Hill was begun in 1693. The initial work consisted of a platform mounting a culverine and four other cannon. Orders to complete the redoubt were received in 1694 and it was finished that year following the original plan (Proulx 1969: 68,87,88,89), but its enlargement was recommended (Ingram 1964: 1).

Work was confined to the interior of the redoubt in 1695 and an important plan and profile of this date is available (Proulx 1969: 89; Pl. 6) (See Fig. 6). The plan shows a fort with four demi-bastions. A central platform rises above the elevation of the exterior walls. The walls are illustrated with a cordon and parapet, but since the walls were not raised to the cordon level until 1697 (Proulx 1969: 92), the 1695 plan must represent proposed construction rather than the work completed. This is the only plan which shows the central platform and perhaps this structure was the one initially built in 1693. The 1695 plan also shows the entrance on the east side of the fort flanked by two structures. A three room barracks, possibly a frame building, was located along the west side of the interior of the redoubt. In the northeast demi-

bastion an underground magazine is shown on one version of the plan (Fig. 6) but does not appear on the other (Proulx 1969: Pl. 6) in which the bastion is shown with a timber deck. A ramp or stairway to the timber decked gun platform is not clearly indicated on either plan. The profile of the fort shows an exterior masonry wall and an interior masonry revetment. Between these two walls the rampart gun platforms were created by earth and rubble fill over which the timber decking was laid. Gun platforms were located on the north, west and south sides of the fort, the east side being the location of the entrance and guardroom. During this period there were twelve cannon at the redoubt (Proulx 1969: 90).

There was no work on Fort Royal in 1696 and a general plan of Placentia of about this period shows few details of the redoubt (Proulx 1969: 90; Pl. 1).

Considerable construction took place during 1697 when the masonry of the redoute royale was raised to the cordon level (Ingram 1964: 1). The powder magazine arch was then under construction also (Proulx 1969: 92). There must have been a change in construction plans for the redoubt between the time of the preparation of the 1695 plan and the 1697 phase of construction. The 1695 plan shows the fort with four demi-bastions while the northeastern one has become a full bastion in the 1701 plan (Fig. 7) (Proulx 1969: Pl. 8). The arched casemate magazine is located in

the northeast bastion, and since it was under construction in 1697 the remodeling or replanning of the demi-bastion must have been done at the same time. A covered way consisting of a palisaded dry wall was erected around the hilltop and an additional defensive wall was built at a lower elevation (Proulx 1969: 92).

By 1698 the masonry work on the redoubt was nearly completed and Fort Royal was equipped with eight cannon. In 1699 some work was done on the interior walls (Proulx 1969: 94,95).

Fort Royal was still not finished in 1700 when it was reported that three-quarters of the redoubt had the cordon and parapet. Two barracks were constructed and work on the west gun platform continued (Proulx 1969: 96,97). It was then intended to mount a battery of eight 18-pounder cannon. Sometime during the post-1695 phase of construction, the removal of the central blockhouse or tower must have been accomplished since it does not appear on any subsequent historical illustration.

There is considerable historical information about Fort Royal in 1701, including one of the most detailed plans of the redoubt (Fig. 7; Proulx 1969: Pl. 8). Apparently work on the cordon and the shipment of limestone to Placentia was approved (Proulx 1969: 98). The latter is an important point in the identification of limestone architectural remains. There were supposedly but ten or twelve

days work left on Fort Royal and the walls were capped with a plinthe (Proulx 1969: 99,100; n. 99). This reference must be to a coping. A plinth is usually a basal course of masonry while the context makes clear that the feature described was a capstone or coping on the parapet. The coping is illustrated on the French plan of 1701 as a sloping trapezoidal stone which had a slight overhang beyond the exterior line of the wall. It is shown as a simple sloping wall top on the English plan of 1775 where this original feature was still preserved on the magazine bastion. The barracks, guard house and hangar were temporarily re-covered with planks while waiting for shingles from Quebec (Proulx 1969: 100). Four sentry boxes had been installed (Ingram 1964: 2). The fort was apparently used as a prison and a serious problem of settlement of the gun platform was noted (Proulx 1969: 99,100).

An examination of the 1701 plan provides additional information (Proulx 1969: Pl. 8) (Fig. 7). The illustration includes both plan and profile views of the fort. The plan illustrates the powder magazine in the northeast bastion and shows the steps leading down into the structure from an entrance in its south wall. A ramp gives access from the interior of the redoubt to the magazine door. Adjacent to the ramp is the hangar, forming the north half of the east curtain wall. Flanking the other side of the entrance is the guardhouse on the south half of the east curtain wall.

Both the guardhouse and hangar are shown with embrasured loop holes. The doorways of these rooms open into the entrance passage. A large L-shaped barracks was located along the south and west sides of the interior, the revetment wall forming part of the structure. Hearth, window and door locations are indicated, and in the profile view it is clear that the barracks was a two storey building with a timber superstructure above the first floor masonry walls. At the east end of the barracks the intended location for water storage is shown. A ramp up to the gun platforms is located in the southeast interior corner while in the northeast corner a stairway leading to the deck is indicated. A platform for two small mortars is shown on the west gun rampart near the northwest demi-bastion. This plan appears to be a very accurate representation of the French Fort Royal in its completed state. Nearly all of the features shown on the plan have been identified archaeologically, although some problems with structural dimensions have been encountered.

The redoubt was still not complete in 1702. The masonry steps and plastering the cordon and barracks were unfinished and water storage facilities were not yet available. Ten cannon were mounted (Froulx 1969: 126,127).

The year 1703 saw additional construction on the dry-wall enceinte around the perimeter of the hilltop as well

as the re-elevation of the sinking cannon platforms. An English prisoner described Fort Royal as having walls 16 feet high and eight feet thick and an armament of 10 cannon and two mortars (Proulx 1969: 129).

Another English account written in 1704 confirmed that the entrance of the redoubt was on the east, described the storage of water in six large casks and said that the garrison consisted of 10 men and an officer. Large stones were kept on the walls to roll down at an enemy. The English prisoner thought the fort to be poorly constructed (Proulx 1969: 132).

An addition to the fortification of the redoubt was made in 1705 with the construction of a mortar platform. Once again the settlement of the rampart fill made it necessary to elevate the gun platforms (Proulx 1969: 133). The mortar platform mentioned is probably the one adjacent to the Castle rather than the one on the gun platform.

Fifteen cannon were mounted at Fort Royal in 1706. Apparently none of the fortifications at Placentia were well constructed for by 1707 they were reported in poor condition. In 1708 the English blockade of the harbour prevented regular supplies from reaching the town. Work on the fortifications was reduced and nothing seems to have been done at Fort Royal (Proulx 1969: 134-136).

The garrison size at the Castle seems to have varied. A 1709 English description reports 30 men and an officer

with an armament of 14 cannon and two mortars. The large stones for defensive purposes were also mentioned (Proulx 1969: 153). Another English account of the same date lists a garrison of 16 men and an officer and only 10 cannon and two mortars, all at "the Castle on the Hill" (Proulx 1969: 156). A new palisade had been erected, but water was still stored in casks. The walls were supposedly so decayed that firing the cannon might cause their collapse. The stones to roll on the enemy were of 100, 200, and 300-weight (Proulx 1969: 157). Fifty men with a captain were on duty at the Castle which was to serve as the governor's post in the event of an attack. The six best guns from St. Johns' were at the Castle and the best of the other cannon at Placentia as well. It was noted that the Castle formed the real key to the defence of Placentia and that the main fort and harbour could not last an hour should the Castle be captured (Proulx 1969: 157). Still another English account of the year 1709 mentions 10 iron and six brass cannon at the Castle which had walls 14 feet thick and a parapet 2.5 feet thick. The magazine was reported in the northwest corner (Proulx 1969: 160) which must be an error of direction since it is actually in the northeast corner.

One map of the Placentia area in 1709 shows the location of Castle Hill and other fortifications but lacks details (Proulx 1969: Pl. 2). Another general map of the

same date provides some information about Fort Royal (Proulx 1969: Pl. 13) (Fig. 8). The plan shows a battery of two mortars adjacent to the fort, probably the mortar platform constructed in 1705. The dry-wall and palisade around the perimeter of the hill is also identified. The L-shaped barracks building can be seen. On the plan the most important new feature is the ditch along the east side of the fort which is clearly shown and identified as unfinished in the key. Thus, another important feature of the fort was recorded and probably had been started sometime before this plan was drawn. Similar details may be seen on the plan of 1713 (Proulx 1969: Pl. 14) (Fig. 9). The ditch may have been constructed sometime between 1709 and 1713 but could have been built earlier. In 1713 the Peace of Utrecht ended the French occupation of Placentia (Proulx 1969: 139) and the English took over the town and its fortifications.

A plan of the area as transferred to the English in 1714 (Fig. 10) shows the redoubt but little in the way of detail beyond its shape, protective dry-wall and two of its buildings (Proulx 1969: Pl. 15).

The first English governor reported the town fortifications to be in a state of ruin, suggested repairs and made plans for them, but by 1718 it was decided not to spend money on the fortifications. Instead it was suggested

that the demolition of the Castle could provide material for construction of a sea wall. In 1730 it was reported that the parapet of the redoubt and the chimneys were in a state of decay (Ingram 1964: 4). The Castle was not even mentioned in a 1741 report on the fortifications (Ingram 1964: 4), although it is shown on a plan of the area of that date (Proulx 1969: Pl. 3).

A 1749 plan of the new fort being constructed at sea level includes a perspective view of Castle Hill (Newfoundland Provincial Archives 13/A7.7:9). The redoubt is shown on top of Castle Hill and is depicted with a flag flying. The drawing indicates the southwest demi-bastion and the south curtain wall but shows no structures rising above the level of the walls. This suggests that the two storey L-shaped French barracks was no longer standing and that the two storey English blockhouse had not yet been erected. The presence of the flag over the fort may indicate that it was in use at the time. The smaller redoubt on Mount Gallardin is also shown.

The English allowed the Castle and other outworks to collapse during the first 40 years of their occupation

of Placentia. It was not until after war broke out that some thought was given to the hilltop in 1775 when it was suggested that a palisaded redoubt with a central blockhouse and armament of six 6-pounders or 9-pounders be installed to defend the position (Ingram 1964: 4,5).

In 1758 the engineer had orders to fortify the Castle hill. He began the work but left the project unfinished, and it was not completed until 1762. Masons repaired the exterior walls as high as a man could reach and the dry-wall around the crest of the hill was rebuilt. The ramparts were provided with pickets and wooden platforms for the cannon were constructed (Ingram 1964: 5).

There are English plans of the Fort on Castle Hill in 1762 (Figs. 11,12). The plans show that the outer walls follow approximately the old line but there are indications of a slightly different parapet line as would be expected from the earlier collapse of the walls. The magazine in the northeast bastion is shown and adjacent to it is the main guardroom. This structure is in the same location as the former French hangar and the adjacent ramp leading into the

magazine, suggesting English reconstruction of these two French structures. An officer's guardroom appears to be in the same location as the old French guardhouse on the south half of the east curtain wall. Immediately to the west and sharing a common wall is a new structure, a storehouse. The old French L-shaped barracks on the south and west walls is missing, and in the centre of the interior of the redoubt stands a blockhouse. Around the Castle is another work, a line of pickets and salients enclosing the fort, but within the dry-wall around the escarpment. The location of fresh water wells (springs) is shown. The fort was renamed Castle Graves by the English at this time.

Castle Graves was apparently kept in no better repair by the English than Fort Royal had been by the French; by 1765 it was reported that the platforms were in bad repair (Ingram 1964: 5).

In 1774 new repair estimates for the Castle were made by Lieutenant Pringle. The grand battery was reported bulged and it was suggested that the fill be removed from the rampart and the wall rebuilt. It was also suggested that the magazine bastion be repaired and a magazine of two arches replace the single arched casemate. The

construction of cisterns for water was recommended. Repair of the blockhouse, guardroom, barracks, bridge and gate was to be undertaken and pickets were to be placed on the ramparts where there were no parapets (Ingram 1964: 6). Ingram suggested that not all of the listed work was done and this can be confirmed by archaeological evidence; however, many of the English structures and repairs have been identified.

Pringle's excellent plan of Castle Graves as of 1775 is available (Fig. 13), and includes sections as well as a plan view. On this plan the entrance is still a narrow passage in the east curtain wall and was flanked on the north by a guardroom. There is a small, narrow room between the guardroom and the east curtain. The unidentified narrow room is the equivalent of the old French hangar while the guardroom is in the position of the French ramp down to the magazine which continues to appear in the northeast bastion on this plan. The north guardroom is also shown in section on the plan and appears to be a two storey structure. The narrow room in the old hangar position is not identified on the plan and may, therefore, no longer have been a usable structure. The location of a guardroom over the magazine entrance ramp suggests that this is new English construction of a room above the ramp using pre-existing masonry walls as foundations. Access

to the magazine door was provided. On the south side of the entrance passage are two structures identified as "additional barracks" which share a common wall. The smaller structure forms part of the east curtain and is in the location of the old French guardroom, although it is shortened on this plan. The larger "additional barracks" appears to be the English addition identified as a storeroom on the 1762 plan. These structures, shown in section on the plan, are one storey, and each has a fireplace. In the centre of the interior of the redoubt is the blockhouse with a large hearth on its northern wall. It is shown twice in section on the plan and was a two storey structure, the second one overhanging the lower walls. The gun platforms are shown planked. Stairways to the rampart level are shown in the northeast and southeast corners.

In the sectional view of the fort it is clear that the tops of the exterior walls have collapsed and that a sloping talus of rampart fill extends from the extant wall level to the gun platform level. A vertical parapet of pickets is shown. Only the northeast bastion retains the original stone parapet. A vertical palisade line just beyond the exterior walls corresponds to such a feature in plan view. A section across the dry-wall at the perimeter of the hilltop is also shown; the structure

was provided with a fraise. As will be seen in later discussions, many of the features shown on this plan were identified in the excavations.

Although the plan of 1775 illustrated a reasonably substantial fortification, the condition of both the lower fort and the Castle was poor in 1776 and the guns were unserviceable (Ingram 1964: 6).

A somewhat later source of information about Castle Graves during the English regime is from the sketches of Placentia in the log of H.M.S. Pegasus, 1786 (Provincial Archives, Newfoundland and Labrador). In a general view of the harbour the Castle is shown with blockhouse and walls intact and flag flying (Fig. 14). A second sketch shows the grand battery or west gun platform in the foreground of a view toward Point Verde. The base of the flagpole is in evidence as is a cannon on a carriage, and a dismantled second cannon is present. The rampart appears to be weed grown and the remnants of some pickets may be indicated (Fig. 15). A third sketch from the same source is a view toward the south, looking at the town of Placentia from the Castle hill. The dry-wall enciente is depicted in the foreground and it is notable that there are no trees on the slopes as there are in a similar view today. At the right of the sketch part of the east curtain wall and southeast demi-bastion is shown. The masonry of

the bastion is weed covered. Part of the barracks roof and entrance gate are visible, as is the bridge over the ditch (Fig. 16). Although these sketches show little of the Castle in a definitive way, they do indicate that much of it was still standing at this date.

The fort on Castle Hill was described as being in ruins in 1794 (Murray 1968: 98). It may still have been armed, for firing the two guns a few times would have shaken the structure down according to a 1795 engineers report (Ingram 1964: 7). The construction of a block-house was recommended but never accomplished; the old one must have collapsed before this date.

By 1805 the Castle "could scarcely be seen;" in 1806 abandonment was recommended and in 1807 the site was described as a heap of ruins without armament. In 1811 remaining ordnance was removed from Placentia to St. Johns and there was no mention of Castle Graves in the report. In 1812 the land was to be sold and in 1822 there was nothing left of the redoubt but ruins (Ingram 1964: 7,8).

This outline traces the basic history of the construction and eventual abandonment of Fort Royal/Castle Graves. The two historical plans of the site which are most detailed and most useful are the French plan of 1701 and the English plan of 1775, which reflect the climaxes of Castle Hill during its major occupation periods. Most of

the features shown on these plans can be identified in the archaeological record, but the excavations suggest that the actual construction did not conform precisely to either drawing. Many dimensions determined from the scales on the several historical plans do not agree with one another nor with the structural dimensions determined archaeologically. These differences are probably due to errors of measurement or scale on historical plans rather than indicative of continual changes in the dimensions of major structural units. Furthermore, some features shown on the plans may have been planned but never constructed.

Archaeological work at the site was conducted as one part of the research necessary for the development and interpretation of this significant 18th century military post. A basic purpose of the excavations was to locate and identify structural remains as well as to expose them for preservation. The recovery of artifacts for use in archaeological analysis and for museum exhibition was no less important. An ultimate value of the research is that it contributes to an understanding of the different patterns of French and English adaptation to the New World.

When excavations began the basic outline of the redoubt could be seen and some masonry walls were exposed in the interior (Figs. 3,4,5). The fallen rock of the dry-wall around the perimeter of the hill was still in a well defined trace. The castle rose above the level of the surrounding

terrain in the form of a generally rectangular mound with sloping sides. Bedrock was exposed in several places on the hilltop and elsewhere there was but a thin mantle of soil and grass.

When the exterior walls of the Castle had fallen, the earth and rock rubble of the rampart fills spilled outward, creating a steep talus slope. Remnants of standing masonry were ultimately found beneath the talus. The redoubt had been built near the southwestern limits of the bluff top and air photos of the site (Fig. 17) show clearly the scree of rubble from the south and west walls extending a third of the way down the hillside to the sea. Cordon stones were found some distance down the slope and more could be recovered by an intensive search of the cliff.

The surface of the slope in the immediate vicinity of the redoubt was littered with irregular igneous rocks. An occasional cut stone from the cordon was found on the surface, along with broken glass and modern trash as well as artifacts from the occupation of the site.

A heavy wooden footbridge crossed the ditch on the east and gave access to the redoubt interior at the approximate location of the original bridge and entrance.

In the interior of the redoubt the northern revetment wall was standing exposed above the surface. Some of the facing stones were missing and in one section a modern

monument commemorating the tercentenary of the site and Placentia had been constructed in the line of the wall. The grass covered surface of the interior of the redoubt was relatively level but irregular due to a virtual pavement of rock rubble beneath the thin layer of sod. The other revetment walls were preserved but not exposed above a low ridge marking the approximate boundaries of the interior. The west wall of the south guardroom on the east curtain wall was also visible above the surface.

Along the crest of the mound marking the south side of the fort a series of flagpoles set in heavy concrete bases had been erected as part of the tercentennial celebration. A remnant of the fill of the grand battery facing the sea to the west was lined with cannon probably from the H.M.S. Gosport which was in Newfoundland waters in 1762 (Richardson 1962; see Grange 1967: 327,332). These had been recovered from the base of the cliff and brought to the site by local citizens. A small wooden gun platform had been placed at the southwest corner of the redoubt and supported one of the cannon mounted on a carriage. The scene was a virtual duplication of the 1786 sketch of the Castle in the log of H.M.S. Pegasus (Fig. 15).

Fragments of brick could also be found on the surface and local informants reported that many of the

chimneys in Placentia had been built of brick salvaged from the site. Apparently the walls of the rooms which formed the east curtain wall were once higher than when excavations began. These had fallen or been knocked down to safeguard visitors during the preparation of the site for the tercentennial celebration in 1962.

Small spruce trees cover the slopes of the mountain on which the site is situated and others were once growing over the redoubt itself. The trees had been removed from the entire top of the bluff for the tercentennial. The absence of the trees greatly facilitated excavations and helped to recreate the original view from the site as indicated in the Pegasus sketches.

Two major field seasons of archaeological excavation, in 1965 and 1968, are the subject of this report. The methods of excavation are described and the report includes an account of the structural remains of the site and their historical identification. The artifacts recovered are described, their distribution in the excavation units is discussed and their association with the French and English periods of occupation is indicated. The study of faunal remains has been a very fruitful source of information reflecting the nature of French and English subsistence patterns. Historical and archaeological data are used in the interpretation of the site from an archaeological point of view.

Throughout the paper the excavation unit associations of artifacts and other materials are recorded in detail in the belief that an essential feature of an archaeological report is the presentation of data in such a format that other researchers, with other goals, may recombine the data to suit their needs.

THE EXCAVATIONS

Personnel

During the 1965 season the field crew consisted of the director, two field assistants and 14 excavators hired locally. Laboratory work that year was done in St. Johns under the direction of the Signal Hill field director. In 1968 the Castle Hill field party included the director, two field assistants and 18 excavators. Three individuals carried out laboratory work at the site. There were few problems in training the field crews on the job despite the fact that none had previous knowledge of archaeological techniques and only two 1965 crewmen were available again in 1968. Some of the men became very adept at profile drawing while others developed outstanding proficiency in recognizing site stratigraphy and features. The ingenuity of the crew was useful in a wide variety of ways, and their knowledge of fishing contributed to the understanding of some aspects of the site.

The 1968 field season combined stabilization and limited reconstruction as the excavations proceeded, a

process dubbed consolidation. Two masons and three additional laborers were assigned to this work, but excavation and consolidation blended into a single operation.

Some aspects of site surveying were assisted by the two man geohm survey team in 1965 and a four man park topographical survey crew in 1968.

The field parties thus consisted of a variety of individuals either experienced or provided with training appropriate to the several different operations conducted.

Methods of Excavation

The excavation of Castle Hill was accomplished by hand labor using standard archaeological equipment such as picks, shovels and trowels. Rock rubble in the fill made the work arduous, requiring the frequent use of pry bars and sledge hammers. Power equipment, a front end loader, was utilized for the removal of back dirt and rubble during the 1968 season as well as for temporary backfilling of the site at the end of work in 1965.

Much of the excavation required the removal of masses of rock rubble from structures inside the fort and from the talus overburden around the exterior walls. The rubble was derived from the collapse of masonry walls and slumping of the rampart fill. The interstices between the rocks were filled with decomposed mortar and clay as well as

occupational debris, but much of the "dirt pile" from the excavations consisted of rock. The interior of the site was too small to accommodate massive spoil heaps and all material removed from that part of the site was taken by wheelbarrow and stockpiled north of the Castle. Material removed in the exposure of the exterior walls was piled adjacent to the excavation trenches.

Excavation technique was varied as necessary with each section of the site. Wall rubble in the upper portions of rooms and the magazine was loosened with picks and barrowed or carried away. Some fallen wall segments, too large to move intact, were broken up after recording. The main area of the redoubt interior was excavated by hand trowel wherever possible to maintain stratigraphic control and prevent the inadvertent destruction of remnant wall footers. Some screening of refuse from the ditch was possible despite the quantity of rock in the fill. The instability of the rampart fill and rubble talus around the perimeter of the Castle made it necessary to slope trench walls and in some cases to construct wooden shoring to prevent the accidental burial of workmen. High winds and fog sometimes hampered the work. Wet weather and visitors to the site resulted in occasional damage. Weekend tourists caused the collapse of one extensive profile.

The photographic record of the excavations made use of both colour and black and white photography using a

variety of 35 mm. and $2\frac{1}{4}$ in. x $2\frac{1}{4}$ in. cameras. A small polaroid camera was used to provide field photos used in wall consolidation. Surveying was done with a transit and mapping also employed a plane table and open sight alidade.

A grid system was established in the interior of the redoubt and extended to other parts of the site. The grid system was oriented so the base line was parallel to the exposed masonry revetment wall on the north side of the interior of the redoubt. This orientation was selected because study of historical plans indicated that such a grid would parallel most of the wall foundations and thereby simplify recording. The initial main stake was in the northwest corner of the redoubt interior at a point 5.0 feet east of the inside of the west revetment and 6.1 feet south of the inside of the north revetment. This point was arbitrarily designated 1,000 feet north and 1,000 feet east so that all excavation grid designations would be on north and east coordinates. At the end of the field work several concrete grid benchmarks were installed to permit future grid relocation.

Elevation of the site above sea level was established by an advance party. Site records include elevations taken with the transit and recorded on the numerous plan and profile drawings as well as in field notes. A contour

map of the Castle itself was made in 1965, and the 1968 park topographic survey included the entire site as well as surrounding park areas (Figs. 18,19).

Consolidation

At the end of the 1965 season the excavations were backfilled to ensure preservation of the site until a decision regarding future stabilization could be made. The exterior walls were supported by dry-wall revetments and the interior was backfilled by a local contractor using beach sand, although subsequent re-excavation indicated that some site backdirt also made its way back into the excavated areas in the backfilling operation.

By 1968 the decision had been made to continue excavations and to consolidate the exposed exterior masonry walls. The areas dug in 1965 were then re-excavated along with the exposure of the remaining wall areas. The initial plan proposed for stabilization of the curtain walls involved the removal of both the rubble talus from the exterior and the rampart fill from the interior side of the wall. It was proposed to then pressure grout the masonry and backfill the interior. This approach was tested in the excavation of the southeast demi-bastion. It was found that the depth and instability of the rampart fill precluded narrow trenching and would require the

complete removal of this material, an impossible task with resources at hand. It was also found that the mortar in the core of the wall was in much more solid condition than anticipated and, therefore, that pressure grouting would not have worked even if such equipment had been available in Newfoundland. It was, therefore, decided to stabilize or consolidate only the exterior side of the curtain walls, which eliminated the necessity of trenching the inside line. Some other technique such as drilling and pressure grouting may be used along the interior. An exception to this was the west wall of the Castle which was found to be in such poor condition that it had to be entirely rebuilt in the season of 1969 (Morton 1970).

Thus, one of the major objectives of the 1968 season was the preparation of the exterior walls for stabilization. The research excavation and consolidation work were coordinated. The selection of excavation projects was partly based on the requirements of the stabilization program and the work was adjusted several times during the season to meet those needs.

Although the engineering staff had the responsibility for the restoration program, much of the immediate supervision of wall consolidation was done by the archaeological field director with constant consultation with the stabilization crew. The archaeological field crew was sometimes

involved in cleaning walls for re-mortaring and the masons and their assistants sometimes collected artifacts during the course of their work.

The major aim of consolidation was simple stabilization of existing masonry but it was sometimes necessary to reconstruct missing sections of the wall to obtain structural solidity. Thus, several different types of restoration problems were encountered.

The simplest task was the stabilization of standing masonry and the bulk of the restoration work fell into this category. Only the lower portions of the original walls were still standing, but once rock rubble had been cleared away the base of the wall was usually found to be in fairly good condition. The mortar was generally leached away in the outer layer of stone to a depth of about a foot into the wall. There were occasional small patches where the original mortar was well preserved at the outer face of the wall. It was necessary to remove loose granules of decomposed mortar and sand from the spaces between the rocks; the process was continued until solid mortar in the wall core was encountered. The loose material was pulled out with masons' routing tools and the spaces were washed with a hand pumped fire extinguisher fitted with a 12-foot hose. Larger stones still held firmly in the mortar matrix were not moved. Smaller chinking stones were removed for cleaning

and immediately replaced. Sections of the wall thus prepared were re-mortared.

Where stones were loose because all mortar had been leached away the walls were often bulged out of line but still in relative order. These stones had to be removed, properly aligned, and re-set in a new mortar matrix. Drawings and permanent photographic records of the wall were made prior to the removal of any loose stone. The stones were also numbered and photographed in situ with a polaroid camera before being moved. These records provided a reference for the precise restoration of such wall sections.

Stabilization of the walls was done from the bottom up and in small sections to allow the mortar to set properly. Work on the masonry, therefore, shifted from place to place.

At the salient and shoulder angles and in a few other places it was necessary to add new construction for the consolidation to proceed, for at these points the walls had collapsed to a lower elevation than along the curtain. The close cooperation of the mason and the archaeologist was necessary to ensure that the reconstruction of such sections achieved the proper angle, slope and general appearance.

In the case of the northwest salient angle the decision

was made to reconstruct the salient using some cordon stones. The archaeological evidence made it clear that these stones had been used by the English in their rebuilding of the original French angle. It was decided to restore this corner to its as found condition reflecting the English repairs.

In other parts of the fort French wall foundations were stabilized. By adopting a policy of stabilizing the site as found, no single period of occupation was selected as a goal. Instead both periods of occupation are represented in the stabilized remains.

Some areas along the east curtain were almost entirely lacking in remnant walls, particularly at the shoulder angles of the two bastions. The locations of the angles were projected from extant wall lines and confirmed by old mortar stains on the bedrock foundation surface.

The consolidation of the site along with continued archaeological research proved to be a successful operation in 1968 (Grange 1969). It was, however, impossible to complete the west curtain wall and that work was done the following summer (Morton 1970).

Geohm Resistivity Meter Survey

A geohm resistivity survey of the Castle was conducted at the start of the 1965 field season, prior to the excavation

of the interior of the redoubt. The survey revealed six high resistance areas which interconnected to form three anomalies within the redoubt (Wilson 1965). Subsequent excavation of the entire area presents an opportunity to evaluate the geohm survey (Fig. 20).

The high resistivity areas A and B and a weak continuation, area C, formed an irregular line along the south side of the redoubt. Excavation here revealed the interior revetment wall along the inside of the south rampart. In this instance the geohm survey corresponded well with archaeological evidence. Traces of this wall could be seen on the surface and the contour left no doubt as to the identification of this feature prior to excavation.

Another high resistivity area formed a right angled pattern near the centre of the redoubt interior and was defined by the intersection of lines D and E on the geohm map. This moderately well defined pattern partially coincides with the location of the blockhouse hearth and an adjacent wall footer exposed in later excavations.

The third major high resistance area was a poorly defined one along the N990 grid line and was indicated as area F on the geohm map. No architectural remains were found in this area although it does coincide with map evidence of the north end of a barracks building constructed by the English.

Excavation of the redoubt interior exposed a heavy pavement of rock rubble beneath a thin layer of sod. The occupational zone beneath the rubble was very thin and bedrock was seldom much more than a foot below the surface. Considering these factors it is remarkable that the resistivity survey produced any recognizable pattern of resistivity variation.

A geohm survey of the glacis east of the fort was also conducted. The mantle of earth above bedrock in this area was so thin that no significant pattern emerged.

The geohm resistivity survey was planned as a test of the technique. Unfortunately conditions at Castle Hill were such that few features were clearly defined and the results were of limited application. It did provide data which suggested a cautious approach to the removal of rock rubble in the interior of the redoubt and many seemingly insignificant rocks were recorded on a grid plan before removal. A less cautious method could have resulted in the inadvertent destruction of wall remnants which were difficult to distinguish from rubble in the fill. From this point of view the geohm survey was a useful preliminary step.

The Excavation Unit Numbering System

The excavations were recorded in the operation, sub-operation, and lot system adopted by the Historic Sites

Service (Rick 1965). Operations are major excavation units and are divided into sub-operations as required. These units may be based on an arbitrary excavation plan or they may reflect significant architectural units such as rooms within a site. Lots are the specimen recovery units within the excavations and may be either arbitrarily or culturally determined. All of the above types of operation, sub-operation and lot designation were employed in the excavation of Castle Hill.

Specimens from the site are numbered in the above system and throughout this report the provenience of artifacts and the designation of architectural or stratigraphic features are recorded in this code. Thus, units and the specimens from them are given code numbers such as 2A1A1. The elements in the example of the code are: 2 (site number), A (designation for Province of Newfoundland), 1 (operation number 1), A (sub-operation A within operation 1), and 1 (the lot number). This system proved to be very convenient both in the field and in the laboratory.

At the start of excavations the available historical plans of the redoubt were compared with the geohm survey and with surface indications of walls and rooms. Tentative identification of several areas was immediately possible. Operation numbers were then pre-assigned to segments of the site. These assignments were made in such a way that

ample sub-operation division could be made during the excavation of any operation unit. The pre-assignment of operation numbers throughout the site made possible a systematic numbering which facilitated reference to particular areas. Thus, the entire west curtain wall was pre-designated operation 4 while the north wall was operation 3. The pre-assignment worked well in general although there were one or two cases where the system was not properly utilized. The location of operations, sub-operations and lots within the site are shown in Figure 21. The structural plan of the site is Figure 22.

Wherever possible the limits of an operation were determined to be coincident with the limits of an architectural feature such as operation 2, the magazine. There were also architectural features which were not evident at the start of the excavations and which, therefore, could not be predicted accurately enough to be given a pre-determined operation number. For example, in the interior of the redoubt there was no surface evidence of the presence of the footers of various structures. Thus, the entire interior area was designated operation 10 and then subdivided into sub-operations and the lots on the basis of the 10 foot grid system and stratigraphic or arbitrary excavation levels or both. This provided ample horizontal and vertical control.

The Excavation Units

A plan of the operations and other excavation units is illustrated in Figure 21. The following list of the major operations will serve to identify those units shown on the operation plan. A more complete discussion of the excavation units will be found in the subsequent discussion of the architectural features of the site.

Operation 1; the excavation of the ramp or room on the north side of the entrance and adjacent to the northeast bastion was designated operation 1.

Operation 2; the excavation of the powder magazine, the interior of the northeast bastion, was labeled operation 2.

Operation 3; the excavation of the exterior of the north wall of the Castle was designated operation 3.

Operation 4; the excavation of the exterior of the west wall of the Castle was designated operation 4.

Operation 5; the excavation of the exterior of the south side of the Castle was designated operation 5.

Operation 6; the excavation of the exterior of the east side of the Castle was designated operation 6. One sub-operation proved to be an interior structure after excavation. The operation includes the ditch beneath the east curtain wall.

Operation 7; the excavation of the room on the south side of the entrance was designated as operation 7.

Operation 8; the excavation of the area between operations 1 and 7 (the entrance passage) was designated operation 8.

Operation 9; the excavation of the ramparts on the south, west and north sides of the Castle was designated operation 9. The limits are between the interior revetment and the exterior walls.

Operation 10; the interior of the redoubt was designated operation 10 and excavated using an arbitrary grid system.

Operation 11; operation 11 was a narrow test trench on the glacis slope on the east side of the ditch.

Operation 12; operation 12 was the test excavation of a dry masonry salient paralleling the northeast salient angle of the Castle.

Operation 13; operation 13 was excavated as a test of the area northwest of the Castle, shown as a mortar platform on historical plans.

A complete listing of the excavation units by operation, sub-operation and lot is presented in Table 1.

Stratigraphy, Disturbance and Cultural Classification of Lots

The known history of occupations indicated the possibility of finding French and English materials in stratigraphic

sequence, and this proved to be the case in several operations. Floor levels in the magazine and other structures were identified and well preserved stratification was found in the rampart fills. However, undisturbed floors and occupation layers were not extensive in the site and it was immediately evident that there were several factors which contributed to the disturbance of stratigraphic deposits. Concerted efforts were made to identify and maintain stratigraphic units.

Within the interior of the redoubt the occupation zone was located beneath a stratum of rubble below the sod level. The occupation zone itself was irregular in depth, and when tested displayed no evidence of stratification. The zone was excavated in arbitrary levels as well as being separated from the rubble zone above it. The area was troweled, thus facilitating the search for stratified remnants, and some French material was found in restricted areas.

The dual occupation of the site is one of the primary sources of potential stratigraphic disturbance. During the French construction period there were modifications as indicated on the several historical plans. The partial physical collapse of the fort in the interval between French abandonment and English reconstruction almost certainly disturbed parts of the site. English construction undoubtedly disturbed earlier French occupational features and debris.

Finally, the post-occupation collapse and erosion of the site must also have contributed to the potential disturbance or mixture of previous deposits.

Robbing brick from the site for local construction was reported to the field party. This and tercentennial celebration clean-up efforts may also have resulted in some disturbance of the site. The location has been a popular visiting spot for many years and the remains of several picnic fires were encountered in the interior of the redoubt. Some parallel ridges in the turf in the relatively flat area immediately northeast of the Castle were identified by a local informant as former potato hills. It is possible that the site or even portions of the fort itself could have been used as a habitation in relatively recent times, although this was not confirmed by local informants.

Modern intrusive artifacts were found in many otherwise apparently undisturbed deposits. The unconsolidated nature of the upper rubble in the ditch, for example, would permit such small objects to filter downward quite readily. The most frequently encountered modern artifacts were fragments of beer and soft drink bottles. Bottle smashing is a local custom and it was only with great difficulty, and without total success, that daily and weekend visitors were prevented from breaking bottles in open excavations. Some "intrusive" material may well have been intruded during

the field season. A watchman was employed in 1968 but it was still impossible to prevent unauthorized activity at the site.

Modern artifacts were saved and their distribution in the site stratigraphy recorded (Table 1) in an attempt to control the modern disturbance factor.

Scattered modern intrusives were found throughout the horizontal limits of operation 10, the interior of the redoubt. Their vertical distribution indicates that the surface, the rubble layer and even the uppermost part of the occupational zone was subject to recent intrusion. The lower portion of the occupation zone was free of modern intrusives, with two exceptions. However, this zone was undoubtedly subject to potential mixing of French and English materials during the occupation of the site. Despite these problems the study of the distribution of ceramics and other artifacts permits the classification of these levels as "probably English".

Only the turf and one other lot in operation 7 included modern intrusive specimens, and this room was relatively undisturbed except by reoccupation and the ultimate collapse of its walls.

In operation 2, the magazine, one fragment of modern bottle glass was recovered from the rubble zone. A second modern bottle sherd had penetrated to an English floor level.

It is most likely that this sherd was thrown into the open excavation by a weekend visitor. Operation 1 also had two modern bottle sherds on the floor level, probably from the same source.

Modern intrusive artifacts were often found in the ditch fill, even to fairly deep levels. The upper zones were not consolidated and these were the most disturbed. The ditch was most heavily subjected to recent trash deposition.

An attempt to take into account all of the potential factors of mixture and disturbance was made during the analysis of the specimens from the site. It was clear from stratigraphic and other evidence that some excavation lots could only be classified as indeterminate or mixed levels. Others were clearly stratigraphically sealed and undisturbed. These could be identified as either definite French or English. Still other lots could be identified as probably French and probably English on the basis of their stratigraphy, their artifact contents or both; ceramics were the best key to identification. In the analysis of the artifacts these three levels of lot reliability, indeterminate, definite and probable, are employed. After the 1968 excavations of the rampart fill levels, an excellent sample from sealed French deposits was available but there is a very small sample of definitely undisturbed English occupational debris, for

obvious historical reasons. Artifact samples from definite French and English contexts are of unequal size. Consequently, the analysis of specimens includes comparisons based on "definite" French and English excavation units, similar comparisons based on materials from "probably French" and "probably English" lots, and finally a comparison of "total" samples. The use of this classification of reliability of cultural identification of excavation units is admittedly cumbersome. However, it has been useful in controlling the problems of stratigraphic disturbance and intrusion at the site. It is a means of indicating the reliability of the cultural identifications, and at the same time permits the use of maximum samples of materials objects for comparative analysis.

Table 1 presents a tabulation of the excavation units. It includes a brief description of the stratigraphy and indicates the field identification of the stratigraphic unit which was a preliminary evaluation to be reconsidered on the basis of artifacts and other factors. In the analysis, the relationship of each unit to others in the operation was also considered in reaching a final cultural identification of the excavation lot. The column marked *, Modern Intrusives, indicates with an X those lots in which recent bottle glass or other material was found. In the ceramics column the predominant pottery identification

is recorded; it is also indicated if there is a significant element of mixture in the ceramics recovered from the lot. In the pipe date column mean dates derived through the use of Binford's formula are listed. Many of these are for single specimens. Where the sample of pipe stems available for bore diameter dating is 10 or more specimens, the date has been underlined. In the miscellaneous artifacts category are listed only those specimens which were utilized in the initial cultural identification of the lot, e.g., the presence of French coins is noted.

In the final column the lots are classified as Indeterminant, Probably French, French, Probably English and English. These terms reflect the differential reliability of the cultural classification of the lots based on a variety of factors.

Another control on the cultural identification of lots is through cross-mended artifacts. Ceramic sherds, glass bottle fragments and clay pipe fragments from more than one excavation unit which fit together and have been cross-mended are recorded in Table 2. The cross-mends were recorded before the lots were given their independent final cultural classification. Then the cross-mend data was compared with the cultural identifications of lot sources of the component parts of the mended artifacts. In most cases the cultural identifications agree, even in examples

of parts of specimens from lots recovered in different operations on opposite sides of the site. There are, of course, a few exceptions but these are mainly from excavation lots in the ditch or other areas of known high disturbance or intrusion potential. For the most part the cross-mend data tend to confirm the cultural identifications of lots based on other considerations.

In the following sections the architectural features of the site are described in detail and discussed with respect to available historical evidence. The 23,535 artifacts recovered in the excavations are classified, described and correlated with stratigraphic and architectural features of the site. The faunal remains, consisting of some 22,518 specimens, are classified and their distribution in the site considered. These data provide a basis upon which the meaning of the site can be evaluated.

ARCHITECTURAL FEATURES

The various excavations at Castle Hill were designed to expose rooms and other structural features of the fort. The operations, sub-operations and lot units have been listed in Table 1. The rooms and walls exposed in these excavations are illustrated on the archaeological plan of the site (Fig. 22). Reference to that plan, to the French plan of 1701 (Fig. 7) and to the English plan of 1775 (Fig. 13) will be of assistance in understanding the following discussion of each operation and the excavated structures. Reference to the detailed stratigraphic analyses of artifacts will also be helpful.

Operation 1: The Ramp/Guardroom

The entrance to the fort was a narrow passage on the east side. The passage was flanked by structures and operation 1 exposed the foundations of one such feature on the north side of the entrance. The operation was 20.0 ft. long (north-south) and 9.25 ft. in width. The limits of the operation extended slightly beyond the

original interior perimeter of the room in order to locate the evidence of its structural boundaries. The exterior sides of the walls were exposed in the adjacent sub-operations 6B and 9J.

The structure appears on the French plan of 1701 (Fig. 7) where it is identified as a ramp leading down into the magazine. The 1762 English plan (Fig. 12) terms it the Main Guardroom and on the plan of 1775 (Fig. 13) it is identified as a Guardroom.

At the beginning of excavation most of the surface in this area was covered with loose rock rubble. The excavation was begun as a single sub-operation, 2A1A, with lots based on the fill stratigraphy. As work proceeded it was determined that the presumed western limit of the room was in fact a segment of the wall which had fallen into the interior. To facilitate removal of the wall fragment and further work, the sub-operation was enlarged and a second sub-operation, 2A1B, was established in the western half of the operation.

The fill stratigraphy consisted of a thick deposit of rubble, a layer of floor deposits and a thin sand and mortar floor resting on bedrock.

Material recovered from the upper rubble layer was designated lot 2A1A1; this layer extended from the surface to a depth of 2.0 ft. to 3.8 ft. below surface. In the northwest corner of the room a continuation of the loose

rubble zone, adjacent to and extending partly beneath lot 1A1, was separated as lot 2A1A2.

Lot 2A1A3 was stratigraphically beneath 2A1A1 and 2A1A2 and consisted of more compact rubble and brown sandy clay. It was coarser towards the north end of the building. Vertically this zone extended from 2.0 ft. to 4.5 ft. below the surface. This level was also part of the post-occupation fill of the room.

Lots 2A1A4, 1A5 and 1A6 were horizontal sub-divisions of a brown sandy clay level stratigraphically below 2A1A3. This stratum contained loose mortar fragments, brick chips, and artifacts including a large quantity of grape shot. It was 0.7 ft. in thickness and was interpreted as a floor or floor deposit layer. The largest concentration of grape shot was found in the north end of the room where the floor was at its lowest elevation. Lots 2A1AB1 and 1AB2 are also from this stratum.

At the bottom of the floor deposit was a layer of hard packed brown clay and artifacts from this stratigraphic horizon were designated lot 2A1A7. The layer was 0.05 ft. to 0.16 ft. thick and was interpreted as an original floor surface. A small black stained clay area was found adjacent to the doorway threshold in the north end of the room. The hard packed clay rested on a quarried bedrock surface. The bedrock floor slopes downward towards the doorway, the

floor at the north end of the room being 2.8 ft. lower than at the south end. This is consistent with the French designation of the structure as a ramp leading into the powder magazine located immediately to the north of operation 1. Figure 23 illustrates a profile of the structure.

The east wall of the structure was well preserved particularly at its north end (Fig. 23). The walls were mortared to bedrock. The northern corner and portions of the west wall were intact but little tangible evidence of the south end of the structure was found. Traces of mortar on bedrock indicated the probable southern limit of the structure. At the east side of the north wall a doorway constructed of cut stone was found; it opened into the powder magazine (operation 2). The doorway in the north end of the room (Fig. 24) had a three stone threshold mortared to bedrock. Some wood stains suggested the former presence of a wooden threshold on top of the stone one. The sides of the doorway were made of rectangular blocks of igneous rock, cut with notches to form a jamb (Fig. 25). In contrast, the masonry walls were constructed of irregular shaped rocks carefully placed to form a flat surfaced wall. All but a few of the doorstones had fallen out of position and several were subsequently found in the rubble fill of the magazine.

On the east side of the doorway three bent iron spikes driven into the wall formed a crude hinge gudgeon. A well made tanged gudgeon was found in the fill of the room, and on the basis of these artifacts a heavy wooden door may be inferred. The doorway was 3.3 ft. wide and was aligned with the stairway inside the magazine. The room excavated as operation 1 obviously served as the entrance to the magazine as shown on the historical plans. The French plan (Fig. 7) shows the door correctly located in the northeast corner of the ramp. The English plan (Fig. 13) shows the door centered in the north wall of the room and does not agree with the archaeological evidence of this detail.

The French plan illustrates the ramp with the entire south end open while the English plan shows a wall and a doorway into the guardroom on its south end. The south wall was detected only as mortar stains on bedrock and no evidence of a door was recovered. On the English plan of 1775 (Fig. 13) a sectional view of the room is shown as a two storey structure with a shed roof sloping downward to the north. From this it is apparent that the English built a guardroom at this location, using the masonry revetment walls of the open French ramp as the foundation for the structure. Since it continued to provide access to the magazine doorway the old ramp must

have become a basement-like entrance passage, or stairwell although the historical plan is not clear on this point. Only a few fragments of wood were found in the rubble fill but a number of nails were recovered and lend some support to the hypothesis that there may have been a wooden floor or stairs in the structure.

The interior dimensions of the ramp/guardroom may be estimated from the scales shown on the historical plans. The length of the east wall on the French plan of 1701 is 18 pied or 19.18 ft. but the wall is only 13.0 ft. long on the English plan. The actual length of the structure is 18.0 ft. if the south end has been correctly identified on the basis of mortar stains. The width at the north end of the room is 7 pied or 7.46 ft. on the French plan and 8.0 ft. on the English plan. The actual width is 7.75 ft. The French plan indicates that the south end of the ramp was slightly wider than the north end, but it appears to be slightly narrower in fact. However, the south end dimension is uncertain, due to the poor preservation of evidence in that area.

Specimens found in the fill and floor deposits of operation 1 are described in detail in various artifact sections. They include a large quantity of grapeshot, fragments of brick, roof tile, leather, wood, nails, strap iron and scrap iron, as well as a fork.

Ceramics from the fill and floor deposit levels are English brown saltglazed stonewares. Lot 2A1A7, initially thought to be the original French floor, produced English stoneware and Creamware sherds and two tin glazed earthenware sherds which could be either English or French. This level had to be classified as indeterminate due to the possible mixture, but was most likely an English level, no good evidence of the French ramp structure other than the sloping bedrock having been found. The floor deposit stratum must be an English deposit based on both stratigraphy and ceramic content.

Clay pipe stem fragments were rare in the structure, a total of nine being available. Combining specimens from lots within the major stratigraphic units, a mean date of 1664 was obtained for the rubble fill level. The floor deposit zone produced a mean date of 1729 and the 2A1A7 floor level a date of 1733. These dates are post-French and tend to confirm the ceramic and stratigraphic evidence that the occupational levels in the structure were remnants of the English period. Perhaps the old French ramp was well cleaned during the English construction of the guardroom. The earlier date from rubble fill specimens may be due to the same factor postulated in other similar situations in the site; mortar stained stem fragments demonstrate that the French workmen discarded pipe fragments in the mortar while building the walls.

The collapse of the structure would introduce such early specimens into the rubble zone which buried the floor levels. Too few pipe stems were found in the structure for adequate dating purposes; a further discussion is presented in the artifact analysis.

Another problem encountered in the interpretation of this structure was a large number of crushed and rusted tin can fragments found in the floor deposit level. Since the canning process and the use of tin cans post-date the occupation of Castle Hill these specimens must be regarded as recent intrusions. The intrusion must have taken place while the floor level was still open and prior to the collapse of the walls which buried these materials under the rubble fill. The room must have been used in relatively recent times, possibly as a picnic or work camp site. One local informant reported that walls of what may have been this room once stood quite high and had fallen in the relatively recent past. Despite these intrusive artifacts the other materials recovered can be attributed to the English occupation of the Castle.

It may be concluded that the historical plans of this room are essentially correct and that it was a ramp built by the French which was later used as the foundation of a guardroom by the English. There are

minor discrepancies between the as found dimensions and those on the historical plans. These are more likely to be errors in drawing these plans or in interpreting their dimensions rather than an indication of gross changes in the size of the structure during the occupation of the fort.

Sub-operation 6B: The Hangar

Sub-operation 2A6B was located immediately east of operation 1. The excavation was begun as part of the operation designed to trace the east exterior wall of the fort, but revealed an interior structure. It is a long narrow chamber flanking the north side of the entrance passage and is therefore discussed as a part of the complex in this area of the redoubt. The area excavated in this sub-operation was 20.0 ft. long (north-south), 7.0 ft. wide at the south end and 3.5 ft. wide at the north end. Its boundaries were determined by the location of masonry walls (See Fig. 26). The east wall of operation 1 was a common wall forming the western limit of sub-operation 6B. The north wall was also that of the powder magazine and the east wall was also the east curtain wall of the fort (See Fig. 22).

The structure exposed is a narrow chamber in the space between the east curtain wall and the ramp/guardroom.

The French plan of 1701 (Fig. 7) illustrates this room and identifies it as the hangar. The English plan of 1775 (Fig. 13) shows this space but does not identify it as a room.

Although there was some rock rubble on the surface in this area the room proved to be earth filled. Stained soil, rubble, animal bone and a few artifacts were found. No natural or cultural stratification could be detected and the fill was removed in 0.5 ft. lot units.

The floor of the narrow room was bedrock and sloped down toward the north. At the north end a small stone floor was found. It consisted of a flat slab roughly 1.5 ft. by 2.0 ft. in size which was set level in a mortar matrix. Beneath the slab was a deep hollow in the bedrock adjacent to the north wall of the structure. The presence of this small slab floor suggests that the structure was an open room when first constructed despite its later, perhaps purposeful, filling.

The walls of the structure were mortared directly to the bedrock. It could be seen that the north end of the west wall of 2A6B (the east wall of operation 1) and the north end of the east curtain wall (2A6C) both make butt joints against the south side of the south wall of the magazine (operation 2) (Fig. 27). This mode of construction indicates that the north-south oriented walls

were probably not built at the same time as the east-west oriented south wall of the magazine. Had all three walls been constructed at the same time bonding rather than butting would have been the logical construction technique. The magazine is in the northeast bastion of the fort, a corner shown on the 1695 plan (Fig. 6) as a demi-bastion which was later enlarged to full bastion form as shown on the 1701 plan. This was the only positive evidence of the enlargement of the bastion. It is interesting to note that on the 1701 French plan (Fig. 7) the magazine and its south wall are shown in a slightly different shade than the remainder of the walls of the Castle. The real significance of this difference is unknown but it could be an indication of the plan to enlarge the bastion.

On the 1701 French plan the hangar is shown with a very thick wall at its southern end and with a doorway or opening at its southwestern corner. The south end of the structure was poorly preserved but wall remnants and mortar stains on the bedrock in the entrance area did indicate that this wall was probably quite thick (Fig. 22). No archaeological evidence of the opening shown on the French plan was found. The French plan also illustrates the east wall of the hangar (which was also the north half of the east curtain wall of the fort) as being provided with at least four embrasured loop holes. No

positive evidence of this feature was found (See 2A6C). The French plan indicates that the north end of the hangar was slightly wider than the south end; the reverse was found to be the case. The same reversal of width dimensions is noted on the English plan of 1775 (Fig. 13). The French dimensions of the structure are: length 16 piéd or 17.06 ft.; width, north end, 6.5 piéd or 6.92 ft.; and width, south end, 6.0 piéd or 6.41 ft. Similar dimensions from the English plan are length, 13.5 ft., width, north end, 4.5 ft. and width, south end, 5.5 ft. The archaeological measurements of the structure are length, 17.0 ft., width, north end, 2.25 ft. and width, south end, 5.0 ft.

The French plan of 1701 also illustrates a guard-room and a barracks, and the plan view illustrates the roof lines of these two structures. It does not indicate a roof line for the hangar and it may be concluded that the structure was probably an open one without any roof or covering. The presence of the embrasured gun ports in the plan of the hangar makes possible some further inferences about construction sequence in this part of the fort. It has already been noted that the doorway from the ramp (operation 1) to the magazine (operation 2) is located right at the east wall line and in the corner of the ramp. This appears to be an awkward arrangement. If the east wall of the ramp area were not present

(See Fig. 22) the doorway would have been centered in the south end of the ramp area, a more logical arrangement. Since the east curtain was provided with embrasures it was obviously the intention of the builders to have musketeers stationed there during an attack. Gunfire from such a location would be hazardous to the safety of the adjacent powder magazine and it may therefore be suggested that the common wall forming the boundary between the ramp and the hangar was a later addition to correct this dangerous defect. The only possible location for such a wall which would leave the entrance to the magazine open and still allow sufficient room to use the hangar is the position where the wall is found. It has already been noted that the joint between the magazine masonry and this wall is a butt joint indicative of late wall construction.

The space designated the hangar on the French plan is shown on the English plan of 1775 (Fig. 13) but not on the English plan of about 1714 (Fig. 10) which shows no structures in this area. The English plan of 1762 (Fig. 12) shows the guardroom extended clear to the east wall of the fort. The guardroom on the 1762 plan would thus encompass both operation 1 and sub-operation 6B as discussed here. The possibility that the guardroom was that large must be kept in mind. However, the scale of

that plan is small and the 1775 plan is more detailed and accurate. The guardroom as shown on the 1775 plan is only in the operation 1 area and the sub-operation 6B space is illustrated but left unidentified. The fact that the space is not identified on the 1775 plan suggests that it might not have been in use and possibly was not even an open room at that time.

The structure was found full of clay and without good evidence of stratigraphy; hence the filling appears to have been done rapidly. The only ceramic specimens recovered were from the upper levels. In lot 2A6B1 an English porcelain sherd and two French tin glazed earthenware sherds were found. In 2A6B2 a single French stoneware sherd was found. This could support a post-French filling hypothesis, but the sample is too small for firm conclusions. Only six pipe stem fragments were found, also too small a sample. Bore dates range from 1664 to 1740. Cannon balls and other artifacts found in the fill of this structure are largely confined to the upper levels of fill. The analysis of artifacts from the sub-operation does not solve the problem of when the structure was filled.

Its clear identification as a hangar and its important structural features shown on the French plan of 1701 make it most likely that it was in use throughout

the French period. Its lack of a functional designation on the English plan strongly suggests that it was not in use in 1775. In the interval between French abandonment and English reconstruction of the Castle the fort collapsed, particularly the upper portions of the curtain walls. If the east curtain had collapsed the simplest repair of the wall might have been to fill in the remnant of the hangar and the hypothesis can be advanced that the filling of sub-operation 6B was done by the English.

The structure therefore appears to have been constructed by the French, perhaps partly as a modification correcting some design defects. Collapse of the east curtain wall may have made the structure unusable to the English who probably filled the chamber as part of their reconstruction effort.

Operation 7: The South Guardroom

Opposite operation 1 and sub-operation 6B the entrance was flanked by another structure, the south guardroom. This building forms the south half of the east curtain wall and appears on all major plans of the fort. A structure in this approximate location is shown on the 1695 French plan (Fig. 6), and on the 1701 plan (Fig. 7) is well illustrated and identified as the "corps de garde". The 1762 English plan (Fig. 12) identifies the building

as the "Officer's Guardroom" while the 1775 plan (Fig. 13) lists it as an "additional barracks."

The west wall of this masonry structure was visible on the surface at the start of excavation, making it easy to identify. The feature was designated operation 7; its maximum limits were 8.0 ft. by 17.0 ft. The basic excavation unit was defined by the masonry walls of the building. The lots within the operation were based on arbitrary horizontal and vertical subdivisions of the area except where floor remnants or cultural deposits were identified and could be used as stratigraphic units.

The upper levels of fill in the structure consisted of clay and rubble. Scattered brick was found and undoubtedly came from the collapse of a chimney. Additional brick fragments were found in the ditch, sub-operations 6D and 6A9 directly below the room. The amount of brick found was insufficient to represent an entire chimney and the local tradition that the site was robbed for brick is probably correct.

The floor levels of the room were greatly disturbed and little evidence of stratigraphy was found over most of its area despite careful excavation by trowel. The area immediately in front of and beneath a hearth found in the south end of the room did produce several stratified deposits from which the occupational sequence of the room can be reconstructed.

The hearth itself was a rectangular platform found beneath the rubble fill of the room (Fig. 28). Below the level of the hearth was a stratum of clay, mortar and brick fragments. Beneath this zone was a thin very dark stained floor level with some brick laid flat in it at the same elevation. Directly beneath the brick was a trace of rotted wood with the grain running east-west, suggesting that a wooden floor oriented in that direction was a feature of this occupational level. Below the floor level represented by the black stained zone and wood traces was a stratum of artificially packed clay, and below that was a thin layer of mortar laid on bedrock. The sequence is illustrated in Figure 29. The lower mortar layer was later found to be the pad on which a French hearth had been constructed (Morton 1970: 7,8).

The lowest floor level consisting of the mortar layer and fireplace base clearly represents the French occupation of the structure. One French earthenware sherd was recovered from this zone, along with two pipe stems which produced a mean date of 1664. The intermediate floor level, consisting of the black stained zone on a packed clay layer, was thought in the field to represent a late French floor. This interpretation was supported by a French coin from the level. One sherd of English stoneware came from the zone and the nine pipe

stems produced a mean date of 1723. These factors suggest some mixture of the level with English intrusive specimens, although the possibility that the level represents an early English floor cannot be ignored. However, the floor deposit is dark black, a characteristic consistently found in sealed French deposits in the site. Since this room appears on the French plan of 1695 and the later one of 1701 in modified form, two French occupations in the structure were possible. The final conclusion was that the intermediate floor level was probably French in origin with possible re-use by the English before the final reconstruction of the building.

The wood traces, coupled with a wooden timber adjacent to the English hearth can be interpreted as the English floor in this room and deposits above this level, along with the rectangular hearth base, are of the English period. Several brown saltglazed utilitarian stoneware and fine white saltglazed stoneware sherds (English period ceramics) were found in these levels and seven pipe stems produced a mean date of 1780.

The uppermost stratum of sod and rubble fill above the hearth level contained four English stoneware sherds and one tin glazed earthenware specimen which could be either English or French. Eleven pipe stems produced a mean date of 1709, probably due to the presence of French

stems in the matrix of the collapsed French wall. Ceramics were regarded as more significant and the lots in this zone were classified as English and probably English.

French elements in the stratigraphic sequence were best preserved in the area of the hearth and poorly preserved elsewhere. Perhaps refuse from previous occupations was removed during the English reconstruction.

The east wall of the room was 4.6 ft. thick since it formed the east curtain wall of the fort. The west wall was 2.0 ft. thick, the south wall was 1.8 ft. thick and the north end wall was tapered and ranged from 3.0 ft. to 4.0 ft. thick. It was not well preserved and some mortar stain evidence was used in this determination. All of these walls were mortared directly to bedrock. The outer edge of the east wall was just at the edge of the vertical face of bedrock at the edge of the ditch. The corner of the operation 7 room exposed in 10B is mortared on clay rather than on bedrock. The clay is the natural purple sub-soil clay on bedrock. Above the base of the wall mortar was smeared on the exterior face; this was at the level of and obscured by the black zone of French occupational level 2A10G10.

The exterior side of the south end wall was exposed in sub-operation 9E. Here, too, the wall is founded on sub-soil clay rather than on bedrock. There is also an extension of the black occupational soil from 2A9E2 beneath a mortar layer at the base of the wall. At the southeast corner of operation 7 the flank wall of the demi-bastion and the wall of the guardroom form a continuous masonry structure. The angled juncture of these two walls was exposed in sub-operation 9E. The exterior of the south end wall of the guardroom is straight, paralleling the interior side of the wall until it reaches a point near the end of the structure. There the wall angles slightly toward the south and becomes the interior side of the demi-bastion flank (See Fig. 22).

The length of the room was 16.4 ft. in the north-south direction. It was slightly tapered, the north end being 8.3 ft. wide and the south end 7.5 ft. in width. The English plan of 1775 (Fig. 13) shows this room as being 10.5 ft. long by 10.0 ft. wide. The hearth location shown in this plan does not agree with the location found. It may be concluded that this detail of the 1775 plan is either incorrect or represents a proposed change which was never made. The dimensions of the room on the French plan of 1701 (Fig. 7) are length, 16 piéd or 17.05 ft. and width, 9 piéd or 9.59 ft. Again the actual measurements

are similar but not identical to those shown on historical documents.

At the south end of the room a rectangular hearth base was found in the English floor level. It was 4.0 ft. by 5.5 ft. in size and was constructed of irregular flat stones laid in a mortar pad. The west side of the hearth was only 0.5 ft. from the west wall of the structure and a large floor beam was found between the hearth and wall. Large spikes were associated with the rotted beam. The beam was oriented north-south, at right angles to other traces of wood found elsewhere in the English floor zone. These facts suggest that the beam was a sleeper which supported flooring.

The hearth was in excellent condition and was re-buried intact at the end of the 1965 field season to await a decision concerning the restoration of the feature. A nearly identical English hearth was also preserved in sub-operation 10G. In 1969 it was decided to remove the operation 7 hearth base and beneath it a French fireplace was discovered (Morton 1970: 7-10). The French brick fireplace rested upon flat limestone slabs in a mortar pad on bedrock (See Fig. 30). The brickwork of the fireplace was inset into the south wall of the guardroom. The brick used in the construction of the fireplace is of the thin variety associated with

the French period of occupation (See the section on bricks). On either side of the back of the hearth a stone and brick projection was built to make a rectangular fireplace (Morton 1970; Figs. 3,11,12). The shape of the fireplace is the same as that shown on the French plan (See Fig. 7). It is notable that the French fireplace is close to the west wall of the room, as it is shown on the 1701 French plan. The English hearth was similarly offset, perhaps to utilize the existing chimney, but it is not shown in such an offset location on the 1775 plan. This detail of the 1775 plan is either incorrect or a projected change.

No direct evidence of doors or windows was preserved in the low remnants of the masonry walls. The French plan of 1701 indicates that the east wall of the room, which was the thick east curtain wall of the fort, was pierced with five embrasured loop holes. A doorway opening in the west end of the thick south wall is also shown on the plan. In the centre of the west wall a small opening, probably a window, is illustrated. In view of the accuracy with which the French fireplace was shown on this plan it may be assumed that the door and window data are similarly reliable. The French plan also shows some detail about the roof of the structure. The roof apparently had a

short central ridge and sloped in all four directions.

The English plan of 1775 does not show the embrasured loop holes in the east wall nor can they be seen in the Pegasus log sketch of 1786 (Fig. 16). During this period the west wall was a common wall for an adjacent additional barracks and no longer had a window. Two openings are shown in the south end of the structure. The roof is illustrated in a profile view and was a shed roof sloping downward toward the east from the western wall. The 1775 floor plan of the room varies from the actual shape as already discussed and the reliability of these door and roof details may be questioned. However, it is likely that the major error is merely in the length of the room as shown on the plan.

The sketch from the log of H.M.S. Pegasus shows the east exterior of this building. The shed roof line may be seen and appears to be shingle covered. The wall may have been covered with vertical planks; it contrasts clearly with the masonry of the southeast bastion in the sketch. The wall is blank and the old French loop holes are not in evidence. This suggests the possibility that most of the east curtain had collapsed by this period and was replaced by a timber wall during English construction.

Artifacts from the room are discussed in detail in various sections; those of stratigraphic significance have been mentioned in the analysis of the floor levels. The room contained relatively few artifacts and most of these were from the upper levels and from the English period.

Two examples of cut limestone should be mentioned here. They were carefully cut with double curved surfaces suggestive of a complex arch and could have come from a decorated door or window. These specimens were found in the talus of rubble from the southeast bastion quite some distance from operation 7. It is only remotely possible that they were associated with that room, but they seem unlikely as parts of the exterior walls and the possibility is therefore noted here. Just how these cut stones were used in the redoubt is unknown.

The archaeological evidence indicates that the French plan of 1701 is probably an accurate representation of the building and that the English rebuilt the structure using the French wall lines. An early French floor, a probable late French floor possibly re-used by the English, and a final English floor level were identified in the stratigraphy and remnants of both the French and the English hearths were found in the room.

Operation 8: The Entrance Passage

The entrance to the redoubt was located in the centre of the east curtain wall. It opened into a short narrow passage flanked by the hangar and ramp/guardhouse on the north and a guardhouse on the south. The area between these structures was designated operation 8. The excavated area was 10.0 ft. wide and 14.0 ft. long. It was bounded by the limits of operations 1 and 7 and sub-operations 6B, 6D and 10H.

The modern footbridge leading across the ditch and into the redoubt was located approximately at the original entrance to the fort. During 1965 this area was used for wheelbarrow traffic in removing the fill from the rest of the interior and only a small test of the entrance area was excavated late in that season; it was sub-operation 8A. The remainder of the entryway was excavated as sub-operation 8B in 1968 except for a small area beneath the modern bridge which could not be worked on until the bridge was moved in 1969. Sub-operation 8C was excavated at that time (Morton 1970: 10,11).

The fill in operation 8 was similar to the rubble zone in the interior of the redoubt. Only small traces of the occupation zone were preserved. Bedrock appeared about 1.0 ft. below the sod covered surface. All strata in sub-operations 8A and B were classified as "probably

English" on the basis of the few English ceramic sherds found, and a lack of French material. The entrance passage was an area unlikely to have retained any extensive remnants of French refuse during the English occupation. The fill in operations 8A and 8B consisted of brown stained clay, brick chips, mortar fragments and fallen rock. The only remnant of the occupation zone was in a pocket adjacent to the end of operation 1. Some coarse earthenware sherds were found in bedrock fissures in sub-operation 8C and may represent a French deposit (Morton 1970: 11).

As in the rest of the interior, the western half of the entrance proved to terminate on a rough weathered and partly quarried bedrock surface. However, at the east end, near the entrance opening in the curtain wall, in sub-operations 8B and 8C, a flagstone paving was found. The paving did not extend all of the way to the entrance opening but could have done so prior to the intrusion of the modern footbridge. An alignment of four stones and some mortar stains on bedrock were found just inside the entrance passage opening. These were exposed in the excavation of lot 2A6D21, a small deposit on the top of the sheer bedrock face which formed the limit of the ditch and the lower half of the east curtain wall. The unit was included in sub-operation 6D because it was

under the footbridge when excavated in 1968 and could not be reached from above. These stones may mark the eastern end of the flagstone paving.

The flagstones within the entryway were not mortared in place when found but evidence of original mortaring to bedrock was later discovered (Morton 1970: 26). At the western end the paving terminated at a shelf or step in the bedrock about half way along the north wall of the operation 7 guardroom. This point may be interpreted as the western end of the formal entry passage although the actual space flanked by structures continued farther to the west. If the flagstone paving originally extended from the bedrock shelf to the opening in the curtain wall it was 7.0 ft. in length. It is assumed that, like the interior of the redoubt, the remainder of the entrance passage probably had its rough bedrock floor covered with a layer of clay or sod.

The north wall of operation 7 was well enough preserved that the line of this structure could be determined with accuracy. The south end of sub-operation 6B, in contrast, was poorly preserved. It had been impossible to determine the original thickness of the south end wall of sub-operation 6B during the excavation of the interior of the hangar and it was hoped that additional evidence would be found in sub-operations 8B and 8C which exposed

the exterior side of this wall. The masonry was in poor condition and the problem was not fully resolved. A thin section of standing masonry was found at the end of sub-operation 6B but the wall is not as thick as the comparable northern end of operation 7 on the opposite side of the passage. The best hypothesis is that the thin wall represents English repairs when the old French hangar was filled and that the original thickness of French construction was similar to operation 7. It is thus suggested that the English widened the entrance passage when they filled the hangar.

The south end of operation 1 may have been open and without a wall during the French period, but could have had a low curb. It may have been enclosed during the English period when a guardhouse was built on the ramp foundations. However, little actual masonry was preserved in this end of operation 1, and the reconstruction of the probable south end of the structure depends upon the position of mortar stains on the bedrock. These stains were used in projecting the dotted line representing the possible French wall line on the site plan (Fig. 22). It is also shown on the operation 10 plan (Fig. 38).

Another mortar stain within operation 8 is also shown on the site plan. It is a narrow strip with an east-west orientation and is located in the centre of

the passage. It is too far south to represent part of the original wall line. It is tempting to guess that this may have been a footer for a stairway leading up to the floor level of the guardhouse built in the operation 1 location by the English. That guardhouse was a two storey structure on the 1775 plan and such a stairway would have been required.

In the stabilization of the south end of sub-operation 6B, the wall was restored as a narrow one based on extant masonry remains. This is shown as a solid line on the site plan (Fig. 22) and is thought to represent the northern side of the entrance in the English period. Dotted lines on the site plan indicate the possible original extent of this wall during the French period. The latter line is projected from mortar stains on bedrock in 2A8A, from the width of the flagstone paving in 2A8B and from the corner of the east curtain wall at the entrance opening. The latter point was projected from the east curtain wall line and confirmed by mortar stains on bedrock; the original corner was not preserved. Thus the line of the north side of the entrance passage for the French period is an estimate based on incomplete evidence. The accuracy of this reconstruction is supported by the measurement of the entrance passage on the French plan of 1701 as discussed below.

Whatever the width of the entrance passageway, it was tapered. The narrowest part was at the opening in the east curtain wall. The tapered construction of the south end of operation 7 indicates the expansion of the entry toward the interior of the fort. It is shown thus on the French plan of 1701, which also suggests that the thick wall did not extend the full length of the end of operation 7. The archaeological evidence of this end of the room did indicate that the wall was thick for its entire length. Since there was a door near the west end of the wall, the thickness may have been present only at the foundation level which was the preserved portion. The French plan of 1701 suggests that the formal entrance passage extended inward from the opening about half the length of the guardroom wall, a distance which coincides with the western limit of the flagstone paving.

The 1701 plan width of the entrance passage at the east curtain wall was 5 piéd or 5.33 ft. and expanded to 6 piéd or 6.39 ft. at its western limit as defined above (See Fig. 7). The archaeological measurements based on the inferred French wall line are 5.5 ft. wide at the mouth and 6.5 ft. wide across the end of the paving. These measurements are remarkably similar to those estimated from the French plan. The length of the entrance

as shown on the 1701 plan varies, if the length is determined to be represented by the thicker end walls of the hangar and guardroom which flank the passage. On the north side of the passage the length shown is 6 pies or 6.39 ft. while on the south side the length is 7 pies or 7.46 ft. The archaeologically determined length, based on the western termination of the paving, is 7.0 ft.

On the English plan of 1775 the entrance is either not clearly indicated or was rebuilt in angled form and became narrower on the interior. It measures 4.5 ft. wide at the east end and 3.5 ft. wide at the interior end on that plan. The archaeologically determined entrance widths for the English period are 6.5 ft. wide at the opening and 8.75 ft. wide at the interior. The accuracy of the English plan on this detail may be questioned; alternatively, the archaeological reconstruction may be incorrect.

The French plan of 1701 shows the exterior of the entrance opening to be bolstered or thickened and to be notched on the interior, presumably for purposes of closure by means of a heavy door. No evidence of this construction was found. During the English period the 1786 sketch from the log of H.M.S. Pegasus shows what may be a wooden gate and/or a spiked portcullis, but is not very clear.

The width of the entrance passage would have been sufficient for the passage of the carriage of a 24-pounder cannon. The restored 24-pounder carriage at the site in 1965 was 4.0 ft. wide. The width of a 24-pounder carriage is 4 ft. 11 in. and that of a 12-pounder is 4 ft. 4 in. (Bugler 1966: Drawing XIII). The largest cannon ball recovered from the site was 24-pounder calibre. In any event carriages could have been built inside the fort.

The main archaeological discovery in the entrance was the flagstone paving which was not shown on any plan. The archaeological evidence suggests that the French plan of 1701 is probably an accurate representation of the entrance and that the English may have widened the entrance when they filled the hangar. The location of the entrance remained the same during the French and English periods. The 1695 French plan, when compared to the plan of 1701, indicates a different location but no such evidence was found.

Operation 2: The Powder Magazine

Operation 2 was the excavation of the interior of the northeast bastion of the Castle. It is clearly identified on the French plan of 1701 (Fig. 7) and the English 1775 plan as the powder magazine. Below the

level of standing masonry, the limits of the excavation unit were determined by the interior walls of the structure. At the surface the maximum extent of the operation was 23.0 ft. by 25.0 ft.

The fill in this structure consisted largely of rock and decomposed mortar derived from the collapse of the thick walls and arched roof of the magazine. Excavation was initiated by removal of loose rock from the surface, revealing two shallow depressions in the area of the operation. Subsequent excavation treated these depressions as if they might have structural significance. Later it was determined that they were the result of differential filling around a large section of the roof arch which had fallen in the centre of the casemate. Three sub-operations were established during the excavations, partly to work around the masonry block and partly to maintain baulks for stratigraphic control. Sub-operation 2A2A was along the east half while sub-operation 2A2B was in the northwest quarter and 2A2C was in the southwest quarter of the magazine. The sub-operations were of different sizes and were only used for convenience in excavation; they have no structural significance.

The size of this room required the efforts of several crew members for most of one season to excavate.

The amount and size of the rock rubble made this an arduous task and, as the depth increased, it became both more difficult and dangerous. Some massive sections of the fallen roof were found in such a position that complete observations were impossible prior to breaking them up for removal. No significant data were lost. The overhanging sections of the arch along the east and west walls of the magazine were an everpresent danger to the crew due to the poor condition of the mortar and required timber bracing and constant attention.

The rocky fill extended from the surface to depths of from 6.5 ft. to 9.5 ft. below the surface. This material was from the walls and arch of the structure and was removed as a major stratigraphic unit. As depth increased the fill included more small rubble such as brick chips, smaller stones and chunks of mortar, but no well defined stratigraphy was present in the main rubble fill. This suggests that the collapse of the arched roof was a sudden event rather than a gradual process and probably took place when the decomposition of the mortar had weakened the structure. Cut door stones from the entrance in the south wall were found beneath the fragments of the arch, indicating that the south wall collapsed into the magazine first. Without its

support the roof could not have stood for long. Structural weakness of the south wall could have developed through the collapse of the doorway. Its cut stones were found concentrated around the stairway.

The irregularities of the rock rubble made it difficult to maintain stratigraphic control, especially where rock had been jammed into floor levels by the force of the collapse.

The largest segment of the fallen arch was measured to determine its curvature before it was broken up for removal. The leaching of the mortar had resulted in a thick lime deposit on the surface of the arch and stalactites of lime one-half in. to one-quarter in. in diameter had developed. The lime deposit was also thick on vertical sections of the east and west walls as well as on the overhanging surfaces of the arch. It was thick enough to obscure the stones within the wall. Similar deposits can be seen in the casemates at Fort Lennox, Quebec.

Most of the rock from the fill consisted of irregular green and red igneous rocks, but some thin tabular slivers of a fine grained blue-grey igneous rock were also present. Observation of the fallen arch segments and standing arch remnants indicated that the tabular stone had been used in constructing the arch. These stones were set in mortar

with their long axis at right angles to the curvature of the arch. Thus; the inside surface of the arch (the ceiling of the room) had a bumpy appearance because it was made up of the ends of the tabular stones. Irregular rock was used to construct the core of the arch and the remainder of the walls.

During the English period it was proposed that the arch be replaced by a double arch using brick salvaged from the old one (Ingram 1964: 6). One or two bricks were found incorporated in the wall structure and a few bricks were found in the rubble fill. However, relative to the mass of material in the magazine brick was rare. None of the preserved segments of the arch included brick or showed any sign of having had a layer of brick mortared to them at any time. The extant walls were covered with a thick lime deposit which must have taken some time to develop. There was, in short, no evidence of any brick construction within the magazine and this English proposal must not have been carried out.

The following lots were assigned to various parts of the rubble fill stratum: 2A2A1,2,3,4,5,9, 2A2B1,2,3,4,5,6 and 2A2C1,2,3,4. These lots represent different horizontal areas and/or different vertical levels distinguished on the basis of minor differences in the color of the sand and decomposed mortar. All of these

excavation units belong to the same basic stratum of rubble fill.

In sub-operation 2A a concentration of black material was found along the north wall of the magazine. After some initial question the deposit was identified as a pile of leached coal and was designated lot 2A2A6. The north wall was stained black as were all specimens found in the deposit.

Lots 2A2A7 and 8 were found stratigraphically beneath 2A2A6 and consisted of a layer of mortar 0.4 ft. thick. Lot 2A2A10 was a layer of mortar with some inclusions of coal; it was probably continuous with the mortar layer of 2A2A7. Due to the disturbance of the layer by roof material jammed into the zone in the collapse of the arch it was difficult to follow this floor layer continuously. All excavations at this level were with trowels where possible. Lot 2A2B7 and 2A2C5,6 and 7 are all from a layer of brown sand and tan mortar which corresponds to 2A2A7 and 10. Thus, a major floor level was traced throughout the magazine except for interruptions caused by the falling arch. This being the first floor level beneath the roof rubble it was identified as English on the basis of its stratigraphic position.

Below this layer was a thin zone of clayey black sand which was designated as lots 2A2A11, 2A2B8 and 2A2C8. There was some disturbance of this level by the collapsed arch but despite these difficulties it could be traced as a stratigraphic zone over the entire floor of the magazine. It was also identified as a floor level and, being stratigraphically below the previously identified English floor, was presumed to be French. A bone comb bearing the initials C.I.R. and the date 1698 was found in this floor level, supporting the stratigraphic identification (Figs. 23,31).

Beneath the black sandy French floor was a thin layer of tan mortar; lots 2A2A12, 2A2B9 and 2A2C9. This was interpreted as the original floor upon which the black sandy French floor deposit built up through use.

Under the French mortar floor a layer of brown sand and clay was designated as lot 2A2A15 extending over the entire operation. Mixed with this sub-floor clay were small angular spalls of bedrock. Removal of the stratum exposed the bedrock surface and it was found to be rough with jagged angular peaks and pockets. The deeper cracks in the bedrock surface were filled with small chips and spalls of the rock, a filling technique observed elsewhere on the site, in operation

10. It was obvious that the bedrock floor was a quarried surface, and four worn iron chisels were found in the French levels.

The stratigraphy of the magazine suggests the following construction sequence. The bedrock surface was quarried in preparation of a relatively level floor in the desired area.

The walls of the magazine were founded on mortar pads on the bedrock. A thick mortar footer was found along the east and west wall bases. The deeper pockets in the rough quarried surface were leveled by filling them with rock chips and the sub-floor was finished with the deposition of a layer of brownish clay and sand. A thin layer of mortar was then applied to form a hard floor surface. A black stained deposit developed on this floor during the French occupation. Subsequently this level was sealed with another floor of mortar and sand during the English period. Coal was either stored in the magazine or used as a floor covering and this, mixed with brown sand and mortar represents an English floor deposit level.

The 1695 French plan of the fort (Fig. 6) indicated the presence of a magazine in this same area, probably a timber structure. No trace of such a structure was found in the excavation and if it was ever constructed

it was entirely destroyed when the demi-bastion was enlarged. The enlargement has been discussed in connection with operation 1 and sub-operation 6B.

The interior walls of the magazine were reasonably well preserved (Figs. 32,33,34,35,36) on all four sides. The floor plan was trapazoidal and conformed to the shape required by the system of re-entrant, shoulder and salient angles of the northeast bastion. The walls were solid masonry and varied from 4.0 ft. to almost 7.0 ft. in thickness at the base. The lower 2.0 ft. to 2.5 ft. of the east and west walls were vertical. At this point, the spring line of the arch, the roof began sloping rather abruptly inward to form the arch. The north and south walls rose vertically the entire height of the room as far as could be determined from the preserved portions. At the centre the arch was probably about 15.0 ft. above the lowest interior level. As the arch sloped inward the east and west walls increased in thickness. The bastion undoubtedly had a flat platform surface above the magazine at the same level as the other gun platforms.

The interior dimensions of the magazine were determined and can be compared with the same dimensions taken from the French plan of 1701 and the English plan of 1775; these data are presented in Table 3. There are variations in all dimensions.

In the south wall a central doorway was present, formed by cut stone jambs on either side. The doorway has already been discussed in connection with operation 1. Beneath the threshold of the doorway a remnant of a stone stairway was found on the magazine floor (Fig. 37). The treads are not complete. Traces of rotted wood in the fill in this area suggest that there may have been wooden risers or treads on the stone stairway foundation. The stairway is shown on the French plan.

The cultural stratigraphy of the magazine consists of three major units. The largest volume and most recent is the rubble fill in the upper levels. Nineteen lots from three sub-operations were included in this stratum. Beneath the rubble an English floor level was found, and below that a French floor and sub-floor deposits were encountered to form the third major stratigraphic unit. Since no trace of the early timber magazine was encountered the French levels must be of the late French period, 1697 to 1713.

Dating and confirmation of the cultural identification of the stratigraphic deposits can be based on artifacts. The dated comb on the French floor has already been mentioned; two French coins were found in the same horizon. Few ceramics were present in the magazine, and these were mostly French sherds from the rubble fill level.

Clay pipe stem fragments were found in many levels and by combining specimens from lots within the major stratigraphic units a sample of useable size, though small, is available. This stratigraphic analysis is presented in detail in the section dealing with pipes. The mean date of the rubble fill zone is 1712. The mean date for the English floor levels is 1724 and for the French floor levels is 1702. The early date from the uppermost stratum can be explained; the rubble is the fallen masonry of the arch which was built by the French. Many of the pipe stems found in this level have mortar adhering to their surfaces indicating that workmen discarded them in the masonry. The collapse of the wall places these French specimens above the material from the English floor. The 1702 date for the French floor deposits is an excellent correlation with the known occupation. The date for specimens from the English levels is too early since they did not make much use of the Castle until after 1760. However, the sample is small, there is some possibility of mixture due to the collapse of the structure, and the date is at least close to the expected time range. The pipe stem dates tend to confirm the stratigraphic identification.

Other specimens found in the magazine include nails of several sizes, grapeshot, lead musket balls,

lead waste, buttons, riveted strap iron and large iron loops, possibly from cannon carriages. The eye bolts could also have been mounted in the roof to serve as block and tackle anchors.

The excavation of operation 2 succeeded in identifying both French and English floors in the magazine as well as uncovering structural features of the casemate.

Operation 10: The Interior of the Redoubt

The excavation of the interior of the redoubt was conducted as operation 10. The operation was divided into 11 sub-operations based on the grid system. The lots assigned within the sub-operations were determined by both grid subdivisions, and a combination of arbitrary and stratigraphic vertical units. The limits of the operation were marked by the line of the north, west and south interior revetment walls and by the west side of operation 7 and operation 8. The area encompassed in the operation is 40.0 ft. by 55.0 ft. (Fig. 21).

Before excavations began several points of orientation were visible and could be identified on historical plans of the fort. The most prominent feature was the north interior revetment wall which was standing exposed above the surface. The facing was partly gone and in one section a commemorative monument had been constructed.

The west wall of the guardroom excavated as operation 7 was also exposed on the surface. On the west and south sides the approximate location of the revetment could be determined by the surface indications of the crest of the rampart fill. The geohm resistivity survey also confirmed the possible structural remnant of the south wall and has already been described. Part of the wall line could be detected by surface exposure of stones as well.

The first two sub-operations 2A10A and 2A10B were grid limited trenches along the west and south revetment wall lines respectively. Their purpose was to locate the masonry remnants beneath a sloping talus of rampart fill which had collapsed into the interior and buried the remnant wall foundations. The walls were quickly exposed by removal of part of the fill. The occupational zone in these sub-operations was excavated later. Since the revetment walls did not form right angled corners, the area enclosed was not perfectly rectangular. Sub-operations A and B were therefore wedge shaped (See Fig. 21).

The other sub-operations were north-south strips between 10 foot grid lines. Sub-operation B marked the southern limit of each while the visible north revetment wall marked the northern boundary. The west side of

sub-operation 2A10C was also the limit of sub-operation 10A, along the E1000 grid line. 2A10C was the strip between E1000 and E1010, 2A10D was between grid lines E1010 and E1020, 2A10E was between E1030 and E1040 and sub-operation 2A10G was the strip between E1040 and E1050, the latter a grid line which coincided with the west wall of operation 7. Sub-operations 2A10A through 10G were excavated in 1965. Sub-operation 2A10H was a partial square at the north end of 2A10G and could have been included in that sub-operation. It was separated because it was not excavated until 1968 and was given a different number for clarity. During 1965 the southwest interior could not be excavated because the small cannon platform and mounted artillery piece were too difficult to move. Power equipment was available in 1968; the area was exposed and excavated as sub-operation 2A10J, lots 1-6. A narrow extension of 2A10J to expose the outer side of the revetment was excavated by Morton in 1969 (Morton 1970: Fig. 1). Lots 2A10J7 and above are thus from the rampart fills and should be included with the other rampart excavations conducted as operation 9.

In 1965 a baulk had been left across the interior of the redoubt in 10D as a profile of the entire interior (Fig. 39). Morton excavated this remnant as sub-operation 10K in 1969 (Morton 1970: 15) and removed

backfill placed in the interior to protect features as sub-operation 10L (Morton 1970: 16).

Geohm resistivity survey of the interior was not completely effective due to the shallow soil deposit and the heavy content of rock in the fill. It did, however, indicate some potential structural areas and dictated a cautious approach to the excavation of the interior. Most rocks were plotted on a preliminary plan prior to removal and any questionable stone was left in situ until its isolation or relationship to a structural element could be determined. The basic stratigraphic levels found in the interior consist of a sod zone, a rubble zone and an occupation zone resting upon bedrock.

Excavation began with the removal of the sod layer which exposed an irregular pavement of scattered rock rubble. Artifacts found in the sod layer were treated as a separate lot in each sub-operation. The scattered rock and clay matrix beneath the sod was termed the rubble zone. Small tests revealed the presence of a stained soil occupation layer beneath the rubble but indicated that the rubble zone itself did not contain stratigraphic sub-divisions. Most of the rubble zone was excavated in arbitrary 3 in. levels within grid square units. Exceptions were in sub-operations A and B initial exploration. It was hoped that such care

would prevent the inadvertent destruction of wall foundations and that analysis of the artifacts recovered in the arbitrary levels might exhibit some chronological differences. Study of the specimens indicates that the rubble zone cannot be culturally subdivided.

Below the rubble zone a thin occupational zone containing many artifacts was found. Tests in the occupational level, which was stained a dark brown to black colour, revealed no obvious signs of stratification. The occupational zone was assumed to be a single deposit, but all excavations were by hand trowel and confined to 1.5 in. vertical levels within the 10 ft. square grid sections. The 1.5 in. levels within the occupation zone were labeled Occupation Zone I, II, III, etc., with I the uppermost, and II beneath it and so on; each was also given a specific lot number as a primary reference.

The use of arbitrary excavation levels to subdivide the basic stratigraphic unit was to insure care in exposing any wall foundations and to permit the careful examination of horizontal exposures of the deposit for any possible signs of cultural stratigraphy within the refuse deposit. The arbitrary units also provided segregated artifacts for further analysis in

an effort to locate any culturally identifiable stratum in the fill. It was assumed that both French and English materials and perhaps levels would be found in the interior, and in limited areas this proved to be the case. In most of the interior the occupation zone proved upon specimen analysis to be primarily English in content, but due to the potential and probable mixture with earlier French materials had to be classified as only "probably English". The interior stratigraphy is shown in the cross section of the site (Fig. 39).

Thus, the excavation techniques employed in the interior were designed to provide the maximum opportunity to discover stratified French and English deposits. In addition to these vertical controls, the sub-operation strips were further sub-divided into 10 ft. grid square units to provide added horizontal control. Thus, lots were based on 10 ft. grid segments and a combination of stratigraphic and arbitrary vertical units within the grid locations. The horizontal subdivision of the sub-operations was done in the hope that some specimens might in this fashion be associated with structures or rooms, and this proved possible in some areas.

The occupation zone included rock rubble, stone chips, fragments of brick and artifacts. It was not

always easy to maintain the desired excavation levels with the absolute precision originally planned. Deviations were not a serious problem, however. The problem of modern intrusives and of disturbance and mixture during the occupation of the site has been discussed in the methods section.

Rock rubble embedded in the occupation zone was left in situ, plotted on a grid plan and studied intensively. Several patterns of remnant hearth and wall foundations became apparent and these stones were left in place while those that could not be associated with a structural element were removed. The wall and hearth patterns thus defined were plotted on a separate grid plan, and later mapped along with other parts of the fort (Figs. 22;38)

Only the lower courses of stone were intact but there were sufficient remains to identify these features as structures shown on various historical plans of the site. Some of the walls were in stratigraphic relationships which assisted in their identification.

The total fill of the interior from sod surface to bedrock had a mean depth of 1.2 ft. in operation 10 and a maximum depth of 2.5 ft. deep in the deepest cracks and fissures in bedrock. The bedrock exposed during the excavations was smooth and weathered in many places.

Such spots must have been exposed on the surface when construction of the fort began. In other places the bedrock surface was irregular and jagged indicating quarrying. Such work must have been undertaken to level the surface. The archaeological evidence thus suggested that a relatively level knob of bedrock was selected for the base of the fort and that it was further shaped and leveled to produce the interior plane upon which structures were built. Irregularities in the surface were filled with quarry chips, gravel and clay in a fashion also used in the bedrock floor of the magazine. The foundations of structures in the interior of the redoubt were built directly on bedrock. In one case parts of a wall rested upon a masonry footer wider than the wall, but the footer was directly on bedrock.

The remains of several buildings were identified in operation 10. These structures are the L-shaped French barracks shown on the plan of 1701, the central blockhouse of the English period and the storehouse/ additional barracks located adjacent to the south guardroom. Five hearths were found in association with these structures and four can be identified on historical plans; the fifth represents an additional feature previously unknown. In addition to the buildings, the north, west and south revetment walls were exposed and

the two shorter walls marking the east end of the redoubt were located. No evidence of the central tower shown on the French plan of 1695 could be detected. Structural features are discussed below.

The Interior Revetment Walls

A well preserved section of the interior of the south interior revetment wall is illustrated in figure 40. The wall is built on a thick mortar footer laid on the bedrock surface. At the southwest interior corner the mortar footer was replaced by a continuation of the wall stone structure. At the corner the stones appear to have been laid in courses but elsewhere in the wall the structure is irregular in pattern. At the corner the west revetment wall sloped slightly, but elsewhere was nearly vertical.

The interior revetment walls marked the outer perimeter of operation 10 just as they delimited the interior of Fort Royal and Castle Graves. These masonry walls served to keep the earthen rampart fill in place. The revetments are shown on all historical plan views of the site and also appear on some of the profiles as well. The plan views are variable in their dimensions but all show these walls in approximately the same way. The archaeological evidence parallels that seen on the

historical documents. In the English profile these walls are shown as rising only to the level of the rampart gun deck (Fig. 13) but on the French 1701 plan they rise above that level (Fig. 7). The north revetment was 5.0 ft. high above bedrock but the revetment was not preserved to its original height which cannot be determined on archaeological grounds. Table 4 compares the interior dimensions of the interior revetment walls as shown on historical plans and as determined through excavation.

The arrangement of the interior is similar on all plans although most different in the 1695 plan which shows the south revetment wall extended much farther to the east than on subsequent plans. The 1695 drawing also lacks the short northeast and southeast walls. If that plan represents a real stage of completed construction rather than planned work, the interior was later modified. The most consistent dimension on historical plans of the revetment is that of the west wall; the archaeological plan length being intermediate between the dimensions calculated from the English and French drawings. The greater length of the south wall as shown on the English plan may reflect the fact that the short southeast end wall of the French period had been razed by the English. No trace of the English southeast wall

was found in the location indicated on their plan. The French plan of 1701 appears to shorten the interior of the fort in the east-west axis in a manner inconsistent with the archaeological evidence of French walls. It is therefore suggested that some of the dimensions shown on that plan may be in error. No really good explanation for the differences in measurement of various walls can be advanced other than that the historical documents may contain some errors. There may be some error in measuring these dimensions based on the scale of the drawing, but such errors would be minimal and not nearly as large as the wall length discrepancies which range from one to several feet difference. The French plans both show the interior as having parallel north and south walls and being rectangular while the English plan and the as found archaeological evidence indicate that these walls diverged and were farther apart towards the east than they were on the west.

The eastern boundary of the interior of the redoubt is the west wall of the guardroom excavated as operation 7. The entrance passage and the ramp leading down to the magazine (operation 1) are also part of this complex. None of these structures was directly related to the interior revetment wall.

The east end of the revetment wall was defined by two short segments oriented north-south. One was at right angles to the east end of the south wall and the other at right angles to the east end of the north wall. These short walls were not connected to one another; they have been termed the northeast and southeast walls here (Fig. 38,41).

Remnants of both structures have been found archaeologically and their dimensions are compared with those taken from the historical plans in Table 4. The lengths of the walls as found do not agree precisely with the ones determined by measuring the plans; however, the relative lengths are about the same. The French plan of 1695 shows no such northeast wall on the north side of the interior, probably because of the need to provide an entrance into the magazine. On the south side of the redoubt the southeast wall is shown aligned with the interior of the east curtain; no archaeological evidence of such a wall structure was found and it may be suggested that either the 1695 version of the fort was extensively remodeled or that the plan was never carried out in that form. The latter seems most likely, but either could be true.

On the 1701 plan short walls equivalent of the archaeological northeast and southeast walls are shown.

The southeast wall is shown longer on that plan than actually found. However, the plan shows the north end of the southeast wall overlapping the south end of the guardroom, operation 7, and the archaeological evidence confirms this relationship. It thus appears that the proportions shown on the 1701 plan are correct but that the dimensions are not. The southeast wall had been leveled below the 335.4 A.S.L. grade established by the English and was not a standing structure during the late occupation of the fort. The English plan of 1775 shows an equivalent of the southeast wall opposite the north side of the additional barracks building, but separated from that structure by a stairway. In fact, there is insufficient space at this location for a stairway between the end of that building and the southeast wall as found (See Fig. 38). The stairway was located but not in the position shown on the 1775 plan. Thus, several lines of evidence suggest that the southeast wall as shown on the English plan of 1775 was probably a proposal not carried out, at least in this detail.

The French plan of 1701 labels the space east of the southeast revetment wall as a ramp leading up to the gun platform level. This area was excavated in sub-operations 10B and 9K but no evidence of the ramp

was found. The relationships shown on the 1701 plan between the southeast wall and the west wall of the operation 7 guardroom approximate the archaeological findings and the ramp could well have existed. The width of the ramp measured on the 1701 plan is 6 pied or 6.4 ft.; the width determined by archaeological evidence is 5.5 ft.

As already has been discussed the location of the southeast wall for the English period cannot be the one shown on the 1775 plan. The structural relationships are wrong and the primary archaeological evidence of the leveling of this wall suggest that it could not have been standing where shown. The old French southeast wall must have been removed by the English. The 1775 plan suggests that there was a masonry wall related to the stairway complex, but no masonry was found in the area of 2A10B10 and 2A9E in which the stairway was found.

The English plan of 1775 indicates a stairway leading upward toward the east onto the east side of the southeast demi-bastion. The stair is shown adjacent to the additional barracks structure. That building was found in sub-operation 2A10G, but no evidence of the stair was found there. It was in this location that the old French southeast wall had been

removed. In fact evidence of a stairway oriented in the same manner as shown on the 1775 plan was found in operation 10B and 9E in a position adjacent to the south wall of the operation 8 guardroom. This is farther to the east than shown on the 1775 plan. Either the 1775 plan was sketched in error or contained a proposed change in this structure. In either case it does not illustrate this detail of the fort as it was found. In spite of these differences, the archaeological evidence does indicate that the 1775 plan illustrates the general nature of the English construction despite inconsistencies in dimension, location and detail.

The stratigraphy in the east end of sub-operation 10B exposed strata which continue into the rampart fill in sub-operations 9K and 9E. In 10B there is a thin layer of turf beneath which was a thick zone of clay, gravel and brick rubble (Fig. 42). The rubble is disturbed above the English step while to the south thin stratified deposits can be seen in the fill. Purple to brownish clay layers can be seen in the 10B profile and were excavated further in 9K. Below the English step the fill of the rampart was brownish clay and contained brick chips. Brick chips were not present in the fill south of the stair area and the rampart fill appears

undisturbed. In the 1.0 ft. above bedrock the fill in 10B took on a darker brown colour and the lowest half foot directly on bedrock was black stained occupational debris. This darker zone extended beneath the English hearth in 10G and may also be correlated with occupational zones in 9E and 9K as an extension of the same layer. Bedrock was deeper in this corner of the interior and there are therefore more sub-units in the excavation of the 2A10B occupation zone.

The bedrock knob upon and around which the fort was built apparently sloped off toward the southeast more steeply than elsewhere in the interior. As a result an extension of the rampart fill zones into the interior of the redoubt was necessary to bring that corner of the interior to the same grade level as the interior bedrock plane. Traces of steps were found in the profile of the east end of sub-operation 10B adjacent to the exterior of the south end of the operation 7 guardhouse. At a point 2.0 ft. below the surface a layer of hard packed clay which included a nail and two small fragments of clay was found in the trench profile (Fig. 42). No trace of the stair had been seen in the horizontal excavations. This must have been the bottom step since it was at an elevation near the base of the wall. The stair was 1.5 ft. to 2.0 ft. wide, extending

south from the masonry wall to grid point N968.25 ft. The location of this step discovered in 1965 was recognized as the base of the stairway leading to the southeast demi-bastion. Although it is adjacent to a different building than shown on the 1775 plan it must be a remnant of the English stair shown on that plan. During the 1968 season the southeast demi-bastion was excavated and the search for additional steps was continued. Two lots, 2A9E5 and 2A9E6, were recognized as intrusive into the bastion fills. The lot 2A9E5 contained English ceramic sherds. A paving stone, mortar and fragments of wood were found. These had served as treads on risers simply excavated into the bastion fill. These steps had the appearance of somewhat improved footholds rather than that of an elaborate stairway. Several large stones with associated mortar were found in the bastion fill just south of the stairs in 2A9E. These stones may have been no more than a concentration of rock in the fill but they could have been a revetment associated with the steps. The latter interpretation is the one advanced. Erosion of the site has destroyed evidence of the stairs which probably existed at elevations above those found. Assuming that these features have been correctly identified it may be suggested that the English jury rigged some steps up to the southeast demi-bastion by improving risers excavated into the bastion fill and

erecting a temporary revetment to keep the adjacent fill from collapsing. The 1775 plan may then be interpreted as proposed improvements on these steps. Unfortunately, the evidence is slim and the hypothesis tenuous at best.

The northeast wall marking the right angled turn at the east end of the north revetment was also found. It was in poor condition and its length was difficult to determine with precision. Preserved wall extends for 5.0 ft. south of the north revetment. Mortar stains on bedrock extend another 3.0 ft. so that the original length may have been 8.0 ft. On the French plan of 1701 the space between the northeast wall and the west side of operation 1 is shown as a stairway and so identified in the key. These stairs were one of the last features completed in the French construction of the fort. Thus operation 1 was a ramp leading down into the magazine and its west wall was a revetment to prevent rampart fill from collapsing into the magazine entry. The northeast revetment was west of the operation 1 wall and between them the stairs leading up to the gun platform were located. The archaeological excavations in operations 2A10F, 2A10H, 2A1B and 2A9J exposed structural elements which may be identified as the walls shown on the 1701 plan. No trace of the actual stairway was

found, but the proper wall relationships were discovered. The width of the stairway shown on the 1701 plan is 6 pied or 6.4 ft. The width between the walls found in excavation is 6.0 ft. The English plan of 1775 also shows stairs in this location although they are farther to the south relative to the structure excavated as operation 1.

At grid point E1037 a concentration of rock rubble projected northward from the south interior revetment. It began at an elevation of 336.3 ft. which suggests it must be of English origin since all older French walls were leveled below 336 ft. A.S.L. Some of the stones were mortar stained but all were loose and they could be merely rubble. They do not appear to be part of the French L-shaped barracks. These stones could have some relationship to the English additional barracks but appear to be too far south to be a functional part of that structure. They could represent the southeast wall of the interior revetment during the English period but their relationship to the actual position of the stairway is incorrect. This poorly defined feature is therefore very difficult to identify with precision, if it was, in fact, more than a pile of over-interpreted rubble.

The excavations succeeded in exposing all of the interior revetment walls and they can be identified on

the plans of 1701 and 1775. The plans appear to be correct in general but to vary in several specific details and dimensions from the structures as found. There is sufficient similarity to suggest that there were probably few major changes in the interior revetment line between the late French and English periods, except for the modification of the French walls and ramp in the southeast corner to steps during the English period.

The L-Shaped Barracks

The L-shaped barracks appear on the 1701, 1709, 1713 and 1714 plans which show the French Fort Royal at its peak of development. The 1695 French plan shows only a barracks along the west side of the interior. This building, possibly frame (Ingram 1964: 10), was either removed or incorporated into the west wing of the L-shaped structure. The west and south interior revetment walls served the dual purpose of retaining the gun platform fill and serving as the west and south walls of the barracks. The north revetment also formed the north end of the structure. The lower course of masonry of the east side of the barracks was found 11.2 ft. to 11.5 ft. east of the west revetment paralleling the west end of the redoubt. Parts of the wall rested upon a masonry footer which protruded beyond the wall toward the west but not to the east. Both

wall and footer were mortared to bedrock (Figs. 38,40).

The south wing of the building was composed of a similar masonry foundation running parallel to the south revetment at a distance of 11.7 ft. to the north. This masonry wall was identical in elevation, construction technique and appearance of mortar with the east wall of the barracks already described. Part of it was stratigraphically beneath a stone foundation from a later English structure.

The east wall of the west wing of the structure was a continuous structural element running across the entire redoubt and separated the south and west wings of the barracks. The north wall of the south wing was butted against the west wing foundation. This could be interpreted as an indication of the later construction of the south wing. If that interpretation is correct, the west wing may be the same structure shown on the 1695 plan, enlarged in 1701 by the addition of the south wing.

The east end of the south wing was not completely preserved. At grid point E1024 a small segment of a 2.0 ft. thick masonry wall foundation was found. It was at right angles to the south revetment and extended northward 4.2 ft. where it was mortared to a projection of bedrock. It could not be traced further but its alignment with the termination of the north wall of the

south wing suggests that it must be the end of the structure. It is of similar construction to the other walls of the L-shaped barracks. It was leveled to an elevation of 335.47 ft. A.S.L. which is also suggestive of its French origin since the English leveled many remnants of the older French buildings. Other French walls had been razed to between 335.4 ft. and 335.9 ft. A.S.L. and this consistent elevation was interpreted as English site preparation prior to the construction of their blockhouse. As indicated above, the blockhouse foundation was found superimposed on part of the French barracks wall.

If the short wall described here is correctly interpreted as the end of the south wing the inside length of that part of the barracks would have been 16.1 ft. and its end at a location about the middle of the south revetment. This would be in approximate agreement with the French plans of 1701 and 1713. The French plan of 1709 shows the end of the barracks farther to the east, almost at the east end of the redoubt. If that were the case the short wall would have been to support the floor of the structure. Another segment of wall rubble projecting northward from the south revetment wall was found at grid location E1043. It was 6.6 ft. in length where it ends

at bedrock. Although this was considered as an alternative possibility as the east end of the L-shaped barracks it was finally identified as the short wall marking the southeast end of the interior revetment. It too had been leveled prior to English construction of later buildings.

Interior features of the L-shaped barracks were found. In the north end of the south wing a hearth platform was found; it abutted the east wall of the west wing which divided the L-shaped structure. A second hearth platform was located immediately opposite inside the end of the west wing. The pair of hearths was obviously so arranged to make use of a single chimney. Hearths are shown in these two locations on the French plan of 1701. Both platforms were made of rough rock mortared to bedrock. The upper surface had been removed, presumably when the walls were leveled.

A third hearth inside the L-shaped barracks was found at the north end of the west wing. It was a brick fireplace in sub-operation 10C, inset into the north revetment wall (Fig. 43). This fireplace did not appear on any historical plan and is an addition based on archaeological evidence. There was no English structure in this part of the fort. It was made of the thinner type of brick associated with the French period. It

was inset into the north revetment wall, and the same manner of construction was noted in the French fireplace found in operation 7. The presence of another fireplace in this part of the structure is logical since the west wing is so long and the other hearth is in the south part of the building. A second hearth inside the wing suggests that there were two rooms within the structure.

The 1695 plan illustrates the barracks along the west wall as divided into three rooms, each with a hearth. No archaeological evidence of this structure was found unless the west wing of the L-shaped barracks was also the original structure, which is possible.

The French plan of 1701 also illustrates door and window locations in the L-shaped barracks (Fig. 7), but no trace of these was found in the excavations, probably due to the fact that only the lowest courses of foundation stones were preserved below the level of English razing. The plan also shows the barracks in profile and indicates that it was a two storey structure. The lower walls were masonry, while the superstructure was timber. There was no archaeological evidence of the second floor but since the plan is essentially accurate in other aspects it is probably so in this one as well.

The dimensions of the structure as shown on the French plans of 1695 and 1701 are compared with those

determined on the archaeological evidence in Table 5.

The south wing of the structure is not a rectangular room due to the angled orientation of the south revetment wall. As a result of this factor the south wing is narrower, 10.7 ft. wide, where it abuts the west wing and wider, 12.0 ft. wide, at its east end.

Specimens found in excavation lots within the limits of the L-shaped barracks were largely English materials and these levels were classified as either indeterminate or probably English. Few remnants of a French occupation zone were found within the structure but one lot, 2A10A11, resting on bedrock, included a French coin and was classified as probably French. Lot 2A10J5 was a French deposit in the southwest corner of the structure.

The English Blockhouse

Another major structure identified in operation 10 was the English blockhouse located near the centre of the redoubt. The building is shown on the 1762 and 1775 plans.

The south foundation of this structure was a 3.5 ft. wide rectangular platform of mortar stained rock, 21.5 ft. long, along the N980 grid line. It was between E1004 and E1025. Most of the rock in this

foundation was loose but traces of leached mortar were present. The foundation was stratigraphically above the foundation of the French L-shaped barracks which had been leveled and partially incorporated into the matrix of the English structure. The blockhouse foundation was left as intact as possible at the end of the 1965 field season, but was dissected sufficiently to demonstrate the location and identification of the French wall beneath it (Figs. 39,44).

The northern part of the blockhouse structure was a mortared stone platform 7.0 ft. by 11.0 ft. in size between grid points E1009 and E1020 along the N995 grid line. A narrow eastward projection 2.0 ft. wide from E1020 to E1028 was identified as part of a foundation wall while the rectangular platform was clearly a fireplace hearth base. The 1775 plan shows a large hearth in this area. The hearth foundation was carefully constructed and mortared directly to bedrock (Fig. 45).

Many English materials were found in this area in the rubble and occupation zones which were classified as probably English. However, no definite floor levels within the blockhouse structure could be identified.

Using the foundation remnants found, the archaeological data suggests that the exterior dimensions of the blockhouse foundation were 21.5 ft. (E-W) by 18.5 ft.

(N-S). The dimensions of the structure shown on the 1775 plan are 20.0 ft. (E-W) by 18.0 ft. (N-S), and are thus reasonably close to the as found dimensions. The location of the structure is also similar to that shown on the 1775 plan. That plan shows the blockhouse 10.0 ft. from the west interior revetment, 9.0 ft. from the north revetment and 9.0 ft. from the south revetment wall. The structure is 9.0 ft. from all these locations, as found, the only difference being the 1.0 ft. variation in distance from the west wall. It may be concluded that the English plan of 1775 is an accurate representation of the blockhouse.

The plan shows the blockhouse as having a door and window on the east side. No archaeological evidence of this was found, nor did the distribution of window glass in the interior clarify the problem. The 1775 plan includes a profile view of the blockhouse. It was a two storey structure with the second floor overhanging the limits of the first floor walls. The second floor was at an elevation of 10.0 ft. and at the level of the gun platforms, walls and roof of the structure rising well above the ramparts of the fort. This is also as the structure was shown in the 1786 Pegasus sketches.

The blockhouse, being of English origin, does not appear on any of the French plans. The 1695 French plan does illustrate a square tower in the centre of the fort, perhaps the first platform begun at the site. No evidence of that structure was found in the excavation of the site.

The Additional English Barracks

The English plans of 1762 and 1775 show a large rectangular room added in the interior of the redoubt. The west wall of the south guardroom (operation 7) was used as a common wall for this structure. That wall was well preserved. The building is identified as a storehouse on the 1762 plan and as an additional barracks on the 1775 record.

In sub-operation 10F portions of a stone foundation were found. The wall segment is approximately 2.0 ft. thick (from E1034 to E1036) and is 20.0 ft. in length, extending from N970 to N990 (Fig. 46). The wall was not preserved entirely and is represented partly by mortar stains on bedrock. Evidence of the north and south walls was limited to mortar stains on bedrock along the N970 and N990 grid lines. However, these patches align well with the west wall remnant and with the standing masonry of the east wall. This

relationship is the same as shown on the 1775 plan and it may be concluded that the archaeological evidence does represent this structure. The interior dimensions of the room from archaeological evidence are 18.0 ft. (N-S) by 14.0 ft. (E-W). Similar dimensions from the English plan of 1775 are 17.0 ft. by 14.0 ft.

No significant evidence of the floor of the structure was found in sub-operation 10F, but the stratigraphy of sub-operation 10G is also within the structure and is important in its interpretation. The excavation of the gravel and clay of the occupational zone revealed extensive patches of bedrock at what must have been the sub-floor level of the room. One of these projections was extensively battered, an indication of purposeful leveling at this point. That could have been done by the French as part of leveling the entire interior of the redoubt. One short fragment of wood and an 8.0 ft. long wooden floor beam were found resting on bedrock. The orientation and grain in each ran north-south. If these were sleepers or floor joists, the planking must have been oriented east-west, a pattern seen in the English floor in operation 7.

A hearth associated with this floor level was found on the east wall. The hearth was a stone and

mortar platform some 4.0 ft. by 7.5 ft. in size. A pile of ash was found on the centre of the hearth and a large amount of brick rubble was found in the fill along the west wall of the building, presumably evidence of a fallen chimney. A re-used French cordon stone was found mortared into the hearth platform; clear evidence of its English construction. The 1775 plan shows a hearth at this location in the structure. The style and construction of the hearth were identical to that of the English hearth in operation 7 and unlike the French brick fireplace of operations 7 and 10A.

In front of the hearth along its western side was a hard packed clay floor level with some rocks embedded in it. There was a distinct depression in the clay at floor at the central point in front of the hearth. The hearth was in an excellent state of preservation when found in 1965 and was left intact for ultimate restoration.

Excavations adjacent to the south end of the hearth revealed evidence of a French occupational zone which extended from sub-operation 10B to the south, and ran under the English hearth to the north.

The area excavated as sub-operation 10G coincides with the interior of this structure. Part of sub-operation 10F was also inside the room but lacked evidence of the floor levels.

The stratigraphy in sub-operation 10G begins with the sod level 2A10G1. Beneath the turf zone was a layer of rubble. Lots 2A10G2 and 10G3 are from the rubble zone, which was 3.0 in. in depth. Beneath the thin rubble zone the occupation layer was found and lots 2A10G4,5,6 and 7 are from this level. Lots 2A10G4 and 10G5 were from above the hearth itself while 2A10G6 and 10G7 are occupation zone deposits above traces of the hard packed clay floor level. The floor may have been partly mortar from other evidence found in the area. The floor and hearth are from the same level. Traces of wooden floor elements have been noted. Their relationship to the clay or mortar floor is uncertain but the mortar and clay level may be later, and could represent floor deposits. The timber could represent an English floor of 1762 and the clay/mortar represent an English floor of 1775 but the evidence found is insufficient to demonstrate this hypothesis. Lot 2A10G9 consists of specimens recovered from the ash pile on the hearth. Below the clay floor level was a continuation of the occupation zone excavated as lot 2A10G8. Specimens from this lot include a restorable bottle of the 1770's (lot 2A10G11). This layer may be pre-construction fill or a floor deposit. Creamware sherds of the English period were also recovered. The lowest

zone in the sequence is lot 2A10G10. This is a very black layer of stained soil which is a French occupation deposit. It is a continuation of the same zone found in 2A10B and extended beneath the English hearth but was not excavated there so that the hearth could be preserved. This French deposit may also be correlated with French levels in 2A9E and 2A9K (Fig. 42).

Ceramics from the English floors included white salt glazed stoneware and creamware. Two sherds of French earthenware were found in the fill above the floor but are probably intrusive specimens. Nails, bottles, buttons, iron kettle fragments, a jewsharp, and foodbone remains were also found. The 1775 plan identified the structure as an additional barracks, and the artifacts recovered are evidence of this function. Several grapeshot, cannon balls and a cannon wormer were also found and these could be interpreted as supporting the 1762 plan designation of the structure as a storehouse.

Clay pipe stems from the structure give dates of 1759 for hearth deposits and 1744 for floor deposits. The French occupation stratigraphically below the hearth had few stems but did produce a mean date of 1717. A single specimen from the turf level is of large bore diameter but could have been in the original French

masonry mortar matrix before the collapse of the east wall.

The 1775 plan indicates that the door was on the north and that there were windows in the west wall. The structure is shown with a shed roof sloping downward to the west or interior of the redoubt. The common wall between operation 7 and 10G is shown on the 1775 plan as higher than the exteriors of both structures.

The archaeological evidence supports the basic accuracy of the 1775 plan of Castle Graves with respect to the size and location and internal features of the additional barracks.

Stratigraphy of the Redoubt Interior

The major stratigraphic zones in the interior of the redoubt were the sod zone, the rubble zone and the occupational zone. A sterile natural clay zone was sometimes present immediately above bedrock (Fig. 39). The methods of excavation and lot subdivision have already been discussed. Most of the excavation units within the interior were classified as probably English, although a few English floors and definite French refuse levels were identified.

The analysis of these levels is discussed in detail in the chapters dealing with pipes, ceramics, glass and

other artifacts, and only highlights need be mentioned here. The mean bore diameter dates determined from pipe stem fragments for the sod, rubble, and occupational levels range from 1721 to 1744. These dates precede the English 1762 construction but do suggest a late period of occupation and in this sense are consistent with the probably English classification of these units. Definite French levels within the occupation zone produced a mean bore date of 1704 which is consistent with the known date of French occupation of the site.

The ceramic analysis of the same group of excavation units revealed the abundance of English ceramics in the sod, rubble and upper occupation zones. A few scattered French sherds signify the intrusion and mixture present, as well as the fact that some lots were identified as French deposits. The ceramic content of individual excavation units can be found in Table 1 and these were used, along with other factors, in determining the final cultural classification of each lot as recorded in Table 1, which correlates the pipe stem dating information.

Individual excavation units within the redoubt interior which were identified as French or probably French are the following lots: 2A10A11, 2A10B12a, 2A10B14, 10B15, 10B16, 2A10B18 through 10B28, 2A10C19,

2A10D19, 2A10D23, 10D24, 10D25, 2A10F17, 2A10F26, 2A10G10, 2A10H4, 2A10J5 and 10J6. A few lots were judged indeterminate, but the bulk of the excavation units were classified as English or probably English in the interior.

The specimen analysis indicates that most of the deposits in the interior of the redoubt are English. This is consistent with the evidence of English clearing out the interior by leveling old French walls to 334.5 to 335.9 ft. A.S.L. It is not surprising that the major remnants of the French occupational debris in the interior are found only in the deeper fissures and hollows in bedrock. These materials were most concentrated in the southeastern corner of the interior.

Summary of Operation 10

The excavation of operation 10, the interior of the redoubt, resulted in the identification of all major structures illustrated on the French plan of 1701 and the English plan of 1775. There are differences in the as found structural remains and the historical map data, particularly with reference to the dimensions of structures. On the basis of the archaeological evidence it may be suggested that the dimensional differences seen in the plans are probably due to errors

of original measurement and to difficulties in measuring the structures on the map scale rather than major changes in masonry structures originally built by the French and re-used by the English. Removal of some structures, modifications and additions, and plans made but not carried out have also been noted in the comparison of the archaeological plan and the English map of 1775. With the cautions noted, the French 1701 and English 1775 plans may be regarded as basically accurate representations of Fort Royal and Castle Graves, if appropriate adjustments in measurements are made.

Operations 3,4,5 and 6: The Outer Walls

Excavations exposing the outer wall foundations were conducted during both seasons at the site. The objective during the 1965 season was to locate all salient angles, re-entrant angles and curtain wall lines. During the 1968 season these areas were re-exposed, excavations carried to the bedrock level, and the entire length of the north, south and east curtains was exposed and stabilized. During the 1969 season (Morton 1970) the west curtain wall was excavated and completely reconstructed.

Operation 3: The North Wall

The excavations along the north side of the Castle

were designated operation 3. The operation was divided into sub-operations. Sub-operation 3A was the excavation of the north curtain wall. Sub-operation 3B was the excavation of the west flank of the northeast bastion. Sub-operation 3C was the excavation of the north face of the northeast bastion. Parts of each sub-operation were excavated in 1965 and all were completed during 1968. The extent and location of sub-operations and lots are shown in Figure 21.

Excavation lot 2A3A1 was the initial exposure seeking the north curtain wall near the re-entrant angle at its east end. The fill removed was the talus of rubble covering the wall line. The wall was in poor condition and virtually gone. Its approximate position was determined by mortar stains on bedrock and by the lower course of stone which was partly out of line. The wall had been built on top of a nearly vertical bedrock face so that the low half of the "wall" at this point was exposed rock foundation. Lot 2A3A2 was behind the area of lot 1, an exposure of the rampart fill and rubble talus and wall core area made in an effort to better define the wall location. Lot 2A3A3, also excavated in 1965, exposed a 12.0 ft. section of the wall at its west end, the northwest salient angle of the fort. Part of the salient had collapsed but the lower stones

were in place. As in the case at other corners, the walls had collapsed to a lower elevation at the salients than elsewhere. Apparently there was a serious structural weakness at the salient angles. Just east of the salient the wall was in excellent condition. There was no foundation or footer; the wall was built directly on the natural subsoil clay layer, a thin compact zone resting on bedrock.

The northwest salient was particularly interesting because positive evidence of extensive English reconstruction was found. Two cordon stones were in situ at the repaired salient and several others were in the immediately adjacent rubble. There was also an irregular line visible in the masonry of the wall some 2.5 ft. east of the salient. East of the line the masonry had a more regular appearance of coursing while west of the line the stones were laid without such a pattern. The mortar in the eastern part was yellower and more sandy because the lime had leached away. West of the repair line the mortar was whiter, firmer and less leached. Some small patches of the whiter mortar were found above the yellower mortar suggesting additional tuckpointing of the wall. It is apparent that the salient collapsed and had been rebuilt, using some of the old French cordon at the base of the angle. This could have been

done by the English. These data confirm the historical references to English repairs of the walls of the Castle (Fig. 47).

The excavation of the north curtain wall was completed in 1968. The area along the wall between the previously excavated east and west ends of the wall was designated as 2A3A4. This lot was from the talus of rubble caused by the outward spilling of former rampart fills which buried the base of the exterior wall. Little evidence of stratigraphy was detected along the north wall. Lot 3A5 included materials recovered beneath the previous season's excavations in 3A1 and appeared to be a layer of early debris, probably French. The entire top of the wall was also exposed for stabilization purposes; this excavation was designated 2A3A6.

The wall was in very poor state of preservation for a distance of 35.0 ft. west of the re-entrant angle. In this section only a few stones of the outer face had been found in situ. Mortar stains on the bedrock served to mark the former line of the wall. The remainder of the wall was in fairly good condition although one 10.0 ft. section was bulged out of line.

The wall is illustrated in Figure 47. The lower course of stone in the north curtain included seven very large stones. One was 2.0 ft. by 2.5 ft. in size. Most

of the other stones used in wall construction were less than 1.0 ft. by 1.0 ft. in size. There is great variation in the size and shape of the rocks used in the wall, and large quantities of small stones and rock chips were used as chinking to fill the spaces between the larger stones.

In the French section of the wall the stone was carefully laid to maintain a generally level work and a few sections approach level coursing although there were no absolutely regular rows in the wall. Irregular stones were carefully placed to achieve generally level or horizontal planes. In short sections chinking and small stones were placed to level up the work for the next row but such courses do not extend laterally for more than a few feet.

One of the most regular sections of the wall is a 19.0 ft. long area beginning 14.0 ft. east of the northwest salient angle and extending toward the east. Here stones were somewhat smaller in size and although not laid in rows have the most even appearance in the north curtain. It is notable that the badly bulged section of the wall is in this area. The bulged section was prevented from complete collapse by the talus of wall rubble and rampart fill. Less regular sections of the wall, where stones interlock, may have been more

durable when the lime leached away leaving sand in place of mortar.

There is some tendency in the standing masonry for small stones and more regular alignment to appear at higher elevations. If this trend continued upward, the upper part of the wall may have been much more regular in its masonry than the standing basal section. Such regularity, if it existed, could have contributed to the collapse of the wall although the leaching away of the lime in the mortar was obviously the primary cause.

In the portion of the wall where it had virtually all collapsed the very large stones of the lower course had been mortared directly to a bedrock shelf rather than being founded upon the thin natural sub-soil clay as was usually the case. In other areas of the east curtain wall stones which had been mortared directly to bedrock were often gone and the wall in poor condition. It is possible that the bedrock surface was a poor one for foundation purposes, providing a poor bonding surface. However, there are also areas where the wall is intact on bedrock and others where it has collapsed above a clay base, and no generalization about the wall foundation as a stability factor can be presented.

Sub-operation 3B was the exposure of the west flank of the northeast bastion. The re-entrant angle had been exposed in lot 2A3B1 in 1965. In 1968 the entire wall was excavated and lot 2A3B2 was the designation for the remainder of the talus rubble toward the north. Specimens from this lot are all from a single stratum of mixed rubble which extended from the surface to bedrock. There was a tendency for a heavier concentration of mortar and less rock at the base of the wall, a condition found elsewhere in the site. In this case no specimens were recovered from the mortar stratum. The mortar level apparently represents the initial stages of wall collapse, the leaching of the wall matrix, after which the actual collapse of rock took place.

From the re-entrant angle at the north curtain the wall was built on a sloping shelf of bedrock (Fig. 48). At the shoulder angle the wall was built on the compact reddish-brown clay, a natural stratum overlying bedrock. There was no evidence of a footer or a footer construction trench. As elsewhere the bedrock was used as the basic foundation if it was exposed, otherwise the natural clay surface was used. The northwest shoulder angle of the bastion was well preserved to a height of 4.0 ft.

The north face of the northeast bastion was excavated

in sub-operation 3C. The salient angle of the bastion was sought in this sub-operation in 1965 and was found in poor condition, completely collapsed. The second season of field work exposed the north face of the bastion, permitting the projection of the original corner. Lot 2A3C1 was from the rubble of the salient angle and 3C2 from the removal of the backfill in that area. Part of lot 3C2 was also the upper portions of the talus of rubble along the north face of the bastion which had been deposited in this location during the filling of the magazine at the end of the 1965 season. At a depth of 3.2 ft. below the surface in 1968 a black layer was encountered and identified as the probable surface level in 1965. Specimens from this zone were designated 3C3. Below lot 2A3C3 a layer of brown clay and leached mortar and rubble was found and became lot 2A3C4. This zone terminated on the natural sub-soil clay stratum. A test near the shoulder angle of the bastion indicates that the clay sub-soil was 1.0 ft. thick and rested on bed-rock. The north face of the bastion was built directly on the clay zone, without a footer (Fig. 49).

The loose material from the core of the wall was cleaned out for stabilization and specimens recovered from the wall core itself were designated lot 2A3C5. These materials are probably French specimens since they

were incorporated in the wall matrix.

The stratigraphic sequence along the north face is similar to that found elsewhere in the wall excavations. The base of the sequence is bedrock and the natural clay stratum above it. Adjacent to the wall, on the clay, a thin layer of mortar dropped during wall construction was found. This grades into the leached or weathered mortar which eroded from the standing walls. Above the mortar is the massive rubble from the collapsed walls capped by recent deposits.

The lower portion of the north face of the bastion was in good condition but the 9.5 ft. long section at the salient had to be reconstructed on the basis of projecting wall lines of the north and east faces of the bastion to locate the probable original salient angle. The projected corner is probably correct, although it should be noted that the length of the reconstructed north face is 35.5 ft. as compared to the 32 ft. length measured from the English plan of 1775. The length is 29.8 ft. on the 1701 plan and 33.03 ft. on the 1695 plan. Along the north face the outer course of masonry stood intact to a height of 3.0 ft. to 4.5 ft.; the wall core rose another 2.0 ft.

The lowest course in the bastion face was composed of large stones ranging in size from 0.5 ft. by 1.0 ft.

to 2.0 ft. by 2.5 ft. These had been selected and carefully placed to form a nearly level course, to serve as the footerless foundation. Smaller stone was used to fill in areas between larger rocks and thereby produce the level course. Courses above the foundation row also include some large rocks, particularly at the shoulder angle, but in general the rock becomes smaller in size at higher elevations in the wall. There are few really regular courses of stone in the wall but stone size and placement maintained a generally horizontal appearance. Small stones and chips were used as chinking.

Historical records indicate that the demi-bastion shown on the 1695 plan was replaced by a full bastion as seen on the 1701 plan. The modification presumably took place about 1697 when the timber magazine was replaced with the masonry casemate. Such rebuilding might be apparent in the north face of the bastion if the structure had been enlarged toward the east. No trace of such modification of the north face was found on either the interior or the exterior of the bastion wall. Perhaps the northeast demi-bastion shown on the 1695 map was merely a plan which was modified prior to actual construction.

The dimensions of the north curtain wall and the bastion flank and face are listed in Tables 6, 7, 8, 9 and 10 which also include the historical plan measurements of these structures. The length of the exterior base of the north curtain is measured at 92 ft. on the 1775 plan and as 91.25 ft. in the field. The west flank of the bastion is 18.7 ft. long on the basis of archaeological evidence and 19 ft. long on the English plan. The face as found is longer than the English plan length but this may be in part due to the difficulty in finding actual evidence of the location of the salient. The French plan dimensions of these walls are all shorter than those actually found, although the 18.11 ft. length of the west flank of the bastion on the 1701 plan is not far off the 18.7 ft. mark. It seems most likely that the differences in wall lengths measured on the plans are due to inaccurate measurement, either when the plans were made or in interpreting the scale. The latter is difficult on the 1695 plan. The fact that the archaeological evidence shows that the English rebuilt the salient at the west end of the north curtain wall is important. It indicates that the original French wall must have been about the same length as its later reconstruction. Even assuming the line of reconstruction to indicate the original end of the wall would indicate

the French wall to be only 2.5 ft. shorter than the English one. The uniform character of the masonry of the north curtain except for the 2.5 ft. length at the salient also speaks for its structural unity. For such archaeological reasons it may be suggested that the dimensions taken from the French plans are sometimes inaccurate despite the general reliability of those documents.

Operation 4: The West Wall

The west wall of the Castle was excavated as operation 4, divided into sub-operations along the component sections of the wall. Sub-operation 4A was the west curtain wall, 4B was the south flank of the northwest demi-bastion and 4C was the west face of the demi-bastion. In 1965 the west curtain was exposed at the southwest salient in sub-operation 4A. The face and flank of the bastion were entirely excavated at that time. In 1968 the excavations were extended from the salient toward the north, but the west curtain could not be fully excavated that season and was completed in 1969 (Morton 1970). Excavations in this area were hampered by the steep slope; the wall was near the edge of the hill. This location must have been selected for military rather than

construction reasons; placing the main gun platform as close as possible to the edge of the hill increased the field of observation and fire. It surely must have been difficult to construct this part of the fort, particularly the southwest salient. The cliff slopes steeply to the sea at this point and it was necessary for the wall to extend farther down the slope than anywhere else on the site. The base of the wall is at an elevation of 319.28 ft. A.S.L. and the southwest salient must have been the point of maximum height along the exterior wall.

The foot of the salient was discovered when three large pointed stones atop one another were found protruding from the talus. Excavation revealed that they were part of the lower courses of masonry but had shifted from their original position. Deep excavations along the west curtain at the salient demonstrated that the walls were built on bedrock or on the natural sub-soil clay, but unlike all other parts of the wall, here there was a projecting, vertical sided footer (Fig. 50). The footer was 2.0 ft. high and 19.1 ft. long (Morton 1970: 4) and extended .3 ft. to .9 ft. out from the wall. Had the footer technique not been employed the salient toe would have been much farther down the slope and very difficult to anchor securely enough to serve as the

foundation for the height of wall necessary. The workmanship in this section was excellent. The stratigraphic sequence at the salient was difficult to detect horizontally in the excavation of the stratified lots 2A4A1, 4A2 and 4A3. In the profile (Fig. 51) sub-bedding in these strata are more apparent. The surface was covered by rubble and sparse grass and tree roots. Below this was a thick layer of stone and mortar rubble with some clay fill, which extended to the elevation of the top of the vertical footer. The footer was partially if not completely buried during the occupation of the fort. At the level of the footer top there was a compact relatively level brown layer interpreted as an old turf or surface line. It must post-date the construction of the footer. Below the old surface level was a layer of mixed clay, gravel and mortar. Beneath this was a layer of loose leached mortar. Adjacent to the wall footer was a talus of mortar sloping up to the footer. This may be interpreted as a mortar deposit resulting from wall construction or repair. Next was a more extensive layer of mortar forming a nearly level deposit. It, too, must represent debris from construction or repair. Below the mortar zone was another stratigraphic horizon of brown clay and gravel fill. Beneath the fill zone

was another thin layer of mortar, hard to partly leached and thicker adjacent to the footer wall. There was a patch of spruce needle duff on top of the mortar level in one place. This mortar layer is also interpreted as construction debris from an earlier period of wall building. Below the lowest mortar was a layer of pinkish gray glacial clay which rested on a thin zone of orange brown gritty sub-soil clay deposited on the bedrock surface.

Lot 2A4A1 was from the talus rubble to the top of the footer. Lot 2A4A2 was below that and lot 2A4A3 was from the mortar zone to the bedrock level, the finer distinctions below the topmost mortar zone not having been recognized in the horizontal excavations. The lot 2A4A3 mortar zone and below are probably French levels and reflect the multiple French construction phases. Lot 2A4A2 contained French ceramics and may well have been a French horizon but was classified as indeterminate because of possible mixture. Even the rubble zone 4A1 appeared to be mainly French in content although it was classified as indeterminate. It was of course rubble from the walls and rampart fill and presumably mostly French material, but subject to mixture.

Lot 2A4A4 was largely the removal of backfill at the start of work in 1968. An additional section of the west curtain was exposed so that at the end of 1968 work 27.0 ft. had been cleared. These excavations, in seeking to uncover the top of the wall as well as its face, also removed some of the rampart fill from the inside of the wall line. Clearing the top of the wall revealed that behind the salient angle it had a thickness of 2.5 ft. At a point 6.0 ft. north of the salient the wall abruptly widened to a thickness of 5.5 ft. This wider section was 12.3 ft. in length. Beyond this point toward the north the wall was again found to be narrow, 2.7 ft. thick, for the remaining 8.7 ft. exposed. Work in the rampart fill (elsewhere operation 9) was started before the limit of the wall was apparent.

At the end of the 1968 season the thick part of the wall was interpreted as a buttress (Grange 1967: 74-75). During 1969 additional excavations were carried out along the face of the west curtain in 4A and in the rampart fills behind the wall in 9M (Morton 1970: 4, 1-13). These excavations revealed that the west curtain wall had fallen outward (Morton 1970: Fig. 8) and that the entire wall had probably been the same thickness as the wider buttress block, but this had not been apparent earlier due to the fallen state of the wall. The thin section

near the salient may be a thin facing restored by the English during repairs to the fort (Morton 1970: 26). The wall was reconstructed on the basis of projection from segments which had not collapsed (Morton 1970: 23).

Sub-operation 2A4B was the excavation of the south flank of the northwest demi-bastion. The entire wall was exposed from its re-entrant angle at the west curtain wall to its shoulder angle. It was not well preserved but the re-entrant angle was located. The shoulder angle of the bastion was missing but the gap was short and was easily determined by projection of the flank and face wall lines. The flank wall was extensively re-built by the English as indicated by the discovery of a re-used cordon stone in the wall matrix. This stone (Field Number 74) was at an elevation of 331.0 ft. A.S.L., far below its inferred original position. It was mortared into the wall face.

In sub-operation 4C the west face of the northwest demi-bastion was excavated. Only a few of the lowest courses of stone were still remaining but the line of the wall could be followed. It had been mortared directly to bedrock. Stones had been carefully placed to level up some bedrock fissures. The bedrock sloped steeply downward toward the north and the foot of the salient angle was 7.5 ft. lower than the foot of the shoulder angle. A

small portion of the wall was missing at the shoulder but the angle could be projected easily. Near the shoulder another re-used cordon stone was found, this one at elevation 328.71 ft. A.S.L. (Field Number 75). The cluster of cordon stones built into the foot of the salient angle was described in connection with the north curtain wall. The evidence of the cordon stones makes it clear the English had rebuilt the salient angle, the west face and the south flank of the northwest demi-bastion. Much of the west curtain had also been rebuilt or repaired. This is good evidence that the repairs to the bulged grand battery suggested by Lieutenant Pringle in 1774 (Ingram 1964) must have been carried out. The 1775 English plan (Fig. 13) profile of the west side of the fort shows that the rampart was at a much lower level there than on the north and south, further documentation of the extensive nature of English repairs along this wall of the fort.

Operation 5: The South Wall

The excavation of the south wall of the redoubt was designated operation 5. Sub-operation 5A exposed the south face of the southwest demi-bastion, while the east flank was excavated as sub-operation 5B. The south curtain wall was exposed in sub-operation 5C.

In sub-operation 5A the line of the wall was determined in 1965 when lots 5A1 and 5A2 were assigned. Both were mixed levels in the talus rubble outside the wall. Lot 5A3 was assigned to the removal of the backfill. Lot 2A5A4 was stratigraphically lower than 2A5A2 and carried the excavation to bedrock; this lot also appears to be too mixed for a classification other than indeterminate. The wall rubble and rampart fill deposits forming the talus terminated on bedrock.

The south face of the bastion had been built on bedrock except for a small section near the shoulder angle. The first 9.0 ft. of the wall at the shoulder was constructed on a fairly level surface of the clay stratum above bedrock. Stone in this area of the wall was laid with regularity (Fig. 52).

Toward the west the bedrock surface slopes steeply down to the southwest salient angle elevation. Along the slope stones had been laid in such a fashion to build up fairly regular surfaces. Depressions in bedrock were filled with smaller stones to level the work for placement of larger boulders. Some stones were laid along the slope of the rock but most were blocked up and oriented to form a level plane. In this wall an unusually large number of larger rocks were used at higher elevations in the wall. This contrasts with the pattern seen in the north curtain wall.

The excavation of the east flank of the demi-bastion was begun in 1965 when the upper portion of the wall was exposed from the re-entrant angle to the shoulder. In 1968 the excavations were carried to bedrock. Both lots, 5B1 and 5B2, were in the mixed talus of rubble and former rampart fill.

The north half of the short wall is founded on the sloping bedrock surface while the south half was built on the natural sub-soil clay layer. The lower stones in the flank wall follow the slope of the bedrock surface. Rocks were placed to achieve a generally level, although irregular, course about half way up the standing masonry. At the shoulder angle the stones were carefully selected and rectangular in shape, thus making a more stable corner. As was the case in the northeast bastion shoulder angle, these block-like stones were alternately placed to bond the corner of the work (Fig. 53).

Some larger stones were used at higher elevations in the wall. There is considerable size variation and the result was an inter-locking structure. As elsewhere many small stones were used for chinking between larger ones.

The excavation of the south curtain wall was designated sub-operation 5C. A small area at the salient angle and at the bastion re-entrant angle had been excavated to locate the wall line in 1965. Lots 2A5C1 and 5C2 were

were from the rubble talus and 5C3 served to record a few specimens found when removing backfill at the salient. These had probably eroded from the slope above the former excavation (Fig. 54).

Lot 2A5C4 was from mixed rubble below 5C2 and 5C3; it terminated on a layer of mortar. The excavation was extended westward to expose more of the mortar layer and lot 2A5C5 was a westward extension equivalent of 5C4 and terminated on the same mortar level. Both of these lots were later classified as probably French.

The mortar layer was excavated as 5C6; it appears to be mortar leached out of the walls before they collapsed. The stratigraphic deposit was thought to represent a late occupational period, but pre-wall collapse and in the laboratory study the interpretation was confirmed.

Lot 2A5C7 is stratigraphically beneath the 5C6 mortar and was a mixed mortar and refuse level. It has been interpreted as a surface level which was open during the construction of the fort. Its mortar content came from spills during construction. This lot was also classified as probably French. This deposit terminates on bedrock and natural clay surfaces. The bedrock in the area was sloping and irregular and the sequence noted was repeated again farther to the west but at higher elevation

above sea level due to the upward slope of the base.

Lot 2A5C8 represents another deposit of mortar leached out of the walls prior to their final collapse. It was stratigraphically below heavy wall rubble. Stratigraphically beneath the leached mortar zone was another layer of brown stained mortar, lot 5C9. This mortar also appears to have leached out of the walls before their collapse but to have weathered in situ. An alternative explanation is that it represents mortar spilled along the wall during English repairs.

Beneath 5C9 was another stratigraphic layer, designated 5C10. It was a zone of white mortar and was interpreted as material spilled during the construction of the wall, presumably French in origin. It rests upon a still lower level of mortar mixed with clay, lot 5C11. Lot 5C11 terminated on bedrock and was interpreted as mortar spilled during an early phase of construction. Unfortunately these stratified deposits contained only a few artifacts, and their interpretation is difficult. Pipe stem dates tend to confirm the interpretation, with some exceptions, but are based on too small a sample for real reliability.

The wall core was cleaned for stabilization and lot 2A5C12 was intended to represent that stratum, and should have provided French material. Unfortunately a

masons' assistant inadvertently mixed specimens from the talus surface in the collection bag and the lot had to be classified as indeterminate.

Farther toward the west the stratigraphic sequence found along the south curtain could not be followed with such accuracy although there was some slight evidence of mortar zones above the bedrock in patches. Materials from the talus rubble along the remainder of the south curtain wall were designated as lot 5C13.

The south curtain wall had been built directly on bedrock for much of its length (Fig. 55). The bedrock exposures along the wall are irregular and between the rocky protrusions the wall was founded on the natural clay sub-soil stratum. Near the southeast salient angle the bedrock drops sharply in steps and it was here that the mortar stratigraphy was well protected and thus preserved.

The stones used in this wall were of moderate to small size and considerable attention had been paid to leveling courses, especially where bedrock sloped.

Operation 6: The East Side of the Fort

The east side of the redoubt was designated operation 6 and excavated in several sub-operations during both 1965 and 1968. The side of the fort included the

faces and shoulders of two bastions, two short curtain walls flanking the entrance which also served as the exterior sides of the south guard room (operation 7) and the hangar (sub-operation 6B). The area also included the ditch and a small section of a counterscarp. Thus, the east side of the fort was more complex than the others.

Sub-operation 6A was the east face of the southeast demi-bastion. Sub-operation 6B was found upon excavation to be inside the fort and has already been discussed; it was the French hangar. Sub-operation 6C exposed the south flank of and shoulder of the northeast bastion. Sub-operation 6D removed the fill from the ditch in front of the east curtain and 6E exposed the east face of the northeast bastion or magazine.

Sub-operation 6A exposed the east face of the southeast bastion. Lots 6A1 and 2 were mixed talus rubble levels excavated and reburied in 1965; 6A3 was the re-excavation of those lots. This work was confined to the salient angle area. Lot 6A4 represents specimens recovered in the wall core in that area during preparation for stabilization. The rubble removed from the north half of the bastion face as lot 6A5 terminated on a stratum of rubble and heavy concentration of yellowish leached mortar. The rubble and yellowish mortar zone was segregated as lot

6A6. Both 6A5 and 6A6 appear to be from the collapse of the walls.

Stratigraphically below 6A6 a thin layer of darker brown leached and weathered mortar was found. This zone, 6A7, was interpreted as mortar which leached out of the wall and weathered on the surface prior to the collapse of the walls.

The next member of the stratified sequence is lot 6A8, a darker brown stained layer which was probably an old turf or surface zone.

The excavation of the face of the demi-bastion indicated that the bedrock surface was quarried and that the quarried ditch exposed in sub-operation 6D extended southward along the bastion face. Lot 2A6A9 was ditch fill rubble east of the trench which exposed the bastion wall; due to the spoil heap from the excavation of 6A and 9E this area could not be fully excavated. However, sufficient area was cleared to indicate that the ditch was open-ended and terminated near the southeast salient angle where the sloping surface contour graded down to the level of the bastion wall base. The English plan of 1775 suggests this ditch form.

The base of the east face of the bastion was mortared directly to bedrock (Fig. 56) with smaller stones placed to form leveling courses. Some fairly large stones were

used in the construction of this wall. These interlock due to their irregular shapes but some effort had been made to produce generally horizontal courses.

Twelve feet south of the shoulder angle the bedrock rises abruptly and the lower half of the "wall" from that point to the shoulder consists of the quarried rock face. Where wall stones had fallen out of place along this section of bedrock it could be seen that behind the facing stones the wall core was bedrock. In this half of the bastion a ledge of bedrock had been used as a base for the erection of a thin mortared stone veneer. Seven feet from the shoulder angle the bedrock leveled off and the wall rested upon the top of the bedrock platform. Small stones were used as leveling wedges beneath larger rocks in the first course of stonework in this area.

The shoulder angle itself was completely gone. Its location could be projected by the intersection of the lines of the face wall and the flank wall at the re-entrant angle. The projected location was confirmed by the presence of mortar stains on the bedrock surface and the shoulder angle could be restored with accuracy.

At the salient angle a large block served as a low foundation but had been leveled by courses of small stones beneath it. There was no projecting footer. Cordon

stones and several other cut stones, possible quoins, were found in the rubble adjacent to the salient.

Like the other salients this one had collapsed to a lower level than had the adjacent wall sections.

After sub-operation 6B was excavated and found to be part of the interior of the fort, sub-operation 6C was excavated in search of the shoulder angle of the northeast bastion. Begun in 1965 as lot 6C1, the backfill was removed in lot 6C2. Beneath the backfill additional rubble was excavated as lot 6C3. This material was largely leached mortar from the collapsed walls. The excavation fully exposed the bedrock shelf upon which the shoulder had been constructed. The re-entrant angle had been difficult to identify in 1965 and the shoulder itself was found to be missing. The wall core was present and through a combination of mortar stains on bedrock and projection from extant walls the shoulder angle and part of the east curtain was restored.

Here too the bedrock had been quarried to produce a ditch and the outline of the bastion flank and east curtain walls. Both north and south of the entrance the east curtain, which also served as the exterior walls of two interior structures, was poorly preserved. Through the presence of a few stones in line and mortar stains on bedrock it was possible to reconstruct the original east curtain line. Most fortunately both north and south

re-entrant angles had been found intact, giving two base points for projecting the wall line.

The east side of the fort thus consisted of two bastion faces, the very short bastion flanks, two short sections of curtain wall and the central entry.

Bedrock along the east side of the fort had been quarried extensively. It must have been a gentle slope toward the east when work began. It was quarried away to create a ditch; the remnant of the slope toward the east became a natural glacis. In addition to producing a defensive ditch, the quarry work produced a bedrock face and shelf upon which the east curtain and bastion shoulders were erected. The inset line of the ditch between the bastion shoulders indicates that the quarrying was done as part of the overall construction plan of the fort. The east side of the fort was planned as a unit. There is some historical evidence which suggests that the ditch was constructed later than the masonry walls of the east face and if this is the case it merely followed the existing line of the east curtain and bastion face walls. This is probably correct since there is little reason to doubt the historical reference which dates the construction of the ditch as 1709 to 1713 (Proulx 1969: 139). However, the ditch quarrying may have been at least started earlier. The 1709 map describes

the ditch as incomplete which implies that it had been started earlier than that date. The fact that part of the face of the southeast demi-bastion appears to be a masonry veneer laid over the face of bedrock suggests that some of the quarrying may have been done early in the construction of the fort. It is also possible that where the masonry is a veneer the bedrock could have been naturally exposed above the original surface.

The east side of the fort shown on the 1695 French plan is far different from that of the 1701 and 1709 plans. The ditch as found could not have been part of the fort in its 1695 version because of the location of later walls relative to the ditch line. Modification of the northeast bastion, and presumably of the rest of the east curtain, was under way during 1697, thus, the ditch must have been started sometime between 1697 and 1709.

Sub-operation 6E was the excavation of the east face of the bastion (Fig. 57). A small area at the collapsed salient was excavated as 6E1 in 1965 but the exact location of the angle could not be determined. The angle had to be located by projection of the lines of the north and east bastion faces. Lot 6E2 was the talus rubble layer along the entire east face of the bastion. Vertically it extended from the surface to

the level of a yellow mortar deposit. Materials from the mortar deposit formed a stratigraphic unit designated lot 6E3. This lot terminated on the natural sub-soil clay or on bedrock. At the shoulder angle the bastion wall was on bedrock; at the middle of the wall bedrock sloped down and the salient was at a lower level and on the clay stratum. It should be noted that the east face of the southeast bastion had a similar form, and that the east side of the fort was thus very symmetrical in appearance.

Lot 6E4 consisted of specimens found in the eroded mortar and debris above standing masonry along the wall while those from 6E5 were recovered from the wall core itself.

The excavation of lots 6E2 and 6E3 included removal of the rubble which had fallen into the ditch in front of the bastion. In operation 12 it was demonstrated that this end of the ditch was also open-ended at the north due to the natural slope of the ground. The ditch and east face of the fort was carefully planned to take advantage of the natural features to create a glacis, ditch and fort wall complex.

Lots 6E6, 6E7, 6E8 and 6E9 were excavated to complete the removal of the rubble fill from the ditch, the earlier

excavations having been confined to the area adjacent to the bastion wall. The eastern limit of the ditch was exposed and the line of a small remnant of a dry masonry counterscarp was found (Fig. 58). This feature is continuous with the line of the English palisade salient which was exposed on the surface and tested in operation 12. Part of the counterscarp was a quarried bedrock face, upon which the dry-wall was erected. The dry masonry was stratigraphically above a layer of stained soil and brick chips, further indication that this construction was of the late period at the site.

Sub-operation 6D: The Ditch

The east curtain wall of Castle Hill is shorter than the other curtain walls because it is located between the flanks of two bastions. The entrance to the fort is in the centre of the east wall. The east curtain is unlike the other walls of the fort in that it consists of the two thick exterior walls of the rooms which flanked the entrance passage. These walls were built on bedrock, the lower half of the east wall being a sheer face of solid bedrock since the guard room walls were erected at the elevation of the interior of the fort. The bedrock once sloped toward the east and the sheer face upon which the east wall was built

is the result of extensive quarrying. The quarrying produced a defencive ditch in front of the east wall and the continued slope of the surface east of the ditch was utilized as the glacis.

The excavation of the ditch in the area between the flank walls of the southeast and northeast bastions was designated sub-operation 6D. The ditch did not end abruptly at the shoulder angles of the bastions but continued along the faces of each bastion and those sections have been described. A ditch was present only on the east side of the fort and was open at its north and south ends. The extensions of the ditch in front of the bastions were excavated in the sub-operations that exposed the bastion faces. Only the central part of the ditch was excavated in sub-operation 6D, and it was in this area that the ditch was widest and deepest. Heavy concentrations of refuse were found in the ditch which had obviously been used as a refuse disposal area. The entire occupation of the fort is represented in the ditch fill midden.

During the 1965 field season a test trench was excavated across the ditch and extended over the glacis as operation 11 (Fig. 59). The 6D test of the ditch itself showed that the fill was stratified. The surface and upper levels consisted of unconsolidated rubble

derived from the collapse of the east curtain wall. Many recent artifacts were found on the surface and within the rubble. Beneath this was a more compact layer of wall rubble, below which were dark stained midden deposits extending to the bedrock bottom of the ditch. The 1965 excavations established that modern trash, especially bottle fragments, had filtered down into the lowest levels of the ditch fill. Thus, despite the stratified nature of the ditch deposits the objects associated with various fill levels are mixed and not reliable for the purpose of identifying French or English artifacts on the basis of stratigraphy. (It is for this reason that the extensive French midden debris in such areas as 9E is so important.) There was less evidence of intrusive modern artifacts in the lower levels of the ditch excavated in the 1968 season.

In the 1968 work the remaining sections of the ditch were divided into three arbitrary horizontal blocks, each of which was stratigraphically excavated as an independent unit. Lot numbers assigned thus separate materials on a horizontal and vertical basis. Careful attention was paid to the vertical correspondence of strata in the A, B and C blocks so that materials from each block could be correlated in

terms of their stratigraphic position. This method provided a means of checking specimen sequences through comparison of the stratigraphy in each strata block and also allowed for total compilation of material from the ditch fill on a cultural basis.

It was found that much the same sequence of deposition could be detected in each of the excavation blocks though the relative thickness of the strata and their elevations varied with the contour of the bottom of the ditch.

The upper level of fill consisted of larger rocks, bricks and other loosely compacted or unconsolidated rubble from the most recent stage of collapse of the east curtain wall. In general this stratum was thicker adjacent to the edges of the ditch than it was in the centre. Exceptions were some rather large segments of the walls in which the stones were still held together in the mortar matrix; these were in the centre of the ditch. This level must be of relatively recent origin.

Immediately below the loose rubble was a more compact layer of wall rubble. In this layer mortar stained rocks and brick fragments were held in a matrix of brown stained clay mottled with mortar fragments and brick chips. This level must be derived from an earlier stage in the collapse of the walls.

The level stratigraphically below the consolidated rubble also included small rocks, brick and mortar fragments but was distinguished by a much darker stained matrix and was distinctly midden-like in character. The stratigraphy suggests that this level may represent a phase of partial wall collapse and occupation refuse deposition. The layer was tentatively identified as representing the English occupation.

The next lower stratigraphic level lacks the mortar and brick chip mottled appearance and is very dark brown to black because of the concentration of charcoal particles in the fill. The level contained larger quantities of animal bone than the levels above and was a midden deposit. The ditch could not have held water when it was open but this level was quite damp and any ditch fill was probably rather soggy when the fort was occupied. The absence of wall debris and the presence of midden material suggests that this horizon in the ditch fill developed during an early occupation period before the walls began to collapse. On these grounds this could be regarded tentatively as a French level.

The lowest level of the ditch fill is a continuation of the midden deposit but was arbitrarily segregated because of the appearance of small angular chips of bedrock within the dark stained fill. These chips are quarry

debris typical of quarried rock levels elsewhere in the site. This level can be certainly attributed to the French period on stratigraphic grounds. This level terminates on the bedrock bottom of the ditch and includes specimens found within the deeper cracks in the quarried surface. The angular surfaces of the faces and floor of the ditch attest to its artificial nature when compared with the smooth weathered surfaces typical of unmodified rock.

The same general sequence was found in each of the strata blocks excavated in the ditch. In some instances an extra lot was defined on the basis of minor colour or texture changes within the fill. The thickness of the various strata varied in different blocks. The strata block A profile is shown in Figure 60.

A major reason for the variation was the contour of the ditch floor. A quarried ridge of bedrock was found in the centre of the ditch, oriented E-W, transverse to the long axis of the ditch. The ridge was located below the entrance passage and is aligned with the entryway. This higher segment of bedrock was evidently left to support the original footbridge leading to the entrance. No evidence of wooden or masonry support pillars for the original bridge were found. A timber support is most likely. The original bridge is

illustrated in an English sketch of the fort (Fig. 16).

The strata block approach to the excavation of the ditch proved useful. Study of the specimens recovered from the fill indicates that one of the three blocks provides a better sequence than the other two. This unit is strata block A, Lots 6D5, 6D6, 6D7, 6D8 and 6D9. There is considerable evidence of specimen mixture in the fill despite the presence of identifiable strata and careful excavation. The slope caused by the bedrock ridge for the bridge support may have caused artifacts to roll into the deeper parts of the ditch. The stratigraphy was also thinner and harder to follow in the area of the ridge and was further complicated by the presence of some very large boulders in the fill.

Study of the specimen content from the lots within the ditch stratigraphy indicates that most of the ditch fill contains refuse of the English period, with smaller concentrations of French material. Strata block A provides the best sequence, blocks B and C being primarily English deposits on the basis of their content. The detailed analysis of the ditch fill deposits in each of the several artifact chapters explains the distribution of materials and the cultural classification of lots from within the ditch fill.

The presence of French deposits on the bedrock floor of the ditch is significant evidence that the feature was constructed during the French occupation. The fact that there are relatively few specimens and that French strata in the fill are limited may also be taken to confirm the historical references which place the construction of the ditch very late in the French occupation of the fort. There was but a short period for refuse accumulation before the French left Fort Royal. The predominance of English deposits in the fill and their stratigraphic superposition over French materials follows the known historical sequence at the site. The mixture of specimens which makes it impossible to classify most ditch lots at a more reliable level than probably English can be explained easily. The mixture of early French materials with later English specimens would be inevitable in the later period of occupation as early materials were cleared out of various areas of the fort by the English as Castle Graves was constructed. Post-occupational mixture and the intrusion of modern specimens in recent times has been identified as well.

The stratified ditch deposits were found to be somewhat more mixed in artifact content than had been anticipated on the basis of field observation of the

layers in the fill. Despite the problem of mixture the seriation of specimens in the ditch fill does reflect the occupational sequence at Castle Hill. The details of specimen analysis are not repeated here.

Summary: The Exterior Walls

The entire perimeter of the fort was excavated and all exterior walls were stabilized. Tables 6,7, 8,9, and 10 record the measured dimensions of the exterior walls. Table 6 deals with the interior side of the walls. This side of the wall structure was vertical. Table 7 gives the dimensions of the top of the exterior side of the wall as taken from various historical plans; comparable archaeological dimensions are not given because the walls were not preserved to this elevation. Table 8 compares the dimensions of the exterior wall base. The face of the exterior wall sloped, the base being thicker than the top; hence, there are variations in the wall lengths at these different elevations.

An examination of Tables 6, 7 and 8 will quickly illustrate the point that there are many differences in wall dimensions taken from the different historical plans and that only a few of these are identical with

those of the walls as found. There is a greater degree of agreement between the English plan of 1775 and the archaeological dimensions, and the least agreement with the French plans of 1695 and 1701. These discrepancies may be partly explained by errors of interpreting historical plans, but this factor is probably not significant. Differences between the 1695 plan and later documents with respect to the east side of the fort simply reflect the alterations of that area by construction of the northeast bastion. Other differences are probably due to errors made while making the drawings or to the possibility that the drawings were plans and that the actual construction did not conform precisely to the plans.

Although it can be demonstrated that the English did major repairs on the northwest demi-bastion and probably to the entire west curtain wall, the same evidence indicates that the size of the fort was not modified at that time, or very little at most. The archaeological evidence indicates then that the exterior perimeter of the fort remained fairly constant. Thus it is more reasonable to attribute differences in the plans to errors of drawing or to deviation from plans in actual construction than it would be to suggest that the outline of the fort was greatly modified from time to time.

Exterior wall thickness is also summarized in Table 9. Exterior wall heights measured on the various historical plans are listed in Table 10. The height of standing masonry is also included and it can be seen that the height exposed by archaeological work is significantly lower than it was even during the English occupation. The data from the plans may eventually be useful in construction of models or full wall restoration.

The slope of the walls varied from place to place and differed on bastion flanks from the slope on curtain walls. In wall stabilization the slope was determined for each section and utilized in restoration. In operation 5C the south curtain wall was found to have a slope of about 1:5 ft. near the re-entrant angle. In contrast the flank of the bastion in sub-operation 5B had a slope of about 1:6 ft. Due to the short remnants of standing masonry and the slumping of many of these remaining walls it was difficult to determine original wall slopes with precision. Some of the variations observed may be the results of slumping.

At one point along the south face of the southwest demi-bastion the slope was measured as 0.7:3 ft.; here the wall sloped to meet bedrock. The range of observed slopes along the bastion face was 1:10 ft. to 1:21 ft. The more vertical area was probably tilted out of its original line. The flank wall of the bastion was 1:8 ft. in slope.

The south curtain ranged from 1:5 ft. to 1:10 ft. slopes. The variations may reflect differential slumping of the wall, but the original wall probably varied.

On the east face of the southeast bastion the slope was 1:6 ft. to 1:7.5 ft., and in a low section (probably not too accurate) the slope was 1:8 ft.

The west face of the northwest demi-bastion varied from 1:10 ft. to 1:12 ft. This area had been rebuilt by the English and perhaps they did not attempt to restore the original slope of the wall.

The west flank of the north varied from 1:4 ft. to 1:10 ft. slope while the north curtain wall ranged from 1:3 ft. to 1:10 ft. The average for the north curtain was probably about 1:7 ft.

All of the historical plans which show the fort in profile or section view indicate that the exterior face of the outer walls sloped while the interior side was vertical. The archaeological data confirm this pattern. It is difficult to make reliable measurements of wall slope on the plans. The English plan of 1775 indicates a slope of about 1:5 ft. The French plan of 1698 may indicate a slope of about 1:4 piéd at the salient angles while the French plan of 1701 indicates a slope of about 1:5.5 piéd along the curtain walls.

The latter would be a slope ratio of 1.06:5.86 ft., or essentially 1:6 ft.

Operation 9: The Gun Platforms

The excavation of the gun platforms on the north west and south sides of the fort was designated operation 9. Test excavations were made in 1965 and more extensive digging was done in 1968. In 1969 the exterior side of the south and west interior revetment walls was excavated as sub-operation 10J and should also be included in the rampart area.

At the start of excavation, the outer walls of the fort had collapsed and the rampart fill spilled outward burying the base of the wall. A similar collapse of the interior revetment buried all but the north interior wall in a talus of former rampart fill. The limits of operation 9 were the exterior side of the interior revetment walls and the interior side of the curtain and bastion walls. The area between these wall structures had been filled with earth to create the gun platforms and it was the excavation of that fill which was accomplished in operation 9. The limits of the operation went sufficiently beyond the masonry to locate the walls on a positive basis.

Due to the collapse of the ramparts the surface in much of operation 9 was steeply sloped. Where ever

possible the excavation units were based on stratigraphic units within the rampart fill. This was particularly true of the excavations in 1968 which had the profile data obtained by testing in 1965 to use as stratigraphic controls.

The English did not attempt to rebuild the gun platforms, but merely used the available remnants (See Fig. 13, profile on 1775 plan), and it could be assumed that most of the material recovered from the operation 9 excavations would be from French deposits. With the exception of near surface levels this proved to be the case.

Sub-operations 9A, 9B and 9C were an L-shaped trench excavated in 1965 to locate the inside corner of the southeast salient angle. The excavation revealed that the inside of the thick exterior wall of the fort was vertical and that the wall had a thickness 4.8 ft. at the elevation exposed. It was estimated that the wall had a thickness of 5.6 ft. at the base. Complete excavation of this area in the 1968 season revealed that the wall was 5.5 ft. thick at the base. The work in 1965 was limited; in 1968 the entire interior of the southeast demi-bastion was excavated as sub-operation 9E and detailed analysis of that work is to be found in that section.

Sub-operation 9B was a narrow trench excavated about the midpoint of the south side of the fort. It extended from the revetment to the interior of the south curtain wall. The purpose was to determine the distance between these structural units. A distance of 13.7 ft. between the walls was determined. On the French plan of 1695 this distance is shown as 18 pied or 19.2 ft. On the 1701 French plan the distance between the walls is 13.0 pied or 13.8 ft. The English plan of 1775 indicates a distance of 15.0 ft. between the walls, on the plan view, and 12.0 ft. on the profile section. By combining profiles from sub-operations 9B, 9C and 10D, a cross-section of the entire site was produced (Fig. 39). This profile clearly shows the Castle was built on a knob of bedrock. The profile can be compared with those available from the several historical plans of 1695, 1701 and 1775. The profile of rampart fill obtained in sub-operation 9B does not exhibit the extensive stratigraphy observed in 9E, 9J and 9K. Instead it consisted of thick layers of clay with angular rock rubble inclusions. The layers were distinguished by slight colour variations but do not appear to be of great significance.

Sub-operation 9C was located on the north side of the redoubt as noted above. It extended from the

north revetment to the exterior curtain wall. In this case the north curtain had almost entirely collapsed and the limit was difficult to determine. Subsequent excavations in operation 3 permit the projection of the wall line in this area. The distance between north revetment and north curtain wall is 13.5 ft. at this point based on the projection. The distance on the 1695 plan is again 18 pied or 19.2 ft. On the 1701 plan it measures to 13.5 pied or 14.4 ft. On the English plan of 1775 the distance is shown as 14.0 ft. on the plan view and 15.5 ft. in the profile. One notable feature of the 9C fill was that it included several large igneous boulders. It was initially thought that this might represent English fill repairs, but there are several references to the French having poised large rocks on the ramparts, ready to drop on an attacking enemy. Perhaps these are those large rocks.

Sub-operation 9E

Sub-operation 9E was the excavation of the interior of the southeast demi-bastion. The 9A test trench excavated in 1965 was within the limits of the 9E work. The work provided a test of the validity of the historical plans of Castle Hill and the area was a good place to seek a larger sample of French artifacts.

The limits of the excavations, and of the interior of the southeast demi-bastion, were readily determined on three sides and arbitrarily defined on the fourth. The limit on the south side was the interior of the south curtain wall. On the east the limit was the interior of the east face of the bastion and on the north the limits were determined by the position of the interior of the left flank of the bastion and by the exterior of the south wall of the guardroom (operation 7) which formed a continuous masonry structure. The western limit of the sub-operation was arbitrarily defined as the East 1050 grid line. The grid line was a projection from the west wall of the guardroom and was a logical limit for the demi-bastion.

During the excavation of the area adjacent to the south end of the guardroom a stairway remnant or a series of footholds and a possible stone revetment were found. These features were left in situ and the western portion of the sub-operation was consequently not fully excavated. The presence of a modern flagpole base nearby also contributed to this limitation. Furthermore, the excavation walls had to be sloped to prevent the collapse of the rubble. Thus, the western side of the sub-operation was smaller in area at the bottom than at the surface level.

The excavation of the bastion fill was done by hand and carefully followed a sequence of sloping strata. These layers included alternating clay and rock rubble zones and were in part distinguished by variations in the colour of the clay matrix and in the size of the rock in the fill. Some intervening layers were refuse laden deposits of black or brown stained soil. These levels represented surfaces which had been exposed at the time of the original construction of the fort (Fig. 61). Field examination of the artifacts indicated that the zones within the bastion fill were of French origin with the exception of an intrusive feature associated with the steps adjacent to the guardroom wall. The steps were probably of the English period, a conclusion supported by historical documentation and an associated ceramic specimen.

Lot 9E1 consists of material recovered from the surface, turf and part of the rubble fill. The surface was mainly bare clay and rock rubble but there were sections of turf and patches of grass. This lot terminated on top of a dark refuse deposit. In the initial stages of excavation a small area within the bastion was started and the slight variations in the fill were ignored because they were not well enough defined to follow and because the erosional slope was so steep. The sub-operation 9A

test had not produced evidence of significant fill stratigraphy and the rubble was first treated as a single stratum. As soon as it became apparent that the strata could be followed the method of excavation was modified.

Lot 2A9E2 was stratigraphically beneath 9E1 in the first area excavated and beneath 9E9 to the north where more strata within the rubble fill were identified and kept separate. Lot 9E2 was a layer of refuse stained black by charcoal particles. Large quantities of artifacts were recovered from the layer. Toward the east and south the 9E2 layer thinned out and disappeared due to the erosion of the fill following the collapse of the bastion walls. The level had probably extended to the wall line originally.

When it became apparent that the 9E2 layer extended to the north beneath fill in the unexcavated area the sub-operation was enlarged from its first limited extent. Lot 9E3 consisted of material recovered from the top stratum, the turf zone.

Lot 9E4 was from the first segregated level within the rubble fill and was stratigraphically beneath 9E3. It was dark brown in colour and, except for the intrusive stair area, terminated on a mottled purple clay zone within the fill. Fragments of the thin type of brick

were found in this zone along with larger rock rubble. An arc of stones was found and left in situ. This feature may have been a stone revetment adjacent to the steps.

Lot 9E5 was from a small area above the possible steps which had first been observed in the profile at the east end of the 10B excavation. Lot 9E5 is stratigraphically below 9E4 and consisted of materials from a dark brown level of fill. It included fragmentary mortar detritus. The lot was terminated on a solid area of mortar at the southwestern corner of the guardroom. A flat stone and a wood fragment was found on the solid mortar. These were possible step remnants.

Lot 9E6 was also stratigraphically below 9E4 and was located immediately to the east of 9E5. Like 9E5 this layer was made up of dark brown clay with fragmentary mortar inclusions. There were several small stones with mortar between them at the base of this lot. These were at a slightly higher elevation than the possible step identified at the base of 9E5 and were interpreted as possible evidence of another riser in the stairs.

Lot 9E7 consisted of materials recovered from a layer of mottled purple clay stratigraphically beneath 9E4 in the main area of bastion fill and beneath 9E5 in the stair area. The fill consisted of a pebbly loam

and clay of dark reddish colour giving an overall mottled purple appearance. Along the south edge of the step area the mottled purple zone ends abruptly indicating that the stairway lots 9E5 and 9E6 are intrusive into 9E7.

Lot 9E8 is stratigraphically below 9E7 and is a purple clay layer within the bastion fill. It was thicker adjacent to the guardroom wall and irregular toward its limits on the east, probably because of the sloping erosion of the fill.

The next layer in the bastion fill, 9E9, is stratigraphically below 9E8 and 9E4. It was a layer of dark brown fill. Adjacent to the guardroom wall along the northern limit of the sub-operation this layer included mortar fragments and a mortared rubble footer for the guardroom wall. This level of the fill terminated on the dark black stained occupation layer previously designated 9E2.

Lot 9E10 was a layer of brown clay and rubble fill stratigraphically below the 9E2 refuse zone. Lot 9E10 was thinnest at the north. Along the south curtain wall it contained black soil and mortar fragments which were interpreted as debris from the construction of the wall.

Lot 9E11 is a second, deeper layer of dark stained soil with a heavy refuse content and represents an earlier exposed construction surface than 9E2. The refuse layer 9E11 extended to bedrock in the northern part of the sub-operation near the guardroom wall where the mortar and rubble footer of the wall was mortared to bedrock. The refuse layer slopes to the south and dips steeply toward the southeast. Where this layer terminated on bedrock, the bedrock must have been exposed at the time of the fort construction. The weathered surface of the rock bears out this interpretation. Toward the south a layer of clay was encountered beneath the 9E11 refuse. The natural stratigraphic sequence of the site includes such a layer of clay immediately above bedrock. The 9E11 refuse layer helps to date the construction of the south guardroom because of the footer evidence which indicates that the guardhouse wall is contemporary with, or precedes slightly, the deposition of the refuse.

During the excavation of 9E11 a disturbed area near the surface at the interior of the left shoulder angle was discovered. All of the strata were thin here due to the erosion of the bastion fills, and modern artifacts were found in the disturbance. All specimens from the disturbed area were separated as lot 9E12 to avoid the contamination of the stratigraphic sequence.

Along the interior sides of the south curtain wall, the face and the east flank walls of the demi-bastion, a narrow band of differentiated deposit was noted. It was designated lot 9E13. This zone was parallel to the walls and about a foot in width. In thickness, it appeared at the level of 9E11 and extended to the level of 9E15 on the south and to the level of 9E18 at the left flank wall. The soil in this deposit included much mortar and had a grey colour. It appears to represent the concentration of mortar spilled adjacent to the wall during its construction. The deposit must be of the same age as the layers noted above since it was apparently a mortar stained continuation of those deposits. It suggests a construction sequence of alternating working surfaces and rubble deposition in the filling of the bastion as the walls were erected.

South of the central part of the bastion it was found that the bedrock dropped forming a low face and then sloped steeply toward the southeast. North of the face 9E11 terminated on bedrock; south of the bedrock shelf 9E11 follows the downward slope and was underlain by additional stratigraphic deposits. A layer of brownish clay and rubble was found and was designated 9E14. It continues to dip sharply toward the southeast and the interior of the salient angle.

Stratigraphically below 9E14 a third occupational zone with refuse and black stained soil was designated 9E15. The layer consists of a matrix of thick gummy clay with inclusions of charred and carbonized wood chips. The chips were most heavily concentrated in the western half of the area. This appears to have been an old surface level. The wood chips may represent debris from clearing the slope of trees prior to the construction of the fort, may be chips produced in constructing scaffolding for the work, or both. Evidence of a possible mortar footer near the salient angle was found at this level along the south and east walls. The east wall may have been re-aligned during its construction; this feature is discussed below.

Below the 9E15 level a thin layer of brownish clay above bedrock was encountered and designated lot 9E16. In places a thin layer of mortar intervened between 9E15 and 9E16. In 9E16 bedrock was not encountered in the southeast corner of the demi-bastion and it is evident that the salient angle was not built on bedrock but on the clay layer which normally occurs above the bedrock. The clay layer dips deeply in the southeast corner.

Immediately overlying bedrock and beneath the 9E16 layer in the southeast corner was a layer of

greenish clay which was designated 9E17. The bedrock surface was beneath this clay layer at the salient angle.

Lot 9E18 consisted of a layer of mortar on the clay immediately above bedrock adjacent to the left flank wall of the demi-bastion. It was stratigraphically beneath 9E13 but resembled 9E13 in that it was a narrow deposit of mortar along the wall. It, too, is probably mortar spilled during the construction of the wall.

Specimens from beneath the mortar wall footer in 9E9 were designated 9E19.

Figure 62 is a diagram of 9E lots.

The excavation of the southeast demi-bastion in sub-operation 9E produced some important information about Castle Hill. It demonstrated the accuracy of the historical plans which showed that no casemates were present in the demi-bastions. The French occupation levels found within the fill of the bastion contained large quantities of specimens in stratigraphic sequence. These fill the gap in the artifact sample from the site and may provide some evidence of change during the French period. The stratigraphic sequence clarifies some aspects of the construction sequence at the fort and the exposure of a large section of the

interior side of the walls provides information about the masonry. Some evidence of a makeshift set of steps can be identified as an intrusive English feature.

The French plan of 1695 includes a cross-section drawing of the Castle which shows that a knob of bedrock was selected for the site. The outer wall of the fort was built around the knob while the top was leveled and used as the interior of the redoubt. Leveling of the interior was demonstrated by the quarried surface found in operation 10 in 1965. The evidence uncovered in 9E confirms this aspect of the 1695 section drawing since it demonstrates that the salient angle was built just beyond a steeply sloping bedrock surface (Fig. 63). The weathered surface of the bedrock and other stratigraphic data reviewed above shows that the bedrock knob had been exposed prior to construction. Some evidence of tree clearing and/or scaffold building was found.

Like the other three salients, the southeastern angle was found to have been built on thin natural clay deposits rather than on the bedrock surface (Fig. 64). Just why this was done when only a few inches of excavation would have exposed a bedrock base for the wall foundation is not clear, especially in view of the fact that in other areas the walls were founded on exposed bedrock. The clay footing may have been a weak point

and if so this would explain why the salients collapsed to lower elevations than the curtain walls. However, it should also be noted that walls bonded directly to the bedrock often broke loose from that surface.

There was some evidence that an irregular footer was made at the base of the wall by mortaring large rocks along the interior of the south curtain near the salient angle. A similar practice was noted where the left flank of the bastion and the south wall of the guardroom joined. Along the east face of the bastion, six feet from the interior of the salient angle, the lower courses of stone are inset and the upper courses of the wall overhang the lower ones slightly. It appears that the line of the interior side of the bastion face was corrected during construction but that the correction was not carried to the base of the wall. Perhaps this was because the backfilling of the bastion with clay and rubble had already taken place to this level when the re-alignment was done. This is not a particularly significant feature but it does suggest something of the nature of the field engineering problems encountered and solved by the French.

Adjacent to the interior walls were narrow parallel deposits of mortar mixed with the various bastion fills. These seem to be evidence of the spilling of mortar

during the construction of the walls. Similar deposits adjacent to the walls were found in other operations.

The evidence of the stratigraphic sequence in the 9E fill suggests that the initial construction took place on a steep slope of partly exposed bedrock. Some trimming of trees and/or scaffold construction took place just below the exposed bedrock slope and the salient angle was built on the slope below the bedrock exposure. The masonry was evidently carried to a convenient height without backfill as indicated by the refuse mixed with the wood chip debris on the old surface level in 9E15. Clay and rubble backfill was then added behind the masonry before the construction of the walls continued. This is illustrated in the profile drawing (Fig. 61). A second dark stained refuse laden deposit developed on this new surface, 9E11, as the walls were once again raised to a convenient working height. This second refuse layer still follows the natural slope of the original surface and extends farther up the slope. The difference in elevation between 9E15 and 9E11 at the west side of the sub-operation is 1.5 ft. The slope of the bedrock made excavation difficult here and suggests that construction requiring the movement of mortar and other materials down this slope may have been equally awkward. The builders

may have backfilled behind the lower courses of the walls sooner than they would have at higher elevations.

Another series of rubble filling ensued on top of the 9E11 surface, then another layer of refuse and stained soil, 9E2, developed on this new working surface. The 9E2 layer is more nearly horizontal than previous layers and apparently a level working surface was being maintained at this point.

The fill stratigraphy shown in Figure 61 immediately beneath the 9E2 occupation zone is interesting because it shows that an effort to level the rampart fill was made at this point. There is a thick layer of small rock and gravel arranged to form a horizontal plane. Above this is a thinner layer of clay. It is apparent that the gravel was placed to level the surface and that the clay was added to cover the gravel. The 9E2 refuse layer developed on the clay surface. The top of the 9E2 cultural deposit is at about 335 ft. above sea level. This elevation is about the same as the interior of the redoubt. An interpretation of 9E2 and the underlying gravel and clay layers as an early temporary terra-pleine level can be advanced on this basis. The most likely period to which such an hypothesis would pertain is between 1694 when the redoubt was completed to its initial stage and 1697 when the walls had been raised to the cordon level. At the latter stage of construction the

rampart fills would have been significantly above the elevation of the 9E2 deposit. Pipe stem bore data from 9E2 gives a mean date of 1705 while dates from the rubble below, 9E10, are 1695. Thick deposits of clay and rubble fill were found stratigraphically above 9E2.

We may assume that the sequence of raising the wall a few feet and then adding backfill behind it was continued as the walls were erected, but such levels in the fill above 9E2 are badly eroded and no higher French occupational zones were found although they must have existed before the collapse of the fort. We may also assume that the construction of the walls and periodic backfilling was a lengthy process because it would have been necessary to allow the mortar to set well before the tons of earth and rock were placed behind the masonry. Historical records do mention settlement and refilling of the ramparts.

Adjacent to the south (outer) wall of the south guardroom (operation 7) possible evidence of stairs was seen in the 10B-10G profile (Fig. 42). There is stratigraphic evidence that these stairs were intrusive into the French layers of rubble fill. Ceramics of the English period were found in association with the steps and stairs are shown in this location on the English plan of 1775. The archaeological evidence suggests that these were not

elaborate stairs but rather a series of steps which might be best described as footholds. Mortar, paving stones and fragments of wood had been utilized as treads on the riser which had been dug in the clay-rubble bastion fills (Fig. 65).

Several large stones with associated mortar were found just south of the stairs and may have been a revetment associated with the steps. These stones might be no more than a concentration of rock in the fill, rather than a revetment. Erosion of the site has destroyed evidence of the steps which probably existed at elevations above those found. This hypothesis suggests that the original ramparts had collapsed to form a steep slope on the interior as well as on the exterior of the redoubt. Historic records available indicate that the English erected a log palisade instead of attempting to replace the former stone parapet on the exterior walls. The interpretation suggested on the basis of the limited evidence of the steps found in 9E is that the interior of the fort may also have been in a state of semi-collapse and that the English merely dug narrow foothold steps into this talus slope to give access to the terra-pleine level. If this evidence is correctly interpreted it would be of some importance in planning either restoration or dioramas

illustrative of the English period. Unfortunately the evidence is slim and the hypothesis presented above is tenuous at best.

The diagram, Figure 62, illustrates the relative positions of the various lots in the 9E excavations. Pipe stem dates of 1689 to 1706 confirm the interpretation of the stratigraphy as a sequence of French deposits. The pottery recovered from these lots is nearly all French coarse earthenware and faience.

Sub-operations 9D, 9F and 9G

Sub-operation 9D was located on the west side of the redoubt and extended 30 ft. westward from the revetment wall. It extended into the interior of the northwest demi-bastion. It was excavated as a test of the remnant of the main gun platform and reached a depth of 6.0 ft. but did not expose bedrock. A complex stratified series of deposits was exposed in the test. Beneath the sod was a zone of clay fill, gravel and topsoil. Below that zone was a layer of angular boulders. The upper portions of the fill are lighter than the deeper orange brown levels which grade into the unsorted angular rock at the west end of the trench. Lot 2A9D1 was from these levels in the test trench. Beneath the clay was a layer of mortar and sand with fragmentary brick inclusions, a layer designated 9D2.

This zone sloped to the west although it was fairly level. Beneath it was a refuse deposit which included sand, clay and ash. This and zones beneath it were designated 9D3. Only a small area in the test trench was excavated deeper; it revealed a layer of beach sand and another layer of refuse and a second lower level of beach sand. These levels appeared to represent stages of filling the rampart.

In 1968 the test trench was re-opened and two sub-operations, 9F and 9G, were excavated using the 9D profiles for stratigraphic control (Fig. 66).

Sub-operation 9F was on the south side of the 9D trench. It was excavated using stratified layers as excavation units, each being designated as a lot. The fairly regular appearance of these layers in the 9D profile soon gave way to a complex of variations of thickness and slope and lateral extent, and stratigraphy was difficult to follow. The same situation was found north of the 9D trench in sub-operation 9G. It had been intended to complete 9F first, but a combination of visitors and rain caused part of the north profile to slump and it became necessary to excavate 9F and 9G simultaneously. It was possible, however, to correlate those deposits which were continuous from one operation to the other. It was

necessary to slope the sides of this excavation to keep the unstable fill in place. There was a high proportion of unconsolidated rock rubble in this area of rampart fill relative to the compact clay layers found in 9E in the southeast demi-bastion.

The eastern limit of the 9D-9F-9G excavation was the west revetment wall and its projected line northward of the northwest corner of the wall. The wall was found to be 2.0 ft. thick and was bonded directly to bedrock. Its masonry matrix included an unexpectedly large number of small stones (Fig. 68) at lower elevations in the wall with large rocks at the corner.

The bedrock floor of the sub-operations sloped downward to the west, more evidence of the natural eminence selected to serve as the core of the fort. The western boundary of sub-operation 9F was the interior of the west curtain wall. The northward projection of this line served as a limit for sub-operation 9G which was thus within the interior of the demi-bastion. The west curtain was also bonded to bedrock with mortar.

The distance from the west revetment wall to the west curtain wall was found to be 17.5 ft. The same distance shown on the 1695 French plan is 18 piéd

or 19.2 ft. On the 1701 plan it is 16 piéd or 17.05 ft. On the English plan of 1775 it is 18 ft. on the plan view and 20 ft. on the profile. The profile measurement is between the walls. On the profile the gun deck is not as wide due to the collapse of the upper part of the wall; the gun deck itself measures 18 ft. in profile. The most extensive English repairs which could be identified archaeologically were on the northwest demi-bastion and west curtain, and this wall was badly collapsed (Morton 1970: 11-14).

The area excavated in sub-operations 9D-9F-9G is that shown on the French plan of 1701 as a platform for two small mortars. The profile drawing indicates that this platform was of different construction than the wooden sleeper and timber decking indicated for the rest of the gun platforms (Fig. 7). None of the excavations in operation 9 revealed any evidence of the timber decking, nor was any particular evidence of the mortar platform structure found in 9F-9G. The character of the fill in this area was, however, unlike that found elsewhere in the ramparts and may reflect the platform. This will be discussed below. However, it must be kept in mind that the remnant elevation of all of the ramparts, including the highest spot in the site which was within 9F-9G, are

substantially lower than the original gun platform level and it is very unlikely that any remnant of the original deck level survived.

The sequence of lots in 2A9F and 9G is as follows:

- 9F1 Sod layer; correlates with 9G1.
 - 9F2 Gravel/topsoil; correlates with 9G2.
 - 9F3 Reddish brown clay with medium rock fill; correlates with 9G3.
 - 9F4 Grey sandy mortar; correlates with 9G6.
 - 9F5 Angular rock fill; correlates with 9G7.
 - 9F6 Sandy mortar and refuse; correlates with 9G8 and 9G9.
 - 9F7 Black refuse deposit; correlates with 9G10.
 - 9F8 Grey sandy mortar; correlates with 9G11.
 - 9F9 Purple clay; correlates with 9G15 (?).
 - 9F10 Black layer, old sod line; correlates with 9G16.
 - 9F11 Brown sub-soil clay above bedrock; correlates with 9G18.
-
- 9G1 Sod layer.
 - 9G2 Topsoil and roots.
 - 9G3 Reddish brown gravel.
 - 9G4 Purple clay lens.
 - 9G5 Reddish brown gravel.
 - 9G6 Grey sandy mortar.
 - 9G7 Angular rock fill.
 - 9G8 Black refuse deposit.

- 9G9 Grey ash and sand.
- 9G10 Black stained refuse deposit.
- 9G11 Grey sand with bricks and large rock.
- 9G12 Brownish red clay and purple clay lens.
- 9G13 Reddish brown clay above 9G10 in NW corner of sub-operation.
- 9G14 Grey sand above 9G10 in west 1/3 of operation.
- 9G15 Dark purple clay below 9G12.
- 9G16 Black refuse below 9G15.
- 9G17 Light grey-purple clay below 9G16 in west 2/3 of operation.
- 9G18 Brown clay below 9G17 and above bedrock.

It had been assumed at the start of excavations that much of the rampart fill might be of English origin because of the evidence for English reconstruction of the northwest demi-bastion. In 3A, 4B and 4C cordon stones had been found mortared into the base of the wall suggesting that the west face of the demi-bastion had been rebuilt by the English. If the wall had been rebuilt the bastion fill would have been replaced or added to. This interpretation could be true farther north and west into the demi-bastion but did not prove to be the case in the area excavated with sub-operations 9D-9F-9G. A study of the ceramics and pipes from within the 9D-9F-9G area indicates that these areas are French rampart fills. French ceramics and consistently early

pipe stem dates came from these lots. The French fills may have slumped with the collapse of the walls but any English refilling was not evident in the area excavated. The rampart fills settled and were frequently refilled during the French occupation as discussed in the review of the history of the site. This accounts for at least part of the stratification of the fill levels. As discussed in connection with sub-operation 9E, the exterior walls were probably built using the partially filled ramparts as a working platform. This would account for the stratified occupational levels found within the rampart fill sequences.

Another interesting feature of the fill in the west rampart exposed in 9D-9G was the presence of rather thick layers of grey sandy mortar, often with brick fragments in the rubble. The bricks may represent debris from earlier structures at the site or from the town site far below the fort. It is also possible that the sandy mortar found in the area represents a location where mortar was mixed while the fort was under construction. It is logical to think that mortar would have been mixed in large quantities at a central location from which it could be carried to other parts of the wall. If the partially filled ramparts were being used as work platforms for construction of the outer wall they would

have provided an easy route from a mortar mixing point to any construction area and would have avoided climbing and long carries. A mixing location on the rampart seems a likely thing. The combination of mortar and sand is not common elsewhere in the rampart fills, but they have not been completely excavated. It can only be tentatively suggested that these deposits within the 9D-9G sequence can be explained in this way.

Sub-operation 9H

Sub-operation 9H was a trench across the rampart fill on the north side of the fort. It was 3.1 ft. wide and 13.0 ft. long. It adjoined the 9G excavation on the south and was located to provide a soil cross-section along a line projected northward along the exterior side of the west interior revetment wall.

The main purpose of the trench was to assist in locating the north curtain wall, but it was also designed to supplement the information about the north rampart fill which had been obtained in trench 9C in 1965 (Fig. 69).

The excavations revealed a complex series of lenses and layers of clay and gravel fill. Lots were utilized to separate materials from the stratigraphic layers. These are listed below in sequence, from top to bottom:

- 9H1 Sod layer.
- 9H2 Reddish brown clay, topsoil, small rock.
- 9H3 Reddish brown gravel lens.
- 9H4 Purple clay layer, small rubble.
- 9H5 Reddish brown gravel.
- 9H6 Purple clay.
- 9H7 Reddish brown gravel and clay.
- 9H8 Purple clay.
- 9H9 Reddish brown gravel.
- 9H10 Purple clay.
- 9H11 Reddish brown gravel and angular rubble.
- 9H12 Black stained clay.
- 9H13 Grey-green sand and mortar adjacent to the interior side of the north curtain wall and at same elevation as 9H12. Lot 9H13 is mortar and decomposed mortar associated with the wall; a possible wall footer stone was present in the lot and the deposit appears to be part of the wall foundation.
- 9H14 Purple clay sloping downward to the north and terminating on bedrock. Natural layer.

The small sample of pipe stems from these levels yielded a mean date of 1664 and it is likely that these are deposits of fill undisturbed from the French period of construction. The alternating layers of gravel and clay appear to have been very systematic in this area.

Figure 69 illustrates the more important stratigraphic levels found in the 9H trench. The north curtain wall may be seen in section in Figure 69, with layers of leached mortar and rubble adjacent to the exterior side of the wall. The wall was constructed on bedrock in this area. The bedrock level slopes upward toward the south on the interior side of the wall. Immediately above the bedrock is a stratum of purple clay (9H14), a natural deposit. This follows the same slope as the bedrock. Immediately above is a layer of sloping stained black clay (9H12) which is also interpreted as a natural layer of pre-construction age. This must have been the surface level at the time of construction. A projecting stone and mortar deposit (9H13) form a footer at the base of the wall. Deposition of rampart fill behind the wall was begun by placing a grey-brown clay and rubble fill (9H11) behind the wall and on top of the black clay surface. To the south this includes a lens of reddish clay with round rock rubble. To the north more angular rock is present and the deposit is thicker adjacent to the wall. At the wall the depth of this deposit is 2.5 ft. and to the south it covers the black natural surface zone by 0.5 ft. The deposit produces a level surface at an elevation of about 332.34 ft. above sea level.

Immediately above the coarse rubble level is a layer of purple clay (9H9) and rock rubble ranging from 0.5 ft. to 0.9 ft. in thickness and maintaining the generally horizontal plane of deposition. Above this stratum is a layer of reddish-yellow clay about 1.0 ft. thick, overlain by another reddish-orange fill zone ca. 1.0 ft. thick. These are generally horizontal layers but are somewhat thinner adjacent to the wall.

These data confirm evidence from other sections of the site which indicate the selection of a knob of bedrock as the core of the redoubt. Here again an effort to produce and maintain a level working surface behind the wall may be seen. The similarity of this pattern with other areas is notable and it is most likely an indication that the walls were erected by workmen standing on the rubble fill inside the wall. It would not preclude the use of a scaffold along the exterior.

Repeating a pattern seen elsewhere, this cross section of the north curtain wall shows clearly that the interior side of the wall was vertical while the exterior sloped inward at a ratio of approximately 1:8 ft. The slope is difficult to determine in this location. Other sections indicate that there were

localized variations in the slope of the exterior walls. The slope ranged from 1:10 ft. to 1:6 ft.

Sub-operation 9J

Sub-operation 9J was a rectangular excavation unit 10.5 ft. E-W and 16.5 Ft. N-S and was located on the north side of the redoubt. The operation was bounded on the east by the wall and excavation limit of sub-operation 1B. It was bounded on the west by an arbitrary line projected northward along the east end of the revetment wall. Operations 10H and 8H marked the southern limit and on the north 9J terminated at the interior of the north curtain wall.

The excavation was designed to search for evidence of the north stairway shown on historical plans of 1701, 1762 and 1775. The lots established in the excavation were based on stratified deposits in the rampart fills. Lot 9J1 was the turf layer above 9J2, reddish brown topsoil and small rubble.

Lot 9J3 was stratigraphically below 9J2 and was a lens of reddish brown clay and gravel which extended over most of the excavation unit.

Lot 9J4, the next stratum, was a darker brown stained level which included charcoal, mortar fragments and brick rubble in a clay matrix. Numerous artifacts were recovered

and the deposit was largely refuse. It is beneath 9J2 and 9J3 at the south and extended toward the north beneath 9J5 and 9J6.

A black stained occupational level which included a heavy concentration of bricks and brick fragments was designated 9J5. Lot 9J6 was beneath 9J5 but extended beyond it northward in that half of the excavation unit. It appeared to be a lensed heap of fill consisting largely of a dark reddish brown sandy clay. It included a large number of bricks and brick fragments (Fig. 70).

The purposes of this sub-operation were partially achieved. The location of the east end of the north revetment wall was found when the corner of this structure was exposed in the south end of the excavation unit. The interior side of the north curtain wall and its juncture with the west wall of the north guardroom was also located in 9J. The west wall of the guardroom was better preserved here than it had been in operation 1 and therefore permitted a more complete definition of that structure. Unfortunately no evidence of the stairs leading to the gun deck level was found. In sub-operation 9H the distance between the north revetment and the north curtain wall was found to be 14.3 ft. In sub-operation 9C the distance of 13.5 ft. had been found. In sub-operation 9J the distance between the two walls was 14.2 ft. The variation is due either to the fact

that the exterior of the north revetment is not perfectly straight or to the difficulty of locating the north curtain in sub-operation 9C where it was missing.

The 9J5 level produced a mean pipe bore date of 1702 and French earthenware sherds, thus helping to date the deposits as French.

Sub-operation 9K

This sub-operation was located on the south side of the redoubt near the southeastern corner of the interior. The stratigraphic sequence of clay and gravel fill in the ramparts repeated patterns observed elsewhere in the site. These deposits are adjacent to and continuations of levels first found in sub-operation 10B, and also present in 9E.

No evidence of steps or ramp was located but the east end of the north revetment wall was located and related to a remnant of a French wall which had been discovered in 1965. The sequence of deposits in 9K is as follows:

- 9K1 Sod or turf layer.
- 9K2 Topsoil.
- 9K3 Clay layer.
- 9K4 Yellow-brown gravel.
- 9K5 Purple clay.
- 9K6 Reddish brown clay and rubble.

9K7 Purple clay.

9K8 Orange-brown clay and rubble.

9K9 Black stained occupational zone.

9K10 Reddish brown gravel.

9K11 Black occupational zone.

9K12 Reddish brown clay and gravel.

9K13 Reddish brown clay and heavy rubble.

9K14 Black soil; old surface deposit and refuse.

The correlation of 9J5 and 9K14 is indicated by the presence of ceramic sherds, one from each lot, which crossmend.

Sub-operation 10J

Sub-operation 10J was excavated to expose the interior of the southwest corner of the revetment. In attempting to locate the revetment wall the excavations were extended into the rampart fill which was elsewhere designated operation 9. In sub-operation 10J, lots 1 through 6 are inside the revetment and have been discussed in an appropriate section. Lots 10J7 through 10J11 were outside the revetment wall and must be included in the operation 9 discussion of the rampart fills. Lot 2A10J7 is a sod layer, beneath which 10J8, a layer of topsoil and gravel was found. Lot 2A10J9 is a layer of red-brown clay and rubble and 10J10

is a more purple colored clay and rubble rampart fill. The lowest level, 2A10J11 was dark brown clay and rubble. The footer of the revetment wall was found resting on this fill.

The sequence found in this limited excavation is similar to that seen elsewhere in the site. The excavation was useful in establishing the location of the southwest corner of the revetment wall which had been below the surface level.

Morton continued the exposure of the exterior side of the south and west revetments as sub-operation 10J14 and 10J15 in 1969 (Morton 1970: 14). These excavations were for wall stabilization purposes. The rampart fill adjacent to the exterior of the revetment wall consisted of brown earth and medium sized rubble and produced no artifacts.

Sub-operation 9M was also excavated in 1969 by Morton for the purpose of exposing the west curtain wall for reconstruction (Morton 1970: 12-14). Wrought iron nails were found in lot 2A9M1 which had a maximum depth of 1.8 ft. (Morton 1970: 12). These nails may either be from the old wooden rampart deck or, more likely, from the wooden palisade erected on the rampart talus by the English as shown in the 1775 plan. The other lots described in sub-operation 9M are additional zones

of gravel, angular rock rubble and clay rampart fills. Morton identified 9M2 as English and the remainder as French (Morton 1970: Table 1).

Behind the north revetment wall another narrow trench was excavated for stabilization purposes (Morton 1970: 13). It was designated sub-operation 9N. The only lot, 9N1, was interpreted as French rampart fill.

Summary of Operation 9

Operation 9, the excavation of the gun platforms between the exterior walls and the interior revetment included test trenches, larger excavated areas and the complete excavation of the southeast demi-bastion. In most areas there was a complex stratigraphy in the rampart fill. Alternating layers of gravel and clay appear in some places to be systematic. Elsewhere cultural refuse forms interbedded deposits which indicate the incompletely filled ramparts were probably used as work platforms during the construction of the exterior walls of the fort, and the use of refuse as fill.

With only one or two exceptions the excavation units within the operation were thought to be French on historical and stratigraphic grounds and these interpretations were confirmed by the artifacts recovered.

Due to the collapse of the walls and the erosion of the fill, the gun platform level of the original fort no longer exists.

Although the ramparts are no longer preserved to the original terre-plein level it is possible to calculate the width of the former gun platforms by measuring the distance between the exterior walls and the interior revetment. The inner side of the exterior wall was vertical, as was the revetment. Hence the distance between these points reflects the original distance across the gun platforms. The archaeologically determined dimensions are compared with those calculated from historical plans in Table 11.

The 1695 plan shows all three platforms, north, west and south, as being the same width. This is not the case on the other historical plans nor is it true of the archaeological discoveries. This evidence could be taken as further indication that the 1695 plan represents projected rather than actual work. This is especially true in view of the fact that the width of the ramparts shown on that plan is 20.2 ft., wider than on any other plan.

On the 1701 French plan the profile indicates that the interior revetment wall rose above the gun

platform level as did the parapet on the exterior side. The rampart width taken from that plan is between the two walls. Those dimensions are very similar to the archaeologically determined widths.

The 1775 English plan shows different platform widths on the plan view than it does on the profile views. Both dimensions are given. Those for the plan view are taken between the exterior and interior revetment walls as before. The dimensions from the profiles are taken to include the thickness of the interior revetment wall which does not project above the terre-plein level as it did in the French period. The allowance for the wall reduces the distance by about 2.0 ft. The platforms were narrower in the English period (profile measurements) due to the collapse of the exterior walls and narrowing the rampart by consequent loss of fill. The original widths (plan view measurements) are similar to those found by excavation.

On the English plan of 1775 the profile shows that the height of the interior revetment walls was 10.0 ft. on the north and south sides. The gun platforms were that height above the interior parade ground. However, the same plan shows that the west revetment gun platform was only 6.0 ft. high above

the interior level. Presumably this is because the west side of the fort had collapsed to a lower level at that time.

Operation 11: The Glacis

Operation 11 was a narrow trench excavated as an eastward extension of the initial trench across the ditch in sub-operation 6D. It was excavated in order to extend the profile of the ditch onto the glacis slope (Fig. 59). The fill consisted of an upper layer of sod and a zone of clay and gravel beneath the turf. A thin layer of sub-soil clay was found directly on the irregular bedrock surface. Bedrock appears from 1.0 ft. to 1.5 ft. below the surface.

Specimens from the sod and clay/gravel levels were included in lot 11A1 while those from the clay deposit in the hollows in bedrock were grouped as lot 11A2. The upper level, lot 11A1, was classified as probably French while the lower one appears to be definitely French on the basis of specimen content. Few artifacts were found.

The test trench demonstrated that the glacis slope was not an artificial deposit of clay, but a natural slope. It was concluded that the French planned the location of Fort Royal to take advantage

of the natural slope of the surface in order to produce a glacis. The ditch along the east side of the fort was later made by quarrying the bedrock to complete the usual defencive profile.

There were no covered way or berm constructions within the quarried ditch, but as previously noted there was a small segment of dry-wall counterscarp preserved in sub-operation 6E.

Operation 12: The Palisade

The northeast salient of the fort is formed by the bastion angle. Parallel to the east face of the bastion a surface feature composed of a line of rock rubble could be seen. The line of stones terminated in a sharp salient angle and short segments of a similar line of surface rock rubble could be found parallel to the north face of the bastion. The English plans of 1762 and 1775 illustrate a structure surrounding Castle Graves in this approximate location. The 1775 plan also shows the palisade line in profile where it appears to consist of a rock (?) base and vertical posts. The line of stone on the surface was tentatively identified as the structure shown on the English plans.

Operation 12 was a small test excavation designed to cross-section the rock line. The excavation was

10.0 ft. N-S by 20.0 ft. E-W and oriented with its long axis along a line projected eastward along the north face of the northeast bastion. This orientation was selected to allow more accurate comparison of the archaeological evidence with that shown on the historical plans (Fig. 71).

The first lot consisted of materials recovered from the sod layer over the entire area of the excavation. Below the sod layer the excavation was divided into two sections, one on each side of the wall. Lot 12A2 was to the east and 12A3 was on the west side of the rock line.

The 12A2 fill proved to be a dark loamy clay with small fragments of brick and mortar inclusions. It terminated on a yellowish clay stratum. The eastern side of the wall consisted of stones somewhat smaller in size than the material in the central part of the rock line, and had slumped out of its original position. The structure was more a collapsed heap of rubble than a wall remnant.

Lot 12A3, west of the wall, consisted of materials from a similar dark brown clay with brick and mortar inclusions. These fragments appear to be derived from the surface debris of the fort. It is notable that the small sample of pipe stem fragments from these two lots

yield mean dates of 1721 and 1740. The rock line is set in a stratum which may be attributed to the English period of occupation. The artifact sample was small, however, and both lots were classified as indeterminate for other analytical purposes.

Both 12A2 and 12A3 terminated on a yellowish clay stratum and excavations in that stratigraphic level, below lot 12A2, revealed that the clay layer was undisturbed. The level was designated as 12A4. The wall had been partly constructed on and above this stratum. The yellowish clay terminated on another natural clay layer, probably the usual sub-soil clay found above bedrock elsewhere. That level was not excavated.

The south half of the operation was further excavated in order to cross-section the wall itself. This excavation unit was designated as lot 12A5 and specimens in this group came from within the wall rubble. A small sample of pipe stems produced a mean date of 1712. Some French sherds were present. Lot 12A5 was finally classified as indeterminate since the sample of specimen material was small and the area excavated was also small. It could not be determined on the basis of this sample whether the specimens were old ones from the surface and incorporated into the wall or if they were of the period of wall construction. The historical data would suggest the former since the palisade is of English origin.

No evidence of regularity was found in the placement of the stones. No evidence of the vertical log palisade could be detected. The wall dissection did reveal that it was not solid rock in the lower level. Below the top layer of stones the rocks were more widely spaced and the total depth of the stone rubble was 2.0 ft. Brick and mortar fragments of earthenware sherds and modern artifacts were found within the stones. The evidence from the small section examined suggests that the stones were embedded in earth from the surface of the site and that could account for early materials in a presumably late structure. The fact that there was stratigraphic evidence that part of the wall was stratigraphically within and above a layer of site debris would indicate that it is a relatively late structure.

The archaeological evidence suggests that the palisade was late but cannot confirm its English origin or rule out possible French origin. The sample tested was small, but the wall could be located from surface indications only in a small area near the northeast salient.

The line of the palisade rock wall is the same as the line of the dry-wall counterscarp exposed in sub-operation 6E. That feature is also stratigraphically above a layer of site debris and appears to be a later

feature. The dry-wall counterscarp in 6E is interpreted as an extension of the English palisade line.

Operation 13: The Mortar Platform

Within the area between the northwest demi-bastion of the fort and the nearby salient of the enceinte wall historical plans indicate the location of a French mortar platform. Operation 13 was excavated as a test in search of this feature.

The flat area north of the fort was used as the spoil heap for two seasons and limited the area which could be excavated without extensive earth moving. The suspected area of the mortar platform had been kept clear, however, and could be tested.

The location was selected by projection from the historical plans. The test was an excavation 5.0 ft. by 15.0 ft. in size. It was oriented to cross the location of the mortar platform determined from the plans. Little positive evidence was located and the test was not expanded (Fig. 72).

Lot 13A1 was the sod layer from the entire area. It terminated on a brown clay soil designated 13A2. Lot 13A2 included a concentration of medium sized rocks, a layer which was thinner at the end of the trench. This zone could have been a gravel layer placed to serve as a foundation for a timber platform floor.

A darker brown lens of soil in the centre of the trench was designated lot 13A3. Lot 13A4 was a medium brown soil lens with mortar fragment inclusions in the south end of the trench. Lot 13A5 was a lighter brown soil and terminated on bedrock in the north end of the trench. Lot 13A6 was a zone of purple clay, the sub-soil deposit above bedrock.

Both French and English materials were found in the excavation and one lot could be tentatively identified as probably French. Spikes found in the excavation might be indicative of a timber deck, but other explanations are possible. The results of the test were inconclusive and the location of the French mortar platform cannot be confirmed on the basis of the available evidence.

The Enceinte

The hill top location of Castle Hill includes a relatively level area of considerable size along the north wall of the fort. It extends to the east and to the west beyond the fort. Around the perimeter of the hill top an encircling line of stone rubble on the surface marks the line of an enceinte or covered way. Construction of this feature is mentioned in French accounts of Fort Royal and in English descriptions of

Castle Graves. The outline of the feature is shown on several of the historical plans. It is also shown in profile on the English plan of 1775. On that plan it is shown with a vertical back wall, a sloping face and a sloped top. Fraising projecting outward from the base of the wall is shown in the profile drawing.

The enceinte was merely a pile of rubble rather than a distinct wall at the time of excavation, but its general line could be followed. It formed a salient northwest of the northwest demi-bastion of the fort. At least two cordon stones were found in the enceinte rubble there. Others have been found elsewhere in the line and may be evidence of English repairs to this French construction. However, local informants tell of "cleaning up" the site in preparation for the tercentennial celebration and some of the cordon stones could have been added to the wall at that time.

No excavations in the enceinte were carried out in 1965 or 1968, but the feature was restored by Karklins in 1970.

Architectural Features: General Summary

The archaeological work on the structure of the fort resulted in very complete knowledge about the redoubt. Some evidence of almost every feature shown on the 1701 French and 1775 English plans has been identified through excavation. These two plans do not agree with the archaeological discoveries in every particular but their essential validity has been confirmed. Many of the wall dimensions taken from or calculated from the plans do not agree with those determined by actual wall remnants. Although there are some possible errors in such measurements these are thought to be negligible. Those plans may have been inaccurate or, more likely, the actual construction might not have conformed precisely to the plans.

The 1695 French plan shows much less agreement and although it probably represents a stage in the construction of the fort there is a greater possibility that it merely represents a stage in planning rather than an actual construction period. The 1695 plan may, on the other hand, represent an actual stage of construction. Data supporting that interpretation, other than the historical record, include the general form of the fort, and the length of certain features. The length

of the west interior revetment wall is nearly the same on all plans and in the archaeologically determined dimensions. This similarity is an argument in favor of the 1695 plan as an actual construction stage.

Despite numerous variations in the actual dimensions of structures found when compared with those same dimensions on historical plans, the archaeological data do support the essential accuracy of the historical plans. Differences have been discussed in detail and need not be repeated here.

On the basis of archaeological evidence and reference to the historical plans and other data about the fort it is possible to identify the archaeological structures of the fort which represent the two periods of occupation. Figure 22 presents the as found structures of both French and English periods. Figure 73 is a plan showing only those features identified as French. Figure 74 identifies the as found structures of the English period of occupation.

CERAMICS

A number of ceramic sherds were recovered during the excavations at Castle Hill and ceramics representative of both the French and English occupations are present in the collection. It was not until after the 1968 season that a good representative sample of French pottery was available from the site; French wares were recovered from previously unexcavated French deposits, many of them sealed rampart fill levels. The sample of English pottery includes specimens from good stratigraphic contexts but much of it is from mixed or potentially mixed levels.

A total of 2159 sherds was recovered in the excavations. The major categories are earthenwares, stonewares and porcelain. The sample has been described and tabulated through the use of "vessel" units; 481 vessel units were established. This vessel count is an approximation, not an absolute figure, and should be regarded as a minimum estimate of the number of vessels represented.

In the tabulation for each vessel the excavation lot number is recorded so the specific number of sherds from each excavation unit is available. The reduced number of sherds resulting from cross-mends is indicated in round brackets in the tabulation of sherd counts. For many purposes in the analysis of the site the sherd count rather than the vessel count was utilized. In the ceramic summary the pottery associated with the French and English occupations is compared on both sherd count and vessel count bases.

Twenty-four ceramic type categories were established for descriptive purposes. A summary of these categories is presented in Table 43 following the description of the pottery. The earthenwares are described first, then the stonewares and finally the porcelain. Since vessel numbers were arbitrarily assigned during the classification of the ceramic specimens they do not always follow one another in sequence from one major ware category to another.

Olive Jars

One of the most common types of pottery at Castle Hill is the olive jar (Figs. 75,76,77). This ware is primarily associated with the French occupation of the site but may have been present in small quantity in

the English period. This pottery from Castle Hill is similar to that described by Goggin (1964); variations from his description will be discussed below.

Manufacture

This pottery was thrown on the potters wheel. The vessel walls are of irregular thickness, in part due to the presence of pronounced grooves on the interior or exterior or both. Some sherds lack the grooves. The interior grooves are due to the potters fingers on the inside of the vessel during throwing. The exterior grooves may be due to the same factor although Goggin attributes the exterior grooves to a finishing tool (1964: 261-62). The exterior of the base often has spiral grooves (Fig. 77i), a trait which Goggin attributes to a finishing tool (1964: 262).

There is evidence which suggests that the vessels were thrown in two halves and subsequently joined at the shoulder prior to the application of the slip coating. The joint is not generally visible but one vessel in the collection was incompletely welded at the joint and glaze from the interior penetrated the joint. Since the joint was open along a weld line the presence of the glaze demonstrates the two halves construction technique.

The thickened collar or "mouth ring" (Goggin 1964: 264) was also wheel made as indicated by throwing rings.

The pottery was well fired. A carbonized core is rare and fireclouding on the exterior, although present, is unusual.

Paste

Texture. The texture of the paste ranges from fine to medium and is compact, although there are occasional air holes within the body. The sherds exhibit a laminated structure when viewed in cross-section and they have a tendency to spall and split along the laminated cleavage planes. There is also a tendency for the body to break along the plane of throwing rings. The edges of most sherd fractures are blocky and at right angles to the vessel surfaces. Air pockets sometimes cause "blisters" beneath the glaze.

Non-plastic inclusions. Fine to moderately coarse quartz and other sand particles are a common inclusion in the paste. Small mica flakes are also present in rare to moderate frequency. The sand and mica particles are evenly distributed in the paste and may have been natural inclusions in the clay source. Aplastic tempering materials of larger size have also been added to the paste and are present in most sherds as rare inclusions. These particles are limestone and iron oxides

ranging from 1 mm. to 9 mm. in diameter; the 2 mm. to 5 mm. size range is most common. A few sherds lack such tempering particles. In a few cases crushed pottery particles have been used as tempering and there are also occasional inclusions of small rootlets or other fibre.

Colour. The colour of the paste is generally a pale orange yellow (7.5YR 9/4) to light yellowish pink (2.5YR 9/3) though whiter, redder and greyer hues are common. Table 12 summarizes paste colour by vessel count, using the Nickerson Color Fan (Munsell code). It should be noted that the fan does not contain sufficient variety to denote the precise paste colours and those tabulated are close approximations. The paste on these specimens is similar to Goggin's "Late Style Paste, Type 1" (Goggin 1964: 271) which is described as slightly pinkish or pale salmon. Goggin did not find standard colour charts useful in dealing with the olive jar (1964: 257).

Strong reddish orange is sometimes found in the core of a sherd having a light yellowish pink colour near the surface, but most sherds are relatively uniform in colour throughout their thickness. A few examples, less well fired, have a grey core or are grey to black on the exterior half of the sherd.

Surface Treatment

The interior and exterior of most sherds are smoothed but feel slightly rough due to the protrusion of sand particles and larger aplastic tempering through the smoothed surface. The surface was often moist-wiped, producing a self-slip (Shepard 1961: 191). Small striations caused by the drag of aplastic particles are present. A few sherds lack the rough feel.

Slip. The exterior of most sherds has been covered with a thin slip coating. On many of the vessels in the collection the exterior has not been slipped but has been wiped producing a self-slip as noted above. Those that have been slipped have a thin layer of noticeably whiter surface clay. The colour is actually an off-white; grey or ivory to cream coloured, but appears "white" against the darker paste. The slip covering has frequently worn away on the higher ridges of the grooved surface, exposing the darker paste beneath.

Both self-slipped, or unslipped, and true slip covered vessels are included in the same category because the use of the added slip is apparently correlated with those vessels having a redder or strong orange paste. Self-slip from wet wiping also produces a slight colour change at the surface (Shepard 1961: 191). Apparently the aim was

to produce reasonable uniformity in exterior colour. The presence of a thin white slip on "Late Style Paste 2" has been described by Goggin but it is absent from paste 1 which is most like the material from Castle Hill.

Glaze. Most of the specimens from Castle Hill have been glazed on the interior. A few of them have been left unglazed and a few have been glazed on both the interior and the exterior surface. Goggin found similar variants (1964: 267) in his "Middle Style" olive jars while interior glazing is most common on late style vessels of shape B, but he states that glazing is not a diagnostic trait (1964: 285). At Castle Hill the relative frequency of different exterior glazed vessels are compared (Table 12). However, the sample for unglazed and interior-exterior glazed categories is too small for reliable conclusions. In Table 15 it is noted that the mean sherd thickness is greater in unglazed as compared with interior glazed specimens and still greater in interior-exterior glazed examples. Again, the small sample size affects the reliability of this observation.

The most common form of glazing on the Castle Hill olive jar is a thin, usually irregular, layer of a lead-copper oxide glaze which has been applied to the interior of the vessel. The exterior is generally unglazed except for part of the exterior of the rim. The shoulders and

body walls of the interior glazed vessels frequently exhibit small spots, drips or splatters of glaze.

The glaze was apparently poured into the vessel, sloshed around and dumped out. Unglazed patches on the interior are present and are clearly the result of an incomplete flow of the glaze during application. In a few sherds the glaze has "crawled" during firing to leave unglazed patches.

The interior glaze is generally a dark yellowish green, ranging from extremes of dark bluish green to light olive. Table 13 lists the variety of glaze colours in terms of the Munsell code in a Nickerson Color Fan. Table 14 further summarizes these data and it is apparent that the majority of the specimens have green yellow hues. There is a great deal of variability, many vessels having rather mottled colours. The variability is in part caused by the relative thickness of the glaze, location on the vessel, body colour, interaction of the glaze with aplastic iron oxide particles in the paste and apparent variations in firing temperature. There are often patches of bubbled or otherwise defectively fired glaze and one entire vessel has a pitted opaque granular glaze due to improper firing.

The glaze colour on interior-exterior glazed vessels is in the same range as the interior glazed examples. These are tabulated in Table 19.

Marks. There are no marks or decorations on the olive jars from Castle Hill.

Vessel Form

Thickness. The body sherds of the olive jars from the site average 10.7 mm. thick, the most common range being 10 mm. to 12 mm. in thickness. Average thickness may vary with the location of glaze as indicated in Table 15 but this may not be a very significant trait. The thickness of sherds varies in part due to their location on the pot, the very short neck being the thinnest part of the vessel. There are considerable variations in thickness on individual vessels, a trait characteristic of Goggin's "Late Style Olive Jar" (1964: 271). Representative ranges of variation are shown in Table 16.

The range of variation in vessel wall thickness in a single vessel is illustrated in Table 16 on partially restorable specimens. The degree of variation is not as extreme as described on single vessels by Goggin for the "Late Style" olive jar (1964: 271). Thickness variations are present in his "Middle Style" jars. The range of thickness variations in the Castle Hill collection (Table 15) is similar to the "Middle Style" thickness range (Goggin 1964: 264).

Shape. The olive jar is a globular vessel with a small diameter, very short, neck and a thickly braced

collared rim. There are no complete vessels in the Castle Hill collection but there are sufficiently restorable examples to determine vessel form (Fig. 75). The body shape is similar to that of Goggin's "Middle and Late Styles, Shape B" (Goggin 1964: 283). The major form difference between the "Middle" and "Late Styles" is the more angular shoulder of the "Late Style" body (Goggin 1964: 272), a trait seen in the Castle Hill examples (Fig. 76a). However, some rounded shoulders like "Middle Style B" are also present (Fig. 75). The short egg-shaped globular body is the only body form represented in the Castle Hill material. Only one possible exception is a body sherd in vessel number 49 which appears to have a straighter wall and smaller diameter than other examples.

The vessel body is surmounted by a thickly braced collar; a "mouth ring" in Goggin's terms (Figs. 75, 77). The profile of this rim in the Castle Hill specimens is most similar to that illustrated as a "typical Late Style Olive Jar Mouth" (Goggin 1964: Fig. 38C). However, similar profiles are present in both "Late Style" (Goggin 1964: Fig. 36 B,E) and "Middle Style" (Goggin 1964: Fig. 33 E,F) vessels.

Goggin notes that the "Late Style" ring mouths are thinner than "Middle Style" mouths, although the ranges

overlap (Goggin 1964: 281). The Castle Hill specimens average 21.0 mm. thick, more like the thickness of the "Middle Style" mouth, but fall within a range of 17 mm. to 29 mm. which includes both Goggin's "Middle and Late" styles. In Table 17 the dimensions of Castle Hill olive jar mouths are tabulated.

There are no handles or appendages, but one rim has two diagonal grooves in the lip which may be remnants of a pouring spout. The specimen is fragmentary.

The collared rim or mouth ring is flared on both the interior and exterior. The lip is a well defined ridge.

Tabulation

The olive jars are tabulated in Tables 18, 19 and 20. Table 18 lists the most common category, those with a slip covered exterior and glazed interior. Table 19 lists the unglazed specimens and Table 20 lists those which are glazed on both the interior and exterior. Some additional differences between these three categories have been discussed above.

In the tabulation an attempt to group olive jar sherds into vessel units is recorded. The "vessels" are groups of sherds which have similar paste colour and texture, similar exterior surface treatment and similar

glaze colour and texture. Some examples with imperfectly fired glaze are quite easy to group; others are somewhat less certain. In many cases sherds grouped together in a category as a "vessel" proved to cross-mend. In other cases they are from the same or adjacent excavation units. In such cases the "vessel" grouping seems to be reasonably accurate. There are other examples where sherds come from widely separated proveniences and may not have actually come from the same vessel originally, although wide physical separation of sherds from a vessel is entirely possible at the site. The "vessel" units, then, are reasonably accurate approximations. A comparison of vessel count with restored sherd and total sherd counts is found in Table 43. For descriptive purposes the vessel count proved to be a useful effort. In the statistical study of the distribution of the pottery in the site, however, the total sherd count was employed. In Table 18 the cross-mends are noted, the number of sherds from each lot is given. Where sherds have been cross-mended, the total sherd count is given and the reduced count resulting from cross-mends is indicated in round brackets.

A total of 45 olive jars with interior glazing was identified in the collection. In addition there was a quantity of chips which could not be accurately placed in

a vessel category; these are also tabulated. Six unglazed vessels were identified and nine vessels with interior-exterior glazing were found. The excavation lot distribution of these sherds will be found in Table 18 and the cultural association of the olive jars in Table 51.

Comparisons

As indicated above there are several points of similarity between the olive jars from Castle Hill and the olive jar styles defined by Goggin (1964). The Castle Hill specimens do not match Goggin's styles perfectly, having some traits of his "Middle Style B" and his "Late Style B". The majority of the traits are those of the "Late Style". Goggin dates the "Late Style" from about 1780 to 1850 plus (1964: 279), too late for the pre-1713 major association of the type at Castle Hill. Goggin's "Middle Style" has a chronological range of about 1580 to 1780 which would correspond better with the Castle Hill occupation dates. It may be that the Castle Hill olive jars represent a transitional form. They have, for example, the mouth ring profile of the "Late Style" but the thickness dimensions of the "Middle Style".

Goggin indicates that the Spanish olive jar was

widely used by other Europeans and in various English sites in North America (Goggin 1964: 256). At Castle Hill they are primarily associated with the French occupation. They are also present in very small quantity in definite English levels and in somewhat greater amounts in probable English excavation units. They may, therefore, also have been in use during the English occupation. If so, they were not as common then as during the French period.

Coarse Earthenwares

Another common type of pottery in the site is coarse earthenware of several different types. This type of pottery includes both glazed and unglazed specimens, and several different vessel forms. Three major wares based on differences in the paste are described below. Some of these materials are similar to those described by Marwitt (1967) from the Fortress of Louisbourg. The three wares at Castle Hill are here termed white paste, pink paste and orange paste. To some extent these colour ranges represent a continuum but there are few borderline sherds and classification on the basis of paste colour was not difficult. There is overlap in the vessel forms present in the three paste categories, and some overlap in glaze colour.

White Paste

This ware is not common in the Castle Hill collection and consists of 27 sherds grouped into nine vessel units (Fig. 78). There is a green glaze, usually on the interior; other colours and locations are present.

Manufacture

The ware was wheel thrown as indicated by the throwing ring striations on the surfaces. One example had the bottom finished with a cutting tool.

Paste

Texture. The paste is compact and fine to medium coarse in texture. It has an irregular laminated structure. Small air holes are present in some examples.

Non-plastic inclusions. Very fine sand and iron oxide particles are present in the paste. Other inclusions are quartz particles up to 2 mm. in diameter. All of the above may be naturally present in the clay source. Inclusions are sparse in the paste but there is some variation; some sherds have almost no larger aplastic inclusions while others have noticeable amounts. One specimen has at least one particle of grog or crushed pottery as tempering material; it is 1 mm. in diameter. One 3 mm. piece of limestone was also noted.

Colour. The paste has a yellowish to greyish white colour; it tends toward pale orange yellow. One thick sherd has a core of light orange (2.5YR 9/3) with pale orange yellow (7.5YR 9/4) near the surface. The core colour is similar to the colour of the pink paste ware, suggesting a possible continuum between the two categories based on differences in firing temperature. One specimen is nearly black and a second a dark grey in cross-section, but most examples of the ware are well fired. Although the paste is not really white it appears so in contrast to the orange and pink pastes.

Surface Treatment

Finish. The surfaces of the pottery have been smoothed. There are some irregularities giving it a slightly rough feel. These include a few tiny depressions and projections of small tempering particles. There are throwing rings, ridges and tiny striations of varying size. Thus the surface is slightly rough but basically smooth. On one sherd the lower body and base have been trimmed by a knife and in another vessel concentric grooves on the flat base indicate the use of a mechanical cutting tool in trimming.

Slip. A thin irregular layer of white slip has been applied beneath the glaze on some vessels. In other specimens a thin layer of orange slip has been added below the glaze, while in other examples the glaze has been applied directly to the body. The slip, when present, is irregular in thickness and apparently did not cover the entire surface of the vessel.

Glaze. All examples of the ware have been glazed. The glaze is most often a moderate to strong yellow green colour; some greenish yellow examples are also present. The glaze is most frequently applied to the interior surface of the vessel. The exterior is unglazed except for accidental spots or splashes which are present. Exterior glazing, especially around the rim, is also present. Some examples of body sherds glazed on both interior and exterior are present. The exterior glaze is bluish and irridescent.

Marks. There are no marks or decorations.

Vessel Form

Thickness. The body walls tend to be quite thin, averaging 5 mm. One base is considerably thicker. See Table 21.

Shape. There are no restorable vessels and the sherds are all small, hence vessel form is poorly

represented. The most common appears to be an open unrestricted bowl with a flat bottom and a thickened rim (Fig. 78). One body sherd has a probable handle scar.

Rim. Two examples have thickened rims and a third has an overhanging collared thickened rim (Fig. 78a). The cross-section indicates the rim was thickened by folding the clay over.

Tabulation

In Table 21 the specimens of this pottery type are recorded. Using paste colour and texture and glaze colour and texture and other characteristics, an attempt has been made to group the specimens of this ware into probable "vessel" units. The provenience and number of included sherds are also tabulated.

The vessel numbers assigned to the sherd groups begin with number 61, following and continuing the sequence begun with the vessel clusters in the olive jar category.

Comparisons

This ware appears to be associated with the French occupation at Castle Hill. The most similar ware from Louisbourg described by Marwitt is Ware la which has a

strong orange to pinkish white paste colour and yellow green interior glaze over a thin white slip (Marwitt 1967). Marwitt's vessel forms include an unrestricted bowl with a similar rim form (Marwitt 1967). However, the paste colour in this Castle Hill ware is not the same as that described by Marwitt which is more like the pink paste earthenware from Castle Hill. As noted above, there is a partial continuum between the white and pink paste wares, so this white paste ware approaches or may be included in the same range as Marwitt's ware 1. From the stylistic point of view there is no doubt that the white paste earthenware described above is of French origin.

Pink Paste

This ware is not common in the Castle Hill collection and consists of 80 sherds grouped into 17 "vessel" categories (Figs. 78h-o). The ware usually has a green or yellow orange interior glaze, but a "splotch" or spotted polychrome is also present.

Manufacture

This ware was wheel thrown as indicated by throwing ring striations on the surfaces.

Paste

Texture. The paste is compact and fine to medium coarse in texture. It has a laminated structure when viewed in section. Small air holes are present but rare.

Non-plastic inclusions. Inclusions consist of small rounded quartz particles and small iron oxide particles which are sometimes streaked when they protrude through the surface. These are usually small in size, less than 1 mm. in diameter, but in vessel number 70 particles up to 10.0 mm. long protrude through the surface of the pot. Temper is quite sparse and the aplastic inclusions may have been natural in the clay source.

Colour. In contrast to the other coarse earthenwares the paste appears pinkish in colour. It ranges from about light yellowish pink (2.5YR 9/3) to light orange (2.5YR 8/6) and light orange (5YR 9/7). Light yellowish pink is the most common colour.

Surface Treatment

Finish. The surfaces of the pottery have been smoothed. Different vessels range from smooth or almost polished to the touch to a sandy or gritty feel. The gritty feel is caused by fine sandy aplastic particles protruding through the surface. Even in the smoothest

examples some large tempering particles protrude. There are throwing ring grooves and striations of different degrees.

Slip. A thin irregular layer of white slip has been applied to the surface of the vessels. The white slip is most frequently present beneath the green glazed areas. Examples with yellow orange glaze are not slipped. Unglazed surfaces are usually not slip covered. In some sherds there are traces of the white slip without glaze but the glaze has probably flaked away in most of these examples. However there are traces of the slip, uncovered by glaze, near the base ring of vessel 82. The slip was not applied carefully and was irregular in its coverage of the vessel surface.

Glaze. Most examples of the ware have been glazed and the unglazed sherds probably are from unglazed portions of vessels rather than from unglazed vessels although this cannot be demonstrated. The glaze was usually applied to the interior of the vessel. It is sometimes present on the exterior but in such cases is confined to the exterior of the rim. The exteriors of the most common vessel form, the unrestricted bowl, were not glazed except at the rim. One small cup or jar was glazed on the exterior, probably only on the

upper portions of the vessel but it is incomplete and this is an inference.

The most common glaze colour is green, ranging from light yellowish green (10GY 8/7) to brilliant yellow green (2.5GY 5/5). The other common glaze colour is strong orange yellow (10YR 7/10). There is one example of a brilliant greenish yellow (7.5Y 9/8). The most common specimen with this paste has a polychrome spotted or splotchy glaze on the interior of the open bowl. The background is a brilliant greenish yellow (7.5Y 9/8) overlain by spots and streaky runs of light yellowish green (10GY 8/7) and greyish brown (7.5YR 3/2).

The exterior glaze colours are continuations of the interior glaze but sometimes slightly different in colour though generally of a moderate yellow green (5GY 5/6).

Marks. There are no decorations or marks.

Vessel Form

Thickness. The body walls are thin, averaging 5.2 mm. in thickness. Bases of vessels are thicker, averaging 7.0 mm. The thickest area is at the base circumference where base and body meet. Here thickness ranges from 10.0 mm. to 12.0 mm., averaging 10.7 mm.

Shape. The vessel base appears to have been flat and the rims are usually thickened. One restorable

specimen is a shallow unrestricted bowl with a flange like rim. Smaller bowls with straighter sides and indeterminate rims are present. One possible jar or cup base has a basal cordon or thickening. Jar or pitcher rims which are flared and thickened are present; body shape is indeterminate. The various vessel shapes are described in detail below.

Bowls; large, shallow.

Vessel number 70, (Fig. 79). This vessel is the most complete example of this ware and is complete except for a few missing sherds. It is an unrestricted bowl with a flat bottom and a flange-like rim. The thickened rim has a groove near the lip on the top surface. The body has a slight constriction immediately below the rim and is irregular on the exterior surface due to the presence of throwing rings. The interior was smoothed. The bowl was broken in half and repaired by means of three pairs of holes drilled on opposite sides of the crack. One pair is located on each of the opposed walls and one pair in the centre of the bottom. The nature of the fastening passed through the holes is indeterminate but metal rivets were probably used. Similar holes and bent iron clamps were used to repair a Rouen faience bowl in the collection of Mr. Bart Peterson, Lake Mary, Florida.

The exterior of the vessel was well smoothed although large particles of iron oxide tempering material protrude through the surface. The underside of the marly was partially glazed with the greenish yellow glaze which forms the background colour of the interior glaze. On the interior, over the yellow ground, spots and streaks of yellowish green and greyish brown were applied to produce a random splotch effect.

Dimensions (in mm.)

Maximum rim diameter:	266.0
Interior diameter:	215.0
Rim width:	23.0
Rim thickness:	10.0
Diameter of base, exterior:	109.0
Total height:	73.4

Vessel number 71. This vessel is represented by a fragment of the flat bottomed base of a bowl similar to vessel number 70. Lacking the vessel wall and rim, the specimen can be included as probably representing this vessel form on the basis of similarity in the base shape.

The exterior is unglazed while the interior has a moderate yellow green glaze applied over a thin white slip.

A notable feature of the specimen is that the exterior of the bottom is chipped and exfoliated; the exterior of the walls and of the chipped bottom surfaces are black and sooty indicating that the vessel was used over a fire and that the chipping of the bottom may have resulted from such use.

Dimensions (in mm.)

Estimated diametre of base, exterior: 110.0

Vessel number 73 (Fig. 78h). This vessel unit consists primarily of a large segment of the flat flange-like rim of a bowl, the rim being similar to that on vessel number 70. The remaining sherds are body sherds which do not illuminate the vessel form. One split sherd is probably from the interior of the bottom since it bears an imperfection in the glaze suggesting that another object touched it in the kiln.

The body exterior was probably unglazed. The interior and the exterior or underside of the rim is glazed a strong yellowish green over a thin white slip.

Dimensions (in mm.)

Maximum rim diametre:	270.0
Interior diametre:	226.0
Rim width:	22.0
Rim thickness:	12.7

Vessel number 77. This fragmentary vessel is probably another large bowl similar to vessel number 70 in shape. Vessel 77 consists of two base fragments which have a similar shape to the bowl form. The exterior is unglazed. The interior was glazed a vivid greenish yellow over a thin white slip.

Dimensions (in mm.)

Estimated diametre of base, exterior: 110.0

Bowls; small, deep.

Vessel number 84, (Fig. 78m). This is a small base fragment of a small, flat bottomed, straight sided vessel, probably a bowl. The specimen is almost identical to vessel number 85 which is more complete. The exterior is smooth with a gritty feel due to protruding sandy granules; the exterior is unglazed. The interior is glazed a strong orange yellow produced by a clear glaze over the unslipped body.

Dimensions (in mm.)

Base diametre, exterior: 80.0

Vessel number 85. This is a small base fragment of a flat bottomed straight sided vessel, probably an unrestricted bowl. The flat bottom and the exterior side are smoothed, though "gritty" in feel, and unglazed. The interior has a strong orange glaze colour; a clear glaze over the unslipped body. The interior exhibits throwing grooves on the sides and bottom.

Dimensions (in mm.)

Wall thickness:	5.0
Bottom thickness:	9.0
Estimated base diameter:	74.0

Small Jar or Pitcher.

Vessel number 72, (Fig. 78 i,o). This is an incomplete vessel. The body form and base shape are indeterminate. The specimen has a flaring thickened rim with a rounded lip. The vessel body was probably of larger diameter than the rim. There are traces of moderate yellow green glaze on the interior of the lip as well as on the exterior. The glaze was applied over a thin white slip. The interior below the lip may have been unglazed; the sherds are split or eroded and indeterminate for this trait. One body sherd cross-mends with a fragment of a loop handle. The handle back has a pinched fillet above a projecting tail where it is welded to the vessel wall. The exterior of the body at the handle juncture is unglazed, and the handle surface is unglazed except for traces of moderate yellow green glaze near the point where it curves toward the top and is broken off. The handle does not cross-mend with the rim sherd but paste and glaze are the same and the specimens were all from the same excavation lot; therefore they probably are parts of a single pitcher or jar.

Dimensions (in mm.)

Rim diameter at lip:	80.0 estimated
Rim thickness:	7.3
Rim height:	12.3
Handle length:	61.0 incomplete
Handle diameter:	13.0 x 16.0-18.0 (tapered)

Vessel number 75. This vessel is represented by a single rim sherd of cross-section and shape similar to the vessel 72 rim; a flaring rounded rim. Interior and exterior are glazed a moderate olive green. On the interior the green glaze grades into a dark orange yellow colour where the glaze is imperfectly fired or where the interior was glazed clear over the unslipped body.

Dimensions (in mm.)

Rim diameter at lip:	60.0 estimated
Rim thickness:	7.0
Rim height:	11.0

Vessel number 76, (Fig. 78 j,k). This vessel is also the rim of a small pitcher or jar form with a flaring rim and rounded lip. The vessel body was of larger diameter than the rim but is otherwise indeterminate. The exterior of the vessel is glazed a moderate yellow green over a thin white slip. The green colour continues on the interior below the lip. Beneath the lip is a narrow band of brilliant

yellow green where a very thin coating of the exterior glaze and/or a clear glaze overlies an irregular width band of white slip. Below that the interior is unslipped, but has a clear glaze giving it a dark orange yellow colour.

Included with this vessel unit is a strap handle section. The handle fragment does not cross-mend with the rest of the sherds but is of the same paste. It is unglazed but has spots (splashes) or traces of the green glaze. Due to the paste and glaze similarity and its location in the same findspot, the handle has been included with the rim as part of a single vessel unit. This seems a reasonable inference but cannot be proven. The strap handle is oval in cross-section with a ridge on the back.

Dimensions (in mm.)

Rim diameter at lip:	90.0
Rim thickness:	7.7
Rim height:	12.3
Body thickness:	5.0
Handle length:	42.0
Handle thickness:	10.0

Base.

Vessel number 82, (Fig. 78 l). This specimen is a fragment of the base of a vessel of indeterminate form.

It could be the base of a small jar or pitcher, or of a cup or mug. It is unlike the bases of the bowl forms described above.

The specimen has a flat bottom and a small cordon around the foot of the vessel; the shape of the vessel wall is indeterminate.

The exterior is unglazed but bears traces of white slip; the upper part, now missing, was probably glazed. The interior is glazed a strong orange yellow; clear glaze over the body colour.

Dimensions (in mm.)

Estimated base diameter: 50.0

Handle.

Vessel number 86. This specimen is a fragment of an unglazed loop handle made of pink earthenware paste. The associated body form is unknown.

Dimensions (in mm.)

Length: 55.0 incomplete

Diameter: 17.0 x 20.0 to
20.0 x 21.0

Indeterminate vessel forms. Vessels: 74, 78, 79, 80, 81, 83.

Summary of vessel forms

<u>Shape</u>	<u>Vessel numbers</u>
Bowl, large, shallow	70, 71, 73, 77
Bowl, small, deep	84, 85

<u>Shape</u>	<u>Vessel numbers</u>
Small jar or pitcher	72,75,76
Jar base	82
Handle	86
Indeterminate	74,78,79,80,81,83

Tabulation

The specimens of this ware are tabulated in Table 22. Using paste, glaze and other characteristics an attempt has been made to group the sherds of this ware into possible "vessel" units. The provenience and number of included sherds is tabulated.

Comparisons

This ware is associated with the French occupation at Castle Hill. The most similar type described from Louisbourg is Ware 1 (Marwitt 1967) which has reddish yellow, strong orange, pinkish white to light red paste colour. The paste on Marwitt's ware 1 appears to be somewhat darker in colour than the pink paste described from Castle Hill. Variety 1C is based on the splotchy glaze effect (Marwit 1967: 55) similar to vessel 70 from Castle Hill. Some vessel forms are similar but not identical to Marwitt's ware 1 (Marwitt 1967: Fig. 1b). The examples of French coarse earthenware from Castle

Hill are similar but not identical to those from Louisbourg. This is not unexpected since Castle Hill is earlier in time.

Orange Paste

This is a relatively common ware associated with the French occupation of Castle Hill (Figs. 80,81,82). It consists of 313 sherds grouped into 74 "vessel" units. The ware is wheel thrown. Many examples are not glazed but over half of the vessel sample is glazed, usually on the interior. With few exceptions the exterior has a thin slip coating. Four descriptive categories have been established to simplify the tabulation of the data. These are (1) unglazed, (2) glazed, (3) glazed, thick body, and (4) glazed, miscellaneous. The miscellaneous category, of course, contains unique specimens. The orange paste is a "red" appearing terracotta rather like that of a common flower pot.

Orange Paste, Unglazed

Manufacture

This ware (95 sherds grouped into 32 vessel units) was thrown on the potter's wheel as indicated by the pronounced throwing rings and striations on the interior of the vessel walls.

Paste

Texture. The paste is relatively compact, and fine to medium coarse in texture. It has a laminated structure. Small air holes are often present.

Non-plastic inclusions. There are very tiny particles of mica and iron oxide in the paste; these are probably natural constituents of the clay. Aplastics added as tempering are present but sparse. These include rare particles of rounded quartz and sandy material up to 3.0 mm. in diameter, though most are less than 1.0 mm. in size. The most noticeable aplastic is limestone fragments of varying size from 0.5 mm. to 9.0 mm. These larger pieces are irregular in shape. Most limestone particles are in the 1.0 mm.-2.0 mm. size range.

Colour. The paste is generally an orange colour. It ranges from a strong yellowish pink (10R 7/9) to a light orange (5YR 8/7). It is most frequently strong orange (2.5YR 7/10 and 2.5YR 6/12). The unglazed interior is usually about the same colour as the paste seen in cross-section, although it is sometimes a slightly different colour due to the "self-slip" effect.

Surface Treatment

Finish. The interior of the pottery usually bears

the unmodified striations resulting from the throwing wheel method of manufacture. There are finger width undulations or grooves as well as finer striations resulting from a wet wiping of the interior. There are some bumps and hollows from protruding tempering particles but these are usually not visible on the interior. The wet wiping of the interior has resulted in a "self-slip" effect on some sherds. The exterior is covered with a thin layer of slip. This has frequently worn or chipped. Tempering particles of limestone are most often seen on the exterior where their presence has caused the slip and outer layer of clay to chip away, exposing the temper particle. The exterior is usually smooth, although an occasional wheel striation may be present.

Slip. The exterior is almost always covered with a thin layer of slip. The slip is usually a darker reddish or greyish orange than the paste so that the exteriors have a reddish to brownish appearance.

Glaze. There is no glaze on either interior or exterior except for one example with a drip of glaze on the interior. This was included here, despite the drip, since it was apparent that the vessel was basically an unglazed piece.

Decorations. The only decoration noted on this sample was the presence of a broad trailed groove around

the shoulder of the vessel, on its exterior surface; a trait present in four examples (Fig. 80g).

Vessel Form

Thickness. The thickness of the vessel wall ranges from 4.2 mm. to 12.7 mm.; the mean is 8.06 mm.

Shape. No complete or restorable vessel is present in the sample and it is difficult to determine vessel shapes. The curvature of the body sherds suggests globular and elongated globular vessels. The examples of sherds with broad trailed grooves are probably from the vessel shoulder and suggest both rounded and angular shoulders. One base fragment is that of a flat bottomed vessel with straight flared sides. Two examples of S collared rims have short necks, suggestive of a short necked jug with a low collared rim. It is possible that one vessel form was a flat bottomed jug with straight flaring lower body and a rounded shoulder surmounted by a short neck with a low collared rim. However, it cannot be demonstrated by restorable material that all of the form traits described above were found on the same vessel.

The descriptions of vessel units below will illustrate the known shape characteristics.

Vessel number 101, (Fig. 80a). This vessel unit consists of two base fragments, two wall fragments and a rim sherd. The rim is included in the vessel unit on the basis of the strong similarity in its paste despite its provenience from a widely separated location in the site.

One base sherd is a chip from a flat bottom. The other is a thicker section of the bottom, at the outer edge. The flat bottom is pitted, and at the edge, is partly blackened and charred. The vessel wall sherd is straight sided.

The rim is a thickened collar, wedge shaped in cross-section. The lip is flattened.

Dimensions (in mm.)

Diametre at lip:	46.0
Maximum rim diametre	53.0
Neck diametre, exterior:	40.0
Rim height:	18.6
Rim thickness:	11.2
Base diametre:	130.0 estimated
Base thickness:	18.0 at edge; 11.0 centre

Vessel number 106, (Fig. 80i). This vessel unit consists of a body sherd of small size and a base fragment. The base fragment indicates a projection of the vessel

foot around the foot of the vessel. The flat bottom is pitted similar to the bottom of vessel 101. The specimen includes only the thickened edge of the base.

Dimensions (in mm.)

Exterior diametre: 120.0 estimated

Vessel number 110, (Fig. 80h). This vessel unit includes the partly restored remnant of a vessel base. The bottom is chipped badly but was apparently flat and had a pitted surface. The outflared side or vessel wall is straight. The interior exhibits throw rings, the exterior is slipped and smooth.

Dimensions (in mm.)

Base diametre: 120.0 estimated

Base thickness: 15.5 at outer edge

Vessel wall: 15.0-10.0
tapers as
it rises

Vessel number 115, (Fig. 80d). This vessel unit includes a partly restorable rim. The vessel had a short constricted neck and a low collared rim. The rim is S shaped in profile. The lip is rounded.

Dimensions (in mm.)

Lip diametre: 26.0 estimated

Maximum rim diametre: 50.0 estimated

Neck diameter, interior:	26.3
Neck diameter, exterior:	38.3
Rim collar height:	18.4
Rim wall thickness:	7.0
Total rim thickness:	12.0

Vessel number 116, (Fig. 80e). This vessel unit includes one half of an S collared rim similar to vessel 115 described above.

Dimensions (in mm.)

Lip diameter:	30.0
Maximum rim diameter:	48.0
Neck diameter, interior:	26.0 estimated
Neck diameter, exterior:	38.0 estimated
Rim height:	20.6
Rim wall thickness:	5.0
Total rim thickness:	12.0

Vessels: 102, 103, 109, 113, 115. The grooved shoulder decoration is illustrated in figure 80g.

Tabulation

The specimens of this ware are tabulated in Table 23. Using paste, glaze and other characteristics an attempt has been made to group sherds of this ware into vessel units. In some cases sherds from widely separated excavation units were found to cross-mend. In other

cases sherds with similar appearance, but from widely separated excavation lots, which did not cross-mend, were tabulated as separate "vessels", partly on the basis of their provenience. It is likely, therefore, that there are actually fewer vessels than indicated by the "vessel" units. It is quite possible that vessels numbers 87, 88, 89 and 90 may all be parts of a single vessel. Vessels 112 and 115 could be similarly combined, as could 101 and 110.

Comparisons

The type is definitely associated with sealed French deposits at Castle Hill. It is also present in mixed, indeterminate and probably English contexts at the site. It is probably intrusive in the latter.

Specimens of the ware were identified as "French" by Dunton at Louisbourg (Pers. Comm.).

Orange Paste, Glazed

Manufacture

This pottery (166 sherds grouped into 24 vessel units) was thrown on the potter's wheel as indicated by throwing rings and striations on the vessel walls.

Paste

Texture. The paste is compact, fine to medium coarse in texture. It has a laminated structure. Small air holes are sometimes present.

Non-plastic inclusions. The amount of aplastic tempering material added to the clay ranges from sparse to moderate, the latter being unusual. Aplastics consist of small particles of rounded quartz, iron oxide and limestone up to 1.0 mm. in diameter. Most of the tempering particles are small; about 0.5 mm. in size. Rare large chunks of temper up to 5.0 mm. in diameter are present, especially in vessel number 134 which has both more and larger tempering particles than usual in its paste. A sizeable plant fibre was found in the paste of vessel 132.

Colour. The paste is a strong orange to strong yellowish pink in colour. Strong orange (2.5YR 6/12 and 2.5YR 7/10) are most common, followed by strong yellowish pink (10R 7/9) in frequency. Moderate yellowish pink (10R 8/6), strong reddish orange (10R 6/12), light orange (2.5YR 8/6) and strong brown (2.5YR 4/7) are also present. Where unglazed areas are present on the interior they are about the same colour as the paste. The exterior is covered with a thin coating of slip of a different colour.

Surface Treatment

Finish. On the interior surface the wheel throw rings are often visible as surface irregularities beneath the glaze. The exterior is usually slip covered and smooth. Tempering particles protrude through the surface often being revealed by chips on the exterior. The interior glaze has a rough or gritty feel due more to the imperfections of the glaze than to the protrusion of tempering particles.

Slip. The exterior is usually covered with a thin layer of slip which ranges from dark grey to whiteish yellow in colour.

Glaze. The interior is glazed. The exterior is usually unglazed, but some examples have traces of glaze on the outside of the vessel. In some cases the interior glaze appears to have been clear, applied over the reddish paste to produce a brownish orange colour (2.5YR 5/9). Moderate to moderate yellowish brown (7.5YR 4/5, 10YR 4/4) and strong brown (5YR 4/5) to brownish orange (5YR 5/8) colours also appear. A few examples of deep yellow (2.5Y 6/8) to light olive (7.5Y 5/5) also are present. Most of the interior glazes are brownish; only a few have the olive greenish colours. The glaze is often rough and gritty, and

applied unevenly. Imperfectly fired granular glaze examples are present. Where glaze is found on the exterior it is either confined to the exterior of the rim (vessel 132) or present as drips and accidental splashes on the exterior of the body (vessel 132). One notable exception is vessel 123. In this vessel the interior has a clear glaze over the paste. On the exterior there are traces of moderate yellow green (7.5GY 5/7) glaze applied over a white slip. The white slip did not completely cover the exterior of the vessel, the foot cordon being unglazed except for drips and runs. The glaze did not cover the white slip, the lower part of the base being slipped but not glazed except for splashes and drips; the specimen is broken off about where the traces of glaze begin to appear. It is assumed that the upper portion of the bowl was more completely glazed but this cannot be demonstrated.

Decorations. No decorations or appendages are noted except one specimen which has either a broad trailed groove or a pronounced throwing ring on the interior; too incomplete to determine. There are no marks.

Vessel Form

Thickness. The thickness of the vessel wall ranges

from 3.9 mm. to 20.0 mm., the latter being present near the base of vessel 132, and apparently rare. The average vessel wall thickness is 7.6 mm. The average thickness of the unglazed orange paste pottery was 8.06 mm., thus the glazed orange paste ware appears to be slightly thinner than the unglazed, although a thick walled glazed variety is described separately below.

Shape. One vessel (132) is half complete. It is a flat bottomed bowl with straight flared sides and a thickened overhanging rim (Fig. 82).

Vessels with thickened, grooved rims (for a cover?) are represented by the restorable rim of vessel 134 and the fragments of the rim of vessel 133 (Fig. 82 a,b). The remnants of these vessels suggest that they probably had globular bodies similar to that of vessel 135 which is otherwise incomplete.

A third vessel form is represented by vessel 123 (Fig. 81c) which has a flat bottom with a cordon around the perimeter of the base. The vessel walls are flared and curved and the form may be a small bowl although other upper body forms are equally likely.

Two rim sherds, vessel 124 and 125 (Fig. 80 k,c) suggest a small mouth bottle or jar form. Two shoulder sherds, vessels 122 and 136, are broken at the neck

point. The small diameter of the neck opening suggests that these might have been associated with the small diameter rims, but the association cannot be demonstrated by cross-mends.

Individual vessels are described below.

Vessel number 132, (Fig. 82). This vessel is restorable and consists of cross-mending sherds; it is a complete half of an open unrestricted bowl form. It has a flat bottom, flared, straight walled sides, and a rim which is thickened and overhangs the body. The interior is covered with a moderate brown coloured glaze (7.5YR 4/5) and the glaze extends to the exterior of the rim. The exterior of the body is unglazed except for a large run down one side; apparently the glaze was applied by filling the bowl and pouring out the excess.

There is a small pouring spout at the rim formed by simply bending the thickened rim outward. The flat bottom is very thin in the centre; both bottom and vessel wall are thick at the perimeter of the base. The wall tapers in thickness, becoming thinner as it rises to the rim.

Dimensions (in mm.)

Diameter at lip, interior:	135.0
Maximum rim diameter:	180.0

Rim height:	22.0
Rim thickness:	20.5
Vessel wall thickness:	7.0

Vessel number 134, (Fig. 81a). This specimen includes a rim restorable completely around its circumference. In form, rim profile and other details it is nearly identical to vessel 133 described above. The rim has the same lower inner edge; the groove or channel is somewhat more pronounced than on vessel 133. The neck is more constricted and the shoulders somewhat broader than vessel 133 but the same globular body form is probable. The exterior is covered with a thin layer of yellowish orange slip. The top of the rim and the upper portion of the interior are also unglazed. The glaze begins 39.0 mm. below the inner lip level. The interior has a strong yellowish brown (7.5YR 5/7) glaze which is granular and imperfectly fired where it begins at the upper part of the interior. The specimen is also marked by larger and more tempering particles which protrude through the surface; on the exterior they have been exposed in part by chipping away of the slip, probably due to the presence of the tempering material.

Dimensions (in mm.)

Lip diameter:	165.0
Maximum rim diameter:	176.0
Neck diameter, interior:	144.0
Neck diameter, exterior:	160.0
Rim height:	22.0
Rim thickness:	10.8
Vessel wall thickness:	5.0

Vessel number 135. This vessel unit consists only of body sherds. One of the sherds is of fairly large size and is indicative of a globular body shape. The nature and distribution of the glaze on the interior suggests that it may be a form similar to the inferred body shapes for vessels 133 and 134 described above.

Vessel number 123, (Fig. 81c). This basal fragment of a small bowl (or ? form) has a flat bottom. The base extends slightly beyond the circumference of the lowest part of the body, forming a small cordon at the foot of the pot. The vessel walls are outflaring and curved. The specimen is too incomplete to measure height or maximum diameter.

On the interior pronounced throwing rings are present and form a spiral in the bottom. The interior is not slipped and a clear glaze applied over the paste gives it a glaze colour of brownish orange (2.5YR 5/9).

In one spot on the interior there is a tiny blob of white slip beneath the glaze; it is possible that the upper part of the vessel may have had an interior white slip. The exterior was nearly covered with a white slip coating. The basal cordon is not slipped and the slip is uneven in its end at or just above the base. Traces of moderate yellow green (7.5GY 5/7) glaze are present on the exterior; the upper part of the vessel was glazed on the outside but the glaze did not cover the exterior slip coating at the bottom of the bowl.

On the flat bottom of the vessel offset concentric striations indicate the removal of the vessel from the potters' wheel by undercutting with string or wire.

Dimensions (in mm.)

Diametre at base; exterior of cordon:	70.0
Diametre at base; above cordon:	68.0
Cordon thickness:	7.0
Vessel wall thickness:	5.7

Vessel number 124, (Fig. 80f). This vessel is a small rim sherd with a flared neck and thickened rim and rounded lip. Poorly fired glaze is present on the interior; the exterior is glazed a strong yellowish brown (10YR 5/6).

Dimensions (in mm.)

Estimated diametre, interior:	40.0
Rim height:	14.3
Rim thickness:	11.5

Vessel number 125, (Fig. 80c). This vessel also consists of a single rim sherd of a small mouthed bottle or jar. The rim has a thickened lower portion and then is concave and tapers to a thin lip. The interior is faintly channeled behind the thickening, forming a very gentle S profile. Interior and exterior are glazed, probably the same glaze but different colour due to thickness variations and firing differences. The interior is strong brown (5YR 4/5) and the exterior is moderate brown (7.5YR 4/5).

Dimensions (in mm.)

Lip diametre:	40.0 estimated
Maximum rim diametre:	46.0 estimated
Rim height:	20.0
Rim thickness:	6.0 at lip
	8.4 at median ridge

Vessels 122 and 136. These body sherds are from vessel shoulders and are missing the neck and rim. However, the approximate diametre of the exterior neck base can be determined, and suggests that the small diametre

rims described above could have come from vessels with shoulders.

Dimensions (in mm.)

Vessel:	122	136
Estimated base of neck diameter:	80.0	60.0

Tabulation

Table 24 lists the vessel units described in this category of pottery. Sherds were included in vessel units on the basis of similarities in paste and glaze, on cross-mends and other evidence.

Comparisons

This ware is associated with sealed French stratigraphic deposits at Castle Hill. It is also found in mixed contexts and in some probably English contexts. It is probably intrusive in the latter.

Examples of the ware were identified as French at the archaeological laboratory at Louisbourg.

Marwitt describes some similar vessel forms. The open bowl of Ware 1 (Marwitt 1967: Fig. 1a) is similar to the body of vessel 132, but the vessel 132 rim has a different profile. The rim profile and probable body shape of vessels 133 and 134 are similar to Marwitt's Ware 5 rim 13 (1967: Fig. 4a), but the Castle Hill specimens lack the handles Marwitt illustrates.

Orange Paste, Glazed, Thick Body

The group of vessels (32 sherds grouped into 12 vessel units) described here have been segregated on the basis of some distinctive characteristics, the most obvious one being their thickness relative to the orange paste unglazed and glazed ware described earlier. Throwing rings are also quite pronounced on the interior. Another characteristic is in the paste which appears to have been the same orange body but generally fired to a dark grey colour, only traces of the orange being present in most sherds, although a few examples are orange throughout.

Manufacture

Wheel thrown as indicated by the pronounced throw rings on the interior.

Paste

Texture. Compact, fine to medium coarse, laminated structure with some air holes. Some examples hard, almost stoneware qualities being present.

Non-plastic inclusions. Very fine mica particles are evident as a natural constituent of the clay. Larger aplastic inclusions are relatively rare and small in size, up to 2.0 mm. in diameter, they sometimes protrude through the surface on the interior.

Colour. Most examples are strong orange (2.5YR 7/10) in remnant traces of paste colour, but most have been fired to a dark grey colour.

Surface Treatment

Finish. The throwing rings have not been removed and the interior has pronounced finger sized grooves. The exterior is smooth.

Slip. The exterior was usually covered with a thin layer of slip, usually of a greyish orange colour. There is some evidence of fire clouding, and black staining or charring.

Glaze. The interior is glazed. The glaze is often rather grainy and has a rough feel, partly due to tempering particles and partly due to imperfections in the glaze. The interior glaze colour ranges from olive brown to dark greenish yellow in most cases with some yellowish brown to strong orange examples.

Decorations. None.

Vessel Form

Thickness. The thickness of the body sherds ranges from 7.2 mm. to 15.0 mm. with an average of 11.2 mm. This is notably thicker than the other orange paste materials.

Shape. The vessel shape is unknown since no large or restorable examples are present. There are no rim or base sherds identifiable. The curvature of the body sherds suggests globular to elongated globular vessels, perhaps not unlike those of the olive jar. In thickness and presence of pronounced throwing rings on the interior these vessels also have a resemblance to the olive jar form.

Tabulation

Table 25 lists the vessel units which are based on sherds similar in paste, glaze and other traits.

Comparisons

This pottery is strongly associated with the French occupation at Castle Hill and examples were identified as French at the Louisbourg laboratory.

Orange Paste, Miscellaneous

The six vessel units (20 sherds grouped into six vessel units) described below cannot be readily included in the major descriptive categories of the orange paste ware utilized above and are grouped together for convenience. The specimens are tabulated in Table 26. Each is described individually in the following section.

Vessel 155

Manufacture

Wheel made.

Paste

Fine texture with a laminated structure and some air holes. Aplastics include considerable fine mica and some rounded and angular quartz particles less than 1.0 mm. in size. The paste shows traces of strong orange (2.5YR 7/10) colour but is mostly dark grey and hard. The interior is unglazed paste colour with some protruding aplastics.

Surface Treatment

The interior is smooth but wheel striations are present. The exterior has a dark reddish brown slip, is smooth and unglazed.

Vessel Form

Indeterminate.

Comparison

The specimen was identified at Louisbourg as French, it is from a probably English zone of mixed rubble at Castle Hill where it is probably an intrusive specimen.

Vessel 156

Manufacture

Wheel made.

Paste

Fine texture, laminated structure with fine quartz aplastics. Colour is strong orange to dark grey.

Surface Treatment

Interior is grey, unglazed. The exterior is also grey, unglazed and smooth.

Vessel Form

Unknown.

Comparison

The specimen is from a probably French level of mixed rubble.

Vessel 157

Manufacture

Wheel made.

Paste

Fine, compact, laminated. Paste is a light yellowish pink (2.5YR 9/3) to grey colour.

Surface Treatment

Interior and exterior are covered with a thin layer of greyish slip and are smooth and unglazed.

Vessel Form

This example is a rim sherd with a remnant of a slightly flaring neck, probably short, and a thickened rim with a broad rounded lip.

Dimensions (in mm.)

Lip diameter:	20.0 est.
Maximum rim diameter:	50.0 est.
Neck diameter, interior:	20.0 est.
Neck diameter, exterior:	38.0 est.
Rim height:	15.0
Rim thickness:	15.5
Vessel wall thickness:	8.0

Vessel 158

Manufacture

Wheel made.

Paste

The paste is fine, compact and laminated. There are some small air holes, and rare 1.0 mm. tempering particles but temper is sparse. Colour is a strong yellowish pink (10R 7/9) to light grey colour.

Surface Treatment

Both interior and exterior are glazed, probably the same glaze although the colour varies some. The glaze is mottled, the exterior is mostly light olive brown (2.5Y 5/5) while the interior is strong yellowish brown (10YR 5/6); however, both interior and exterior colour ranges between these two extremes due to thickness variations.

Vessel Form

Indeterminate.

Comparisons

The specimen was identified as French at Louisbourg.

Vessel 159 (Fig. 85h)

Manufacture

Wheel made.

Paste

The paste is strong orange (2.5YR 7/10) to light grey in colour. It is compact and fine with small quartz and iron oxide tempering particles, less than 0.5 mm. in size.

Surface Treatment

The surfaces were smoothed though there are rough particles protruding in the glaze. The exterior, where visible, is a dark reddish brown. All but the base and lower part of the body, on the exterior, has been covered with white slip. On the interior the white slip is found for an irregular distance around the rim but most of the body was not slip covered on the interior. Where glaze covers the white slip on the exterior it has a dark orange yellow (10YR 6/8) colour. A narrow band of the slip and the unslipped foot of the vessel are not glazed on the exterior. On the interior the dark orange yellow colour is present over the white slip area, while over the unslipped area in the interior the glaze colour is a strong yellowish brown (7.5YR 5/7). The variation appears to be due to the different background colour, slipped and unslipped.

Vessel Form

The specimen is about one-third restorable and is a small inflected independent restricted pitcher. The bottom is flat, the base forms a low foot pedestal. The vessel wall tapers to a thin slightly flared lip. There is a strap handle on one side.

Dimensions (in mm.)

Lip diametre:	60.0
Maximum body diametre:	82.0
Rim thickness:	2.6
Diametre of base:	50.0
Height of base:	4.0
Total vessel height:	72.5
Handle dimensions:	6.4 x 14.5
Handle diametre, interior:	22.0
Thickness of base:	4.5
Thickness of vessel wall:	6.0 - 2.6
	tapered

Comparisons

The specimen consists of several cross-mended sherds, all of which come from sealed French rampart fill levels. The specimen is very similar in form to Marwitt's Ware 4, rim 7 (Marwitt 1967: Fig. 3e).

Vessel 160 (Fig. 85d)

Manufacture

Wheel made.

Paste

The paste is fine, compact and laminated. It has a small amount of small aplastic tempering particles, mostly iron oxide particles, some of which protrude through the surface on the exterior. The colour is strong orange to greyish.

Surface Treatment

The exterior is smooth and unglazed except for drips and splashes similar to the interior glaze colour. The interior is glazed a brownish orange (5YR 5/8). One sherd is discoloured, due to post-breakage burning of the sherd.

Vessel Form

The specimen is an open unrestricted cup (?) with a thickened flat lip. A base was included in this unit on the basis of similar paste but does not cross-mend to the rim. The base has a low pedastle foot, a flat bottom and is unglazed

on the exterior. A trace of the burned discoloured glaze is present on the interior, which is chipped.

Comparison

The specimen is from probably English levels in the ditch fill. However, it is probably a French piece; the paste and base form being very similar to vessel 159 above.

Coarse Earthenwares, Summary

The several varieties of coarse earthenwares with white, pink and orange pastes, with a variety of surface treatments and vessel forms, are French ceramics on the basis of their stratigraphic association at Castle Hill. Comparative typological data have been discussed in connection with each variety as appropriate; these data also confirm the identification of these wares as French pottery. They exhibit some similarities with the Coarse Earthenwares from Louisbourg described by Marwitt (1967) of the period 1720-1760, but are not identical. The material from the French occupation at Castle Hill is pre-1714 and hence earlier than the Louisbourg wares.

Tin Glazed Earthenware

Earthenware glazed with a thick coating of glaze opacified with tin oxide is associated with both the French and the English occupations at Castle Hill. The total sample of tin glazed earthenwares is 174 sherds which can be grouped into 73 vessel units for descriptive purposes, (Figs. 83,84).

Three major sub-groupings have been established to simplify the following description; these are based on paste and glaze differences. The first has an orange paste and a white glaze. The second group has a yellow paste and a white glaze. The third group also has the yellow paste but the glaze is bluish-white. A fourth category consists of yellow paste sherds from which the glaze has completely flaked away and is therefore an indeterminate category. The three basic sub-groups are apparently significant. The orange paste group is associated with the French occupation of the site. The yellow paste-white glaze group is found in both the French and the English occupations and the bluish-white glazed yellow paste ware is associated with the English period.

Orange Paste

Manufacture

Wheel thrown, indicated by throwing rings.

Paste

The paste is fine and compact and has a fine sandy texture. Sparse aplastic tempering material consists of rounded quartz and iron oxide particles. The paste is a light orange colour (2.5YR 8/6).

Surface Treatment

The interior and exterior is covered with a thick layer of opaque white glaze. The bond between clay and the glaze is poor and the glaze has a tendency to split away from the surface, usually along crazing lines. The surface is, in many examples, almost devoid of remnants of the glaze. Painted decoration is also present.

Decoration. Two examples have painted decorations.

Vessel 398, (Fig. 84a). This specimen is a rim sherd from a plate or large bowl and has a painted band on the interior surface near the rim perimeter. The field is limited by two parallel black lines which encircle the vessel rim. A serpentine line in blue waves between the black borders; there is a blue dot in the space formed by each loop. The black lines were painted after the blue wavy line. Dots in such a field are common on Rouen faience (Fourest and Giacomotti 1966: 95,100,102) and Noel Hume illustrates an almost identical

sherd (1963: 298, Fig. 126) as Rouen faience.

Vessel 401. This body sherd has a painted decoration on the exterior. It is a floral (?) design primarily in moderate blue (2.5PB 5/9) overpainted with strong orange yellow (7.5YR 7/11) and strong reddish purple (10P 4/10) lines.

Vessel Form

Thickness. The thickness of body sherds ranges from 3.6 mm. to 8.4 mm. with an average of 5.9 mm.

Shape. Shape is difficult to determine due to the fragmentary nature of the sherds. Vessel 398 (Fig. 84a) appears to be a plate. Vessels 400 and 403 are base sherds (Figs. 83 q,j) and have a thick flared base similar to the bottom of a Sack bottle (Garner 1948: 9A) although it could also be a jug base or some other vessel form. Rim and base dimensions are recorded in Table 31.

Rim shapes. (Fig. 83a-h) Rim shapes are rounded and flared.

Tabulation

The examples of this ware are listed in Table 27 as vessel units.

Yellow Paste, White Glaze

Manufacture

Wheel made; throwing rings visible on interior (93

sherds, 31 vessels).

Paste

The paste is fine and compact and has a fine sandy texture. It contains sparse aplastic tempering material which consists mainly of small particles of iron oxide. The paste is similar in texture to the orange paste described above, but differs in colour. The colour is a pale orange yellow (7.5YR 9/4).

Surface Treatment

Both interior and exterior are covered with a thick coating of opaque white glaze. In some cases the glaze did not cover the entire interior of the vessel the irregularities being apparently from pouring out the glaze before the entire interior had been coated. A few specimens exhibit a creamy white colour, but the usual is white. A few specimens bear painted decoration on the interior, but painted decoration is more frequent on the exterior.

Decoration. Blue colours are the most common in painted decoration but polychrome designs are present.

Vessel 406, (Fig. 84d). This jug (?) is the most complete decorated example, but the design is not complete. It was probably a floral motif with large curvilinear

swirls of blue and strong yellowish brown (7.5YR 5/7) lines and curved tassels. The style cannot be accurately identified from the fragment; possibly it is Moustiers.

Vessel 407, (Fig. 83d). This small piece has an incomplete remnant of an exterior painted decoration consisting of horizontal encircling lines of a moderate violet colour (2.5P 3/8). Such lines are found on the shoulder below the flared rim and around the top of the pedestal footing.

Vessel 408, (Fig. 84b). An incomplete design painted on the exterior includes patches of dark and light blue (7.5B 8/4) and a tapering series of bars in a light olive brown.

Vessel 420, (Fig. 84c). Fragments of a vessel with a floral design. Petals are outlined in violet and filled with blue; small blue flowers are present. A blue line encircles the vessel below the rim. On the interior there is a violet encircling line.

Vessel 426. This specimen has blue and violet encircling lines.

Other decorated examples are too small for further description in detail.

Vessel Form

Thickness. 2.7 mm. to 10.5 mm. thick is the range

of body sherd dimensions. The average is 4.9 mm.

Shape. Most examples are too incomplete to determine vessel form. Typical rim and body profiles are shown in figure 83. Dimensions are recorded in Table 31.

Vessel 406 (Fig. 83m) has a globular body and a tapered neck. Vessel 407 (Fig. 83d) has a flared rim, with a flat lip. Vessel 418 includes a strap handle. Vessel 419 (Fig. 83n) has a rounded triangular footring with a groove near the top exterior. Vessel 423 (Fig. 83r) is a flared or pedestal base. The bottom is slightly thinned.

Tabulation

Sherds are tabulated in Table 28 by vessel unit. Vessel units are based on paste, glaze and decoration colour and other factors.

Yellow Paste, Bluish-White Glaze

Manufacture

Wheel made.

Paste

The paste is compact and fine and has very sparse aplastic tempering particles of iron oxide and sand. It

is very similar to the paste described above. The colour is pale orange yellow (7.5YR 9/4).

Surface Treatment

Both interior and exterior are covered with a thick coat of opaque glaze. The glaze is a bluish-white in contrast to the "white" glaze described in the sub-group above. The glaze colour is about very pale blue (7.5B 9/2) to very pale blue (2.5B 9/2), with some bluish white (7.5PB 9/1) specimens. There is somewhat less crazing and loss of glaze by flaking off the body than in the white glaze type, although both crazing and flaking are present.

Decoration. Decorations are mainly painted in darker blue on the bluish-white ground. Chinese motifs are present. Most designs are too incomplete to warrant detailed description; they consist of spots and irregular lines, part of larger pictures, usually in light blue (2.5PB 6/8) to dark blue (2.5PB 3/6).

Vessel 438, (Fig. 84i). This specimen is a fragment of a teacup. On the interior are thin blue encircling lines, one below the rim and one near the bottom. On the exterior is a tree and shrub landscape in dark blue (5PB 3/10) in Chinese style.

Vessel 440, (Fig. 84f). The design includes tiny birds in flight.

Vessel 447, (Fig. 84h). Floral elements and bridge (?) in design.

Vessel 458, (Fig. 83p). This is a vessel base. The glaze is badly chipped on the interior which originally had a floral design including brown bordered yellow flowers on the blue background. The decoration is poorly preserved. There is a trace of a green leaf on the exterior. The number "2" is on the bottom of the vessel.

Vessel Form

Thickness. The body sherds range from 2.0 mm. to 6.8 mm. in thickness, with an average of 4.4 mm. The sample is small and there is overlap, but this subgroup tends to be somewhat thinner than those described earlier.

Shape. Vessel shape is difficult to determine due to the fragmentary nature of the sherds. Cups are present, probably pitchers since there is a loop handle, and at least one large bowl base is present. It has a footring. A small cup has a pedestal base. Typical rim and base profiles are shown in figure 83. Rim and base dimensions are recorded in Table 31.

Tabulation

The vessel units and sherds are listed in Table 29.

Yellow Paste, Indeterminate Glaze

A small number of sherds (15 sherds, 12 vessels) with yellow paste (7.5YR 9/4) but with all traces of glaze flaked away are tabulated in Table 30. From both French and English contexts, the body sherds range from 3.0 mm. to 6.8 mm. in thickness, averaging about 4.9 mm.

Comparisons

Three sub-groups of tin-glazed earthenware were established on the basis of paste and glaze and used for descriptive purposes. Examples of these types can be tentatively identified as to origin. At least one specimen of the red paste variety can be identified as Rouen faience. Four examples, vessels 408, 418, 419 and 422, of the yellow paste-white glaze variety were identified as "European, French? Not English." at Louisbourg (Dunton, pers. comm.), while two examples, vessels 447 and 454, of the yellow paste-bluish-white glaze were identified as "Probably English." These identifications correspond well with the stratigraphic

distribution of the earthenwares at Castle Hill. The red paste is found in French contexts and the yellow paste-white glaze variety is associated with both French and English deposits at the site. Much of the tin glazed earthenware sample came from the rubble fill of the ditch, rather badly mixed deposits, so that precise association of these ceramics exclusively with one or the other occupation is difficult.

In the 18th century the decorative styles of English delftware consisted largely of Chinese motifs (Garner 1948: 17); such design elements have been identified in the Castle Hill sample and an 18th century date corresponds to the occupation.

The French faience lasted until about 1750 (Lane 1948: v) with plain or simply decorated items being made for mass consumption (Lane 1948: 9). The tin glazed earthenware at Castle Hill is all of this quality.

Miscellaneous Earthenwares

A small number (29 sherds grouped in 7 vessel units) of rare (in this site) types of earthenware are grouped in this section for description. They are probably all English wares (See Table 32).

The vessels will be described below.

Vessel 161, (Fig. 85a).

Manufacture

Probably wheel made.

Paste

The paste is fine and compact. There are few large tempering particles visible, but the sherd is quite small. The colour is a strong yellowish pink (10R 7/9).

Surface Treatment

Both interior and exterior are glazed. The glaze is black. The vessel was well used, the glaze having worn off of ridges on the exterior.

Vessel Form

The vessel shape is indeterminate. The vessel consists of a single small rim sherd, the exterior of which is straight and the interior slightly out-flared in profile. The lip is rounded. Two horizontal grooves are present on the exterior of the rim.

Dimensions (in mm.)

Rim Thickness:

7.7

Vessel 162, (Fig. 85b).

Manufacture

Probably wheel made.

Paste

The paste is fine, compact but has a few tiny air holes. It lacks large aplastic tempering material but the sherds are small in size. The paste is a strong orange (2.5YR 7/10) colour.

Surface Treatment

Both interior and exterior are glazed. The glaze is black.

Vessel Form

Vessel form is indeterminate. One sherd is a small body sherd. The other is a fragment of a base. The bottom was flat. The foot pedestal tapers in at the bottom of the vessel. On the interior, the bottom is sunken into the base of the pot forming an indented bottom below the flared sides of the vessel.

Dimensions (in mm.)

Base diameter:	60.0 est.
Height of base:	7.5
Vessel wall thickness:	5.4

Comparison

The specimens are from both probably French and probably English levels.

Vessel 163, (Fig. 85e).

Manufacture

Probably wheel made.

Paste

The paste is fine in texture, compact and contains a medium quantity of tiny quartz particles as aplastic tempering material. The colour is a strong yellowish pink (10R 7/9).

Surface Treatment

Both interior and exterior are well glazed with a carefully applied coat. In some places the glaze has flaked off. The glaze is primarily a brownish orange (5YR 5/8) colour with streaked spots of moderate reddish brown (2.5YR 3/3). Below the rim on the exterior are two encircling ridges.

Vessel Form

The sherds are small; the vessel appears to be a

small cup or jar. The body is slightly constricted below the rim where there are very narrow grooves and ridges. The rim is slightly thickened and has a rounded lip.

Dimensions (in mm.)

Lip diameter:	140.0
Maximum diameter:	144.0
Rim height:	11.0
Rim thickness:	6.0
Vessel wall thickness:	5.3

Comparison

The specimen was identified as probably English at the laboratory at Louisbourg and was found in probably English contexts at Castle Hill.

Vessel 164, (Fig. 85c).

Manufacture

Wheel made.

Paste

The paste has fine texture and includes a medium amount of fine rounded sandy tempering particles; the body is compact. The paste is pale orange yellow (7.5YR 9/4) in colour.

Surface Treatment

Both interior and exterior are glazed. The glaze is a strong yellow (5Y 7/10) on both interior and exterior. On the exterior there are also spots of varigated colour, primarily dark orange yellow (7.5YR 6/9). The glaze has a medium crackle (See March 1934: Plate V).

Vessel Form

The specimen consists of several sherds but cannot be restored. It appears to have been constricted above the basal pedestal, had a bulging lower body which incurved below a gently flared rim. The lip is rounded. At least one strap handle was present. The vessel was probably a posset-cup.

Dimensions (in mm.)

Lip diameter:	130.0 est.
Lip thickness:	4.0
Body thickness:	4.0 x 5.0
Handle base:	7.0 x 17.0

Comparison

The specimen was identified as an English Staffordshire posset-cup at Louisbourg (Dunton: pers. comm.).

Vessel 165

Manufacture

Wheel made.

Paste

The paste is fine, grey in colour, has a minute air hole but is otherwise very compact and hard, almost of stoneware quality.

Surface Treatment

Both interior and exterior are glazed. The glaze is irregular, ranging from light grey to greyish white. The glaze has a medium crackle (March 1934: Plate V).

Vessel Form

Indeterminate.

Vessel 166, (Fig. 85f).

Manufacture

Cast?

Paste

The paste is compact but has some minute air

holes. Tiny tempering particles of iron oxide grains are present but rare. The colour is primarily pale orange yellow (7.5YR 9/4) but has varigated streaks of brownish orange (2.5YR 5/9).

Surface Treatment

Smooth, unglazed.

Vessel Form

Indeterminate. The specimen is a very small sherd from a flat sided vessel with a rounded angular edge and a thickened area, but the form cannot be determined.

Comparison

The specimen may be a fragment of marbleware.

Vessel 167, (Fig. 85g).

Manufacture

Cast.

Paste

The paste is a varigated colour ranging from pale orange yellow (7.5YR 9/4) to dark reddish orange (10R 4/9), the colours being mixed.

Surface Treatment

The sherds are split on one side. The other side bears crude longitudinal moulded ridges and minute striations, perhaps a segment of a basketry-like pattern.

Vessel Form

Indeterminate. The sherds are both flat.

Comparisons

The specimens may be fragments of a marbleware.

Creamware

Cream coloured earthenware (Figs. 86,87) is a common type of pottery associated with the English occupation of Castle Hill. The ceramic collection includes 493 sherds of this ware; these have been grouped into 42 vessel units for descriptive purposes.

Manufacture

Moulded; slip cast.

Paste

The paste is fine, compact and cream coloured. The pottery was quite thin and this, coupled with its

deposition on a rock site and primarily in a well traversed area (operation 10, the interior parade of the redoubt), probably accounts for the many small fragments of this ware. The sherds also have a tendency to split parallel to the vessel walls, probably due to cleavage planes resulting from the slip casting method of moulding. There are no striking variations in the homogeneous paste in the sample from the site.

Surface Treatment

Both interior and exterior are glazed. The glaze gives the pottery a pale yellowish colour. Some sherds exhibit fine crazing (March 1934) a trait eliminated in the more developed Queensware (Hughes 1966: 44), but some sherds are not crazed. The glaze colour varies and four categories of colour variation are noted in Table 33. The first of these is a deep or dark cream colour tabulated as "orange yellow" for convenience. This colour is distinctive and may be an early style or late survival of the deeper colour (Towner 1957: 3). The other three colour categories were difficult to distinguish with constant standards since they form a continuum. These are listed as Yellow,

Yellowish-white and Greenish-yellow in Table 33. The greener colour is due to somewhat thicker glaze as can be seen in hollows in the design, but is also found on flat surfaces. It may be simply a glaze variation but the greenish colour is also a trait of Leeds creamware (Cox 1945: 920). There is no significant variation in the stratigraphic distribution of these colour variants of creamware in the site. The glaze tends to chip considerably on the sherds in this sample.

Decoration. The primary method of decoration was the moulded design found on the marly edge of plates and the rims of cups. Only one tiny sherd of an enamel decorated creamware vessel was found in the site.

The enameled piece is vessel 394 which is a tiny rim fragment from a cup (?). The painted decoration is on the interior and is in red, black and blue. A red scalloped line is found below the rim lip (Fig. 86g) and the black forms an outline for a blue painted flower petal (?).

Several different types of moulded decorations are present. These are low relief designs either on the marly edge of plates or bowls or on the exterior rim below the lip on cups, or other straight sided vessels. Figure 86 illustrates the various decorations.

Feather-edge (Fig. 86 k,m) is fairly common, being found on plate or bowl marly forms on vessels 381, 382, 383, 384 and 385. The feather-edge is associated with the scalloped rim.

Diamonds (Fig. 86 j,n) is a pattern consisting of a row of alternating hollow and solid diamonds; it is found on plates in vessels 386 and 387, one of which is scalloped and the other is octagonal in rim shape.

Lines and diamonds (Fig. 86f) is a pattern consisting of alternating parallel lines and diamonds, found on the rim of a straight sided vessel, number 358, in the dark cream coloured ware.

Raised dots (Fig. 86d) is a simple design consisting of a row of dots below the rim. It is associated with straight sided cups, vessels 388, 389 and 390.

Plain undecorated (Fig. 86i) pieces are also present. Some are plates with scalloped marly forms; vessels 376, 377, 378 and 379. The others are cups, vessels 391, 392, 393 and 394, the latter being painted as described above.

Vessel 380 is indeterminate but is a scalloped marly fragment and probably plain.

Vessel Form

Thickness. The thickness of vessel wall and body sherds ranges from 1.8 mm. to 6.0 mm., with an average thickness of 3.7 mm.

Vessel Shape. Shape is difficult to determine in that there are no restorable vessels. However the sherds clearly indicate two major vessel forms, the plate or bowl with flange-like marly edge and delicate thin walled straight sided cups (?) with straight to slightly flared lips. Most of the vessels with the marly are scalloped around the perimeter, some more pronounced than others (Fig. 86). Vessels 376, 377, 378, 379, 380, 381, 382, 383 and 386 are of this form. Vessel 387 has an octagonal marly perimeter (Fig. 86j). Straight sided vessels (Fig. 86f) are numbers 358, 388, 389, 390, 391, 392, 393 and 394.

Vessel Bases. Vessel bases are illustrated in Figure 87. Several base and footring differences are notable.

Rounded Footring, (Fig. 87a). This type of footring is a very low rounded triangular ridge. Vessels 362, 365, 367, 371, 372 and 374 exhibit this type.

Squared footring, (Fig. 87b). This form, seen only in vessel 370, is rectangular in cross-section.

Rounded rectangular, (Fig. 87g). Vessel 375 has a somewhat more elongated, slightly rounded rectangular footring. The base of the vessel is also thickened in the centre.

Inset Base, (Fig. 87d). One specimen, vessel 366, has an inset base in which the bottom of the vessel is thinner than the vessel wall and base perimeter.

Rounded, (Fig. 87 e,f). Two specimens with the low rounded footring, 363 and 364, are illustrated because they are bases from larger vessels. On 364 the bottom of the vessel is thickened in the centre. Vessel 363 includes the vessel wall and a trace of the marly edge.

Tabulation

The creamware sherds are listed in Table 33 by vessel units. Vessel units are based on shape, colour, design and other traits and represent probable vessel units in most cases. Vessel numbers 395, 396 and 397 were utilized for convenience of tabulation only since they are groups of miscellaneous body sherds, mostly split and chips, grouped on glaze colour. Some of these sherds may belong to other listed vessels.

Comparisons

Creamware is almost exclusively found in English

or probably English contexts at Castle Hill. A few sherds are from probably French mixed contexts in which they must be intrusive since this pottery was not manufactured until after the French had left Castle Hill. The chronological range of cream-coloured earthenware begins about 1720 although the improved types found at Castle Hill are of the 1760's (Towner 1957: 3). The ware was replaced by Pearlware circa 1779 (Hughes 1965: 70) (Fisher 1965: 89).

French Stoneware

The French stoneware (Fig. 88 a-d) is a distinctive although relatively rare type of pottery in the collection from Castle Hill. It is represented by only 14 sherds grouped into six vessel units. It is associated with sealed French stratigraphic deposits in the site as well as with some mixed levels.

Manufacture

Wheel made as indicated by the throwing ring lines and grooves on the vessels, particularly on the interior surfaces.

Paste

Texture. Fine, compact and hard, and granular.

Non-plastic inclusions. There are some very tiny sandy particles of temper well distributed through the clay. There are very rare inclusions of iron oxide particles up to 1.0 mm. in size; such larger particles are best seen where they protrude through the exterior surface.

Colour. At least two wares are represented, one with a light grey paste colour (Lynch's Ware 2) and one with a reddish brown core and dark grey exterior (Lynch's Ware 1).

Surface Treatment

Finish. On the interior well defined throwing rings and striations remain. Such striations are present but much less common on the exterior surface. There is no evidence of slip on any of these examples. The surfaces tend to feel slightly rough.

Glaze. The ware is "glazed" in that it has a faint shiny coating. Lynch suggests that this may have been due to the use of wood in firing the kilns (Lynch 1968: 4), and that it is accidental.

Decorations. One rim exhibits cordon like ridges and grooves. No other decorations are present in this small sample.

Vessel Form

Thickness. Body sherds range from 4.0 mm. to 8.0 mm. in thickness with an average thickness of 4.8 mm.

Shape. Vessel shape is largely indeterminate. One specimen has a flat bottom and rounded lower body. Another has a flat bottom and a straight flared lower body. Two rounded shoulder sherds are present as are two strap handles. One rim has fairly straight sides and cordon like ridges. Another has an S collared profile which forms an interior groove or channel, possibly to receive a lid. Detailed descriptions are presented below.

Vessel 189, (Fig. 88a). The specimen is a fragment of a base of a small bowl. The base has a flat bottom. It is convexly constricted at the top to form a low pedestal, above which rises the outflared and curved vessel wall remnant. This specimen is grey in paste, unglazed, and appears to be an example of Lynch's Ware 2 (1968: 10). It could be a bottle base; see Lynch's vessel shape g (1968: Fig. 6).

Dimensions (in mm.)

Base diametre:	130.0 est.
Base thickness, exterior circumference:	4.0
Bottom thickness:	4.0
Vessel wall thickness:	5.0

Vessel 190, (Fig. 88c). This vessel consists of a single small rim fragment. It is of the grey ware 2 paste and has a brownish orange exterior glaze colour. The fragment is part of a rim, the lip is missing. There are circling ridges around the rim. It is slightly channeled on the interior.

Dimensions (in mm.)

Rim thickness: 8.0

Vessel 191. This specimen is an incomplete fragment of a strap handle. It is oval in cross-section, and tapered slightly. Ware 1 paste (Lynch 1968: 7).

Dimensions (in mm.)

Thickness: 7.0

Width: 23.0

Length: 38.0 incomplete

Vessel 192, (Fig. 88 e,d). This vessel includes the base of a vessel. It has a flat bottom and outflared but straight side. It is of Ware 1 paste (Lynch 1968: 7). A strap handle is also included in this vessel unit on the basis of its similar colour and texture and adjacent find spot; however, it cannot be demonstrated that the vessel base and strap handle necessarily belong together. The handle is oval in section.

Dimensions (in mm.)

Base diameter: 110.0

Base thickness: 10.0 at edge

8.0 at centre

Wall thickness:	9.0 near base to 7.0
Handle thickness:	9.0
Handle width:	27.0
Handle length:	62.0 incomplete

Vessel 193. Two rounded shoulder sherds are included in this unit. It is Ware 1 paste.

Dimensions (in mm.)

Thickness:	4.0
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Vessel 194, (Fig. 88b). This vessel is a single segment of a rim sherd. It has an angular S shaped profile forming a channel on the interior which is lower than the lip at the exterior of the vessel top. It is Ware 1 paste. A faint thickening may be the start of a spout but is indeterminate.

Dimensions (in mm.)

Diametre at lip:	120.0
Neck diametre, interior:	90.0
Rim height:	14.1
Rim thickness (wall):	8.3
Rim thickness (total):	18.0

Tabulation

Table 34 lists the vessels in sequence.

Comparison

There is an association of this ware with sealed French deposits at Castle Hill. Both Ware 1 and Ware 2 as described by Lynch (1968) from Louisbourg are present in the Castle Hill sample. The Castle Hill material presumably pre-dates 1714 and is earlier than the French occupation at Louisbourg.

Westerwald Salt Glazed Stoneware

Examples of the distinctive salt glaze stoneware with grey body and cobalt blue and incised decoration (Fig. 88 f-m) typical of Rhenish stoneware are present in the Castle Hill ceramics. A total of 28 sherds have been grouped into 19 vessels.

Manufacture

Wheel made, moulded.

Paste

The paste is fine and compact, evenly fired and hard. The colour is grey.

Surface Treatment

The interior is smooth but does retain the fine striations of manufacture encircling the vessel walls.

The interior is glazed, with a clear glaze. The interior colour is usually that of the paste beneath the salt glaze. The exterior often has a pebbled or orange-peel glazed surface texture, again a grey colour.

Decoration. Vessels are often decorated with encircling cordons, ridges and grooves. These have sometimes been covered with cobalt blue before glazing. The vessel walls are also decorated with incised lines forming checkerboard, curvilinear and floral designs. The designs are further embellished with combinations of cobalt blue and the uncoloured grey background colour. Cobalt blue painting without associated incised lines is also present. Various designs identified are listed in Table 35. Similar decorations on identical ware are illustrated by Watkins (1968: Fig. 66).

Vessel Form

Thickness. Body sherds range from 3.0 mm. to 7.0 mm. in thickness with an average of 3.99 mm.

Shape. The tankard or cylindrical mug is the most common vessel form. Vessel numbers 196, 197, 198, 204, 205, 209 and 212 are cylindrical mugs.

Vessel 199 is a fragment of a chamberpot rim and vessel 203 may be another chamberpot but is a small fragment.

Vessel 213 is part of a flat bottomed vessel, possibly a plate.

The other vessels are sherds from pots with rounded or globular bodies of indeterminate form. However, they are most likely to be fragments of chamberpots or curve sided flagons.

Similar vessel forms are illustrated by Watkins (1968: Fig. 66).

Individual vessels with measureable dimensions other than vessel wall thickness are listed below. All vessels are tabulated in Table 36.

Vessel 197, (Fig. 88g). Tankard rim

Dimensions (in mm.)

Rim diameter: 80.0 est.

Rim thickness: 5.0

Vessel 198, (Fig. 88j). Tankard rim and base.

Dimensions (in mm.)

Rim diameter: 80.0 est.

Rim thickness: 5.0

Base diameter: 76.0

Vessel 199, (Fig. 88h). Chamberpot rim

Dimensions (in mm.)

Rim diameter: 250.0

Rim height: 8.0

Rim width: 21.0

Rim thickness: 8.0

Vessel 204, (Fig. 88f). Large tankard or pitcher rim.

Dimensions (in mm.)

Rim diameter:	120.0 est.
Rim thickness:	10.0

Vessel 212. Tankard base.

Dimensions (in mm.)

Base diameter:	100.0 est.
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Tabulation

The sherd and vessel counts and excavation lots are listed in Table 36.

Comparisons

This ware is almost identical to the sample illustrated by Watkins (1968: Fig. 66) from Marlborough, Va., of the mid-18th century. Stoneware of this type was widely used by the English (Watkins 1968: 129) and large quantities of chamberpots of this ware were being shipped to England by 1710. The ware was popular between 1710 and 1760 (Noel Hume 1969: 148-9).

Salt Glazed Stoneware, Brown

Utilitarian salt glazed stoneware is represented by some 97 sherds which can be grouped into 14 vessel

units. This stoneware is associated with the English occupation at Castle Hill.

Manufacture

Wheel thrown as indicated by the throwing ring ridges and grooves which are most pronounced on the interior of the vessel. Finer encircling striations are present on the exterior in some cases.

Paste

Texture. The paste has typical stoneware texture and hardness. It is dense and compact, although there are a few tiny air holes present. Some sherds exhibit traces of a laminated structure.

Non-plastic inclusions. Aplastic tempering material consists of very fine sand and iron oxide particles evenly distributed through the paste. Iron oxide particles up to 1.0 mm. or 2.0 mm. in diameter are present but rare.

Colour. The paste is mainly grey in colour although in some cases it approaches a pale orange yellow.

Surface Treatment

Finish. Broad grooves and fine striations are present on the interior surface which is slightly rougher

to the touch than the glazed exterior. The exterior has a pebbly texture in some cases both from the protrusion of some tempering particles and from the nature of the salt glaze. There is no evidence of slip except a band of iron oxide around the interior of the rim of one jug.

Glaze. The exterior is glazed. The interior is glazed on one example. The glaze colour ranges from the grey of the paste to mottled yellowish brown, to reddish brown. The darker brown appears on the rim and shoulders of a restorable jug while the base of the vessel is the grey glazed paste colour. The transition between these zones is gradual and there are, thus, numerous "colours" possible on individual sherds from a single vessel.

Decorations. None.

Vessel Form

Thickness. Body sherds range from 3.2 mm. to 15.0 mm. in thickness with an average of 6.8 mm.

Shape. The only vessel form that can be determined is a small based, rounded shouldered jug with a small collared rim and a strap handle. Individual vessel examples are described below.

Vessel 180, (Fig. 89). This is a partly restorable vessel. It has a flat bottom, from which the vessel walls flare outward to a rounded shoulder which is larger in diameter than the base. The shoulder curves into a short neck surmounted by a thickened collar rim. The rim has a rounded lip. On the neck below the rim are four shallow trailed grooves. The basal scar of a strap handle is present on the shoulder of the vessel. The outer edge of the base is beveled.

The exterior of the vessel exhibits considerable variation in colour range from grey at the base to a moderate reddish brown on the shoulder and exterior of the rim. The interior of the rim is coloured a moderate reddish brown.

Dimensions (in mm.)

Lip diameter:	40.0
Rim diameter:	45.0
Neck diameter, interior:	31.0
Neck diameter, exterior:	49.0
Shoulder diameter:	195.0 est.
Diameter of base:	135.0
Vessel height:	300.0 est.
Rim collar height:	19.0
Rim thickness:	14.0
Vessel wall thickness:	6.0 to 9.0
Base thickness:	6.0
Handle dimensions:	8.0 x 33.0 inc.

Vessel 168, (Fig. 90b). This vessel is the base of a jug similar to the one described above. The specimen is notable in that the top apparently was broken off and the base was either re-used or an attempt was made to repair it. The top of the fracture is covered with a thin coating of a black substance.

Dimensions (in mm.)

Base diameter:	154.0
Wall thickness at base:	15.0
Base thickness:	11.0
	at edge
	5.5
	at centre

Vessel 169. This vessel is a fragment of the base of a jug similar to vessel 180 and 168 described above.

Dimensions (in mm.)

Base diameter:	130.0
Wall thickness:	8.0 to 11.0
Base thickness:	8.0
	at edge

Vessel 170, (Fig. 90a). This vessel is one half of the base of a jug similar in form to that described as vessel 180 above.

Dimensions (in mm.)

Base diameter:	140.0
Base thickness:	8.0
	at edge
	6.0
	in centre
Wall thickness:	6.0 to 11.6

Tabulation

The vessel units are tabulated in Table 37. The vessel units are based on cross-mending sherds in the more complete examples. The remainder are based on the colour variations in the individual sherds; since vessel 180 illustrates the wide range of potential colour difference in a single vessel, it is possible that the "vessel" classification of single sherds is not completely reliable.

Comparisons

This pottery is associated with the English occupation of Castle Hill. Utilitarian salt glaze stoneware of this type is of the 18th and 19th centuries (Cotter 1968: 13-14).

Salt Glazed Stoneware, Cream Coloured

This ware is a utilitarian salt glazed stoneware with thick body similar to the brown salt glazed stoneware described above, but with a cream coloured paste and surface. It appears "white" but is not as white as fine white salt glazed ware. Nine sherds are grouped in seven vessel units.

Manufacture

Wheel thrown as indicated by throwing rings on the interior.

Paste

Texture. Compact, fine, stoneware.

Non-plastic inclusions. A plastic tempering particles are very rare. Very fine specks of dark material are present, but material added to the clay was well ground.

Colour. When viewed in section the paste is a pale orange yellow colour (7.5YR 9/4).

Surface Treatment

Finish. The exterior is well smoothed; prominent throwing rings remain on the interior surface.

Glaze. The interior of some sherds is quite dull and the colour of the paste; these have been tabulated as "unglazed". The other sherds are the paste colour on the interior but shiny. The exterior has a good coat of salt glaze with an "orange-peel" texture. It is a cream colour and somewhat whiter than the paste as seen in section. There is no evidence of the use of a white slip, however.

Vessel Form

Thickness. Body sherd thickness ranges from 3.8 mm. to 5.2 mm. with an average of 4.5 mm.

Shape. Vessel form is indeterminate since the ware is known only from small body sherds. One strap handle is present.

Tabulation

The specimens are listed in Table 38.

Comparison

The type is primarily associated with the English occupation at Castle Hill.

White Salt Glazed Stoneware, Wheel-turned

A common type of English ceramic ware found at

Castle Hill is white salt glazed stoneware (Fig. 91). This ware is represented by some 211 sherds which can be grouped into 125 vessel units, although the actual number of vessels was probably smaller.

Manufacture

The interior surfaces of the pottery have very fine striations and occasional decorative grooves. These encircle the vessel and are very regular and precise, having been produced by turning on a wheel. The exterior, especially on the bottom of the piece bears similar fine, regular, concentric striations. Fine shallow grooves at the juncture of the top of the footring and the vessel wall are also present. Wheel turning was the major method of production of round pieces (Lynch 1968: 8), and this is the most common form at Castle Hill. The vessel walls are very thin, and the footrings are uniformly wedge shaped in cross-section, thicker at the top than at the bottom. These characteristics suggest that the pieces may have been slip cast, another major technique employed in the manufacture of white salt glazed ware (Lynch 1968: 29). The horizontal and concentric striations described above could be the result of the use of a template on the turner's lathe, by means of

which a slip cast piece was finished while leather hard (Savage 1964: 14). Thus the white salt glazed pottery at Castle Hill appears to have been made by slip-casting and turning. Pressed salt-glaze is also present but is described separately in the following section.

Paste

The paste is fine compact and cream to greyish white in colour, mostly a uniform white. Although some greyish-white specimens are present they are not the earlier "grey core" variety (Lynch 1968: 4) which was covered with a white slip. The material in the Castle Hill collection is the "homogeneous:" white salt glaze (Lynch 1968: 8).

Surface Treatment

As indicated above in the discussion of manufacture, there are very fine horizontal and concentric striations present on the surface, particularly in the area of the bottom of the vessel. These appear to be indicative of the method of finishing the pottery.

This stoneware has the fine pebbly or orange-peel surface texture of salt glazing. Both interior and exterior surfaces are white. There are a few examples

which are greyish white; either from poor firing and fireclouding or from post-manufacture accidental burning.

Decoration. The sample from Castle Hill is all plain and undecorated; no scratch-blue or enameled pieces are present. Four specimens have fine horizontal and concentric grooved decoration lines.

Vessel Form

Thickness. The vessel wall thickness ranges from 1.2 mm. to 5.0 mm. with an average thickness of 2.5 mm. The vessel walls are very thin at the lip (See Table 39) and thicker toward the base just above the footring.

Shape. Due to the thin body and the rocky nature of the site this pottery is badly fragmented and only known from relatively small sherds. This is particularly true of the upper parts of vessels, basal fragments being somewhat larger due to the thicker and hence more substantial construction of the bases. Vessel forms can only be guessed at but cups and saucers are probably the most common vessel forms. One handle fragment is probably an indication of a teapot. Plates and bowls may also be present. One or two straight walled sherds are probably indicative of tankards or mugs.

Vessel lips are tapered and rounded. Some are very

slightly outflared and/or thickened at the lip. One specimen has a very delicate hollowed rim formed by rolling the lip. The single handle fragment is plain, round and tapers slightly. The vessel walls curve to form a relatively flat base which is provided with a footring. The footring is wedge shaped, thicker at the top and tapering to its bearing surface. The bearing surface is flat. Footring diameter, heights and thickness-taper dimensions are recorded in Table 39.

Several different types of rim lip shape can be distinguished. These are illustrated (Fig. 91).

Rounded Lip, (Fig. 91). A simple rounded lip on a direct rim wall is found on vessels 284, 274, 287, 285, 283, 300, 301, 302, 308, 317 and 327. The same lip with a different body shape is found on vessel 303 (Fig. 91g).

Thinned rounded lip, (Fig. 91b). Also on a straight walled body form is a lip which is rounded but slightly thinned on the exterior. Examples of this form are vessels 270, 313, 316 and 323.

Rolled lip, (Fig. 91f). One example of a rim formed by rolling the lip is seen in vessel 267. The interior of the roll is hollow.

Flared thinned rounded lip, (Fig. 91d). The most common lip form is one which is slightly thinned and rounded and with a slightly outflared rim. This form is found on vessels 268, 269, 280, 281, 282, 286, 288, 292, 294, 290, 291, 295, 296, 297, 298, 299, 293, 309, 304, 305, 306, 307, 314, 315, 310, 311, 312, 318, 319, 320, 321, 322, 325, 326, 271, 273, 276, 277, 270, 272, 278 and 279.

Flared lip, (Fig. 91c). A slightly rounded lip on a slightly outflared rim is found on vessel 289.

Flared, beveled lip, (Fig. 91e). An outflared rim with a lip thinned by interior beveling is seen on vessel 275.

A wide variety of base forms can be identified on the basis of the shape of the footring cross-section and the presence and location of grooves. These are illustrated in Figure 91. With few exceptions the footrings are wedge shaped. However, they vary from wedges with a vertical outside, or inside, to ones with equal sides. Presence or absence of adjacent grooves is another variable trait. There are also variations as to the relative height of the inside and outside of the footring which depends in part upon the relative thickness of the adjacent vessel body and thickness of the base of the pot.

Vertical outside w/groove, (Fig. 9li). This form has a vertical outside on the footing wedge and an incised groove at the top of the exterior. Vessels: 216, 245.

Equal sides w/grooves, (Fig. 9lo). This form has a footing with equal taper on inside and outside; it has an incised groove at the top on both inside and outside. Vessel: 218.

Vertical outside w/two grooves, (Fig. 9ls). This footing has a vertical exterior; incised grooves are present on both interior and exterior. Vessels: 219, 255.

Equal sides, differential height, (Fig. 9lv). This equally tapered footing is shorter on the interior due to a thicker vessel bottom. There are no incised grooves. Vessels: 220, 230, 232.

Equal sides, equal height, (Fig. 9ly). This equal tapered footing has the same height interior and exterior and lacks incised grooves. Vessels: 221, 228, 229, 241, 247, 248, 251.

Vertical outside, no groove, (Fig. 9lm). This footing with vertical exterior and equal interior and exterior height lacks incised grooves. Vessel: 224.

Equal sides, differential height w/groove, (Fig. 9lp). This equally tapered footing is longer on the interior due to the thin vessel bottom. There is a

slight groove on the outside. Vessels: 225, 223, 237, 249, 252, 253.

Vertical inside w/groove, (Fig. 9lw). This footring is vertical on the interior, which is also higher due to the thin vessel bottom. There is an incised groove on the exterior. Vessel: 238.

Vertical inside w/exterior groove, (Fig. 9lt). This footring with a vertical side is of equal interior and exterior height. It has an exterior groove. Vessels: 226, 234, 239.

Trapezoidal wedge, (Fig. 9lz). This footring has a vertical outside. The bearing surface is beveled rather than straight, giving the footring a trapezoidal cross-section. It lacks grooves. The sherds also exhibit a turning centre point in the middle of the base. Vessel: 227.

Ridged foot, (Fig. 9lq). This footring has a vertical inside and a faint groove on the exterior. The bearing surface is channeled or thinned on the interior. Vessel: 235.

Equal sides, w/two grooves, (Fig. 9lu). This footring has equally tapered sides, but differential heights being higher on the interior due to the thin bottom. There are incised grooves on both the interior and exterior. Vessel: 236.

Vertical inside w/groove, (Fig. 9lk). This footring has a vertical inside which is also slightly higher due to the thin base. There is an exterior basal groove. The ring is wedge shaped but the exterior is nearly vertical, hence the ring is thinner than others with the same combination of traits.

Vessel: 240.

Vertical outside w/double groove, (Fig. 9ln). This footring is vertical on the exterior. The bottom is thin and thus the interior of the ring is higher. The exterior has two grooves, one on the base of the vessel as usual, and one horizontally on the side of the footring. Vessel: 242.

Equal sides, (Fig. 9lr). This footring has equally tapered sides and an exterior incised groove. The interior side of the ring is short due to the thickened vessel bottom. Vessel: 243.

Vertical exterior, (Fig. 9la'). This footring has a vertical exterior with an incised groove. The interior is higher due to the thin bottom. The vessel also has a decorative groove on the interior of the vessel itself. Vessel: 250.

Angled flange, (Fig. 9ll). This vessel form has a footring which is rounded and angles out from the vessel bottom at its perimeter. The bottom of the bowl

is flat and thin and has a turning point in its centre, exterior. Vessel: 215.

Indeterminate bases. There are several fragments which are indeterminate; they all exhibit the basal groove. Vessels: 222, 223, 231, 244, 254, 246.

Tabulation

The plain white salt glaze stoneware is listed by vessel unit in Table 39. The vessel units are based on size, colour, texture and other factors, but the 125 vessel units used for descriptive purposes is probably too large a total for the vessel count of this type. This is due to the fragmentary nature of the sample and the difficulty in finding cross-mends between bases and rims, and many body sherds. Eight "vessel units" numbers were assigned to eight groups of body sherds; these were based on minor colour variations, and undoubtedly represent many different vessels. Since it was not possible to find rim to base cross-mends it must be assumed that some of the rims and bases come from the same vessels. Consequently it appears to be certain that there were fewer than 125 vessels of this ware in the collection. It is most likely that the true vessel count for this type of white salt glaze is on the order of 61, a figure derived from the rim sherd count.

Despite this difficulty the vessel unit for descriptive purposes was used because it provided an economical and systematic way to summarize the data.

Comparisons

This pottery is found almost exclusively in English and probably English contexts at Castle Hill. Two or three specimens were found in possible French contexts; since this ware was not manufactured until after the French occupation of Castle Hill these sherds must be intrusive in these areas.

The chronological range of white salt glazed stoneware of this type is about 1730-1770 (Lynch 1968) with the thin fine variety competing with imported porcelain by 1740 (Hughes 1865: 78), and remaining popular until replaced by Creamware about 1760 (Fisher 1965: 76). The popularity of this ware coincides with the English period of occupation at Castle Hill with which the pottery type is associated.

White Salt Glazed Stoneware, Pressed

A small sample of pressed white salt glazed stoneware was found in the collection. It consists of 38 sherds grouped into 12 vessel units. (Fig. 92).

Manufacture

This type of white salt glazed stoneware was made by pressing the clay in moulds which imparted a variety of embossed basketry and other designs in the process (Lynch 1968: 32 ff).

Paste

The paste is typical homogeneous white salt glaze (Lynch 1968: 8) and the pieces are white, with some variations. The most notable is a specimen which is greyish white and has blue flecks.

Surface Treatment

The surfaces are smooth and glossy from the glaze with an orange-peel like texture. Embossed basketry and other designs are moulded onto the pieces.

Decoration. The moulded decorations are found on the marly surface; all designs present include the barley pattern.

Barley pattern, (Fig. 92f). This design is illustrated by Lynch (1968: Plate XXIV). One specimen, vessel 343, probably had this pattern alone. Other examples, vessels 341, 344, 345, 346 and 347, have traces of the barley pattern but are too small to be sure that this was their only decoration.

Barley and Basket, (Fig. 92c). This design includes alternating panels of the barley pattern and a basket weave. The vessels with this decoration are 339, 348, 349 and 350.

Barley and Basket, (Fig. 92e). This is also a design consisting of alternating barley and basketry panels, but the basketry is of a different pattern than that described above. Vessel 342 exhibits this decoration.

Plain. Vessel 340 does not exhibit any decoration but consists only of sherds from the bottom of the plate which was undecorated.

Vessel Form

Thickness. Thickness ranges from 2.7 mm. to 5.8 mm., the average being 4.3 mm. Lynch notes that the pressed type is usually thicker than other forms (Lynch 1968: 33), and this is a notable difference at Castle Hill as well.

Shape. All specimens appear to be fragments of plates. However, since most are merely fragments of the marly edge it is possible that other vessel forms were present. The bases present are plates. These are either grooved or ungrooved on the bottom (Fig. 92 a,b). Both rounded and angular scalloped edges are present (Fig. 92 d,f).

Tabulation

Sherds and vessel units, along with dimensions, are recorded in Table 40.

Comparisons

This type is associated with the English occupation at Castle Hill which is consistent with its 1740's date (Lynch 1968: 33).

Miscellaneous Stonewares, English

Five vessels (11 sherds) have been identified as miscellaneous stonewares of English origin (Fig. 93). These specimens are described below.

Vessel 351, (Fig. 93). This vessel is a fragment from the rim of a very thin walled tankard or mug. It has a moderate reddish brown exterior glaze, which is lustrous, and a somewhat lighter yellowish brown interior glaze colour. The vessel is decorated with a series of closely spaced narrow grooves and ridges which encircle the body. It has a rounded lip. It was identified as "Staffordshire" at Louisbourg.

Vessel 352, (Fig. 93d). This "vessel" is a fragment of a strap handle with a lustrous moderate brown glaze. The handle has longitudinal grooves and

a flattened protruding tail. The specimen is probably a Staffordshire piece. Vessel form is indeterminate; possibly a teapot.

Vessel 353, (Fig. 93e). This vessel consists of two fragments of the base of a large vessel, possibly a pitcher. It has a moderate brown glaze and can be identified as "Nottingham" type because the glaze is separated from the body by a thin white layer (Noel Hume 1969: 114).

Vessel 354, (Fig. 93b). This "vessel" is a small pointed oval knob or finial broken off a vessel lid. It has a white strip at the break, adjacent to the former lid, above which it is a lustrous moderate brown colour. It may be a Staffordshire piece.

Vessel 335, (Fig. 93c). This vessel is the lid of a small jar. It has a shiny black glaze on both interior and exterior. The piece was identified as "Black glazed English stoneware" at Louisbourg.

Tabulation

These specimens are recorded in Table 41.

Comparisons

All of the miscellaneous stoneware vessels are of English types and are found in English contexts at Castle

Hill. Such wares form only a small proportion of the pottery used at the site during the English occupation. Nottingham stoneware was made in the period of the 1690's to the 1800's (Hughes 1965: 65).

Porcelain

A small sample of porcelain (Fig. 94) was identified in the Castle Hill ceramic material. It consists of 30 sherds grouped into 11 vessel units. The porcelains are almost exclusively associated with the English period of occupation at the site.

Chinese Porcelain

Paste

The paste is hard and compact and greyish white to white in colour. The body is translucent to opaque.

Surface Treatment

All examples have a thin glaze or glassy layer at the surface; it is very thin and uniform. The surface is pebbly. Where designs have been painted the colour appears to have sunk into the glassy surface layer where it can be seen in cross-section.

Decoration. The most common form of decoration is in blue on a bluish white background. Designs are curvilinear and geometric and appear on interior or exterior or both. These examples, vessels 471-478, are probably all Chinese export porcelain. Plain white and polychrome decorated porcelain specimens, vessels 479-481, are probably English in origin. The decorations will be described by vessel unit below.

Vessel 471, (Fig. 94a). This vessel is a teacup. The interior is plain bluish-white. On the exterior a design in a light blue over the bluish-white ground is present. There is a single narrow line where the base of the cup curves inward. Below the rim is a field defined by parallel horizontal encircling lines within which is a pattern of alternating dots and circles.

Vessel 472, (Fig. 94c). This somewhat larger diameter vessel has a plain bluish-white exterior. On the interior below the lip is a field of horizontal parallel encircling lines between which is a pattern of alternating crossed parallel lines and dots.

Vessel 473, (Fig. 94d). This fragment of a flat vessel base has a design on the interior. The exterior is plain bluish-white. The design consists of two encircling parallel lines between which is a pattern of concentric ovals; the entire design being a narrow

band presumably forming a circle around the centre of the base.

Vessel 474, (Fig. 94b). This fragment of a cup rim has a bluish-white colour interior and exterior; dark blue painted designs occur on both inside and out. The remnant of the pattern is a wavy tapering broad blue band with paralleling narrow lines.

Vessel 475, (Fig. 94e). The interior of the vessel, probably a bowl base, is plain bluish-white. On the exterior beginning at the top of the footring are light blue encircling and curvilinear designs. It is too incomplete to describe further.

Vessel 476, (Fig. 94f). On the interior of this fragment of a vessel base are traces of a blue geometric (?) design which is otherwise indeterminate. The ground colour is bluish-white but not as blue as other examples described above.

Vessels 477 and 478, (Fig. 94g). These small sherds are plain but have the bluish-white colour of the decorated specimens described above and belong to the same category.

Vessel Form

Cups and bowls are present. Vessel shapes are illustrated in Figure 94.

Tabulation

Porcelain vessels are listed in Table 42.

Comparisons

Vessel 475 was identified at Louisbourg as "Chinese, probably early 19th century" (Dunton, pers. comm.). All of the vessels described above are similar and can be grouped together. Pottery of this type was exported to North America in the 17th and 18th centuries (Cotter: 1968: 17).

English Porcelain

Paste

The paste is white and compact.

Surface Treatment

The specimens have a thin glaze or glassy layers at the surface into which colour has sunk in the polychrome example. The surface colour of the vessels described below is white. The surfaces are smooth.

Decoration. Two of the vessels are plain white, the third has a painted floral design.

Vessel 479, (Fig. 94j). This vessel consists of several fragments of a teacup base. The exterior

and interior surface colour is very white. The specimen has straight sides and an angular bottom.

Vessel 480, (Fig. 94h). This vessel has a white colour, somewhat discoloured, probably by burning or other accident.

Vessel 481, (Fig. 94i). This is the rim of a jug or pitcher. The interior is plain and white. The exterior has traces of a polychrome floral painting. There is a violet tinge at the lip on the exterior. The flower includes green leaves and red to yellow petals.

Vessel Form

Vessel shapes are illustrated in Figure 94.

Tabulation

Porcelain vessels are listed in Table 42.

Summary of Ceramics

Twenty-four ceramic categories and sub-categories were established for classification and descriptive purposes. These are summarized in Table 43. The table also includes a comparison of vessel count and sherd count for each category and a relative frequency comparison based on the percentage of vessels and sherds in the total sample.

There are some notable variations when percentage of total sample in vessel and sherd counts is compared. The largest differences are noted in the percentages of Olive Jars, White Salt Glazed Stoneware and Creamware. These deviations are probably a function of the relative fragility of these wares as well as their relative frequency at the site. Creamware and the White Salt Glazed Stoneware, for example, are thin and fragile and largely recovered from areas where foot traffic was heavy; sherd and vessel counts may not be reliable. Furthermore, the reliability of the assignment of sherds to "vessel units" varies from type to type and at best must be regarded as an estimate of the number of vessels represented. It is likely that the sherd count and percentage is a more accurate reflection of the relative frequency of the various pottery categories at the site.

Although cultural association analysis of the vessel count is utilized, stratigraphic seriation and other analysis of the distribution of the ceramics in the site are based on sherd counts rather than vessel units.

Cultural Associations

The stratigraphic and cultural association of the various pottery types provides a useful means of confirming or correcting the field identification of the

excavation units at the site. The numerical and percentage frequency of the pottery types in the various excavation lots is presented in Table 44.

Examination of Table 44 will quickly reveal that, with few exceptions, the pottery fragments were widely scattered and many excavation units produced only one or two sherds. Some refuse levels produced large amounts of pottery, but where sample size is not a problem, possible intrusion and mixture may be; exceptions to this are some sealed French rampart fill deposits.

Examination of Table 44 will also illustrate the non-random distribution of different pottery types in many excavation lots. Where coarse earthenwares are present, white salt glazed stoneware and creamware are absent, and vice versa; this is an indication of the value of the ceramic remains as indicators of the cultural origin of many of the deposits excavated at the site.

The data in Table 44 may be used as a reference so the ceramic content of any lot may be determined. Lots which did not produce pottery are not included in the table. These data may also be used in stratigraphic analysis of the ceramic remains. In the discussion of various stratified sequences, the ceramic

data drawn from Table 44 are presented; in some cases the ceramic totals from excavation lots are combined. These are cases where such lots are different parts of the same stratum. The ceramic stratigraphy may be compared to that of bottles and pipes by reference to the appropriate sections.

Stratigraphic and Cultural Distribution of Ceramics

Some of the ceramics recovered in the excavations at Castle Hill can be associated with periods of cultural occupation at the site on typological grounds alone. For example, white salt glazed stoneware and cream coloured earthenware were not manufactured until after 1740 and must therefore be artifacts of the English occupation of the site. Similarly, sherds identified as French stoneware are almost certainly representative of the French period. In this fashion the ceramic specimens recovered from the site are of considerable use in confirming the cultural identification of many excavation lots, and as a potential means of identification of the cultural origin of other excavation units for which stratigraphy yields no firm identification. The problem is, however, more complex, and further analysis of the stratigraphic distribution of pottery in the site is necessary.

One major difficulty is that of sample size; some excavation units contained no pot sherds and most yielded only a small sample at best. In view of the known possibilities of cultural mixture in many areas of the site a cultural identification based on a small sample may not be absolutely certain. In addition it should be remembered that intrusion or other contamination is more common in English levels at the site; that is, there are some sealed French strata but relatively fewer English levels in stratigraphic circumstances which preclude artifact mixture. Because of these problems there is an inevitable mixture of ceramic and other remains. In attempting to compare the English and French occupations it is necessary to attempt to control this problem. The ceramic remains are both part of the problem and part of the solution.

One solution is to utilize ceramic materials from culturally identified strata to identify the French and English ceramic complexes, along with appropriate typological identification data. Excavation lots which can be culturally identified both on stratigraphic and ceramic typological grounds can be designated as definite French or English.

The ceramic contents of other lots, somewhat less firmly identifiable on stratigraphic grounds alone, can

be used to determine excavation units which are probably French or English. In these lots, the refuse laden strata of the midden filled ditch, for example, there may be some mixture of ceramic (and other) materials.

A third class of excavation units is composed of those which on stratigraphic grounds are known to be mixed, or for other reasons cannot be culturally identified.

The materials from definite and probable French and English lots can be appropriately combined for total cultural comparisons. Where potential cultural intrusion must be eliminated as a possibility, only definite levels should be used in comparative study. However, restricting the cultural samples to those levels alone eliminates most English lots from consideration and thus there is some real need to utilize data from probable identification contexts for some aspects of site analysis.

The identifications based on ceramics, as discussed below, have been used in the study of pipes and pipe stems, data which afford confirmation of the ceramics identification. Glass bottles and other specimens adding typological identification to stratigraphic association were also considered in the overall cultural identification of lots as ultimately used in all artifact analyses.

Since many English levels are potentially mixed, the best sample of ceramics from stratigraphically identifiable

excavation units are French. These samples are from sealed strata in the French rampart fills in operation 9.

The distribution of pot sherds in sub-operation 9E, the southeast demi-bastion, is shown in Table 45. Both number of sherds and percentage of the total for each stratigraphic unit are included in the table. These data are drawn from Table 44 but combined the materials from appropriate excavation lots.

Excavation units 2A9E5 and 9E6 were identified in the field as evidence of an intrusive English stairway feature. A single sherd was recovered from this small feature and was a fragment of white salt glazed stoneware; the sherd confirms the identification. The remaining lots in the 9E sub-operation are various stratified layers of rampart fill, 9E2, 9E11 and 9E15 being more heavily charged with occupational debris than the other layers of clay and gravel fill. All of these are of French origin and can be combined to provide a better "French" ceramic sample; such a total is included in Table 45. The only notable typological exception in the French sample is a single sherd of white salt glazed stoneware which was not manufactured until long after the French occupation and must be an intrusive specimen. This sherd was

recognized at the time of excavation; it was found adjacent to the inner face of the bastion wall in an area of relatively loose rampart fill and could have percolated downward through air spaces in the rocky rubble quite easily. Its relative percentile frequency in the total French sample is negligible. Aside from this problem the bastion fill sample indicates that olive jars, the several varieties of French coarse earthenwares, French stoneware and tin glazed earthenware constitute major portions of the French ceramic complex.

The sample of pottery from other French rampart fill strata presents a very similar picture. Sub-operations 9D, 9F and 9G in the west rampart fill provide another sample of presumably French deposits. These data are recorded in Table 46. Here again orange paste coarse earthenware and tin glazed earthenware sherds are most common.

Excavation lots 9-14 in sub-operation 9K, another rampart fill sample of presumed French origin, exhibit a similar ceramic complex (Table 46).

Table 46 also includes a summary of pottery recovered from several excavation lots in the rubble fill of sub-operation 2A. These lots consisted of the fallen masonry roof of the powder magazine, a

structure built by the French. It is presumed on stratigraphic grounds that this rubble fill level must be largely of French origin, with some possibility of intrusive English specimens. As noted in Table 45 the ceramic contents include earthenwares of the types found in sealed French strata. One sherd of salt glazed utilitarian stoneware is probably an intrusive English sherd.

Few "pure" or undisturbed English strata could be identified and only a small ceramic sample was obtained from such contexts. However it is strikingly different and clearly indicates that the English ceramic complex is typologically distinctive.

Operation 7, the excavation of a guardroom built by the French and re-used by the English provides a stratified sample of small size; it is recorded in Table 47. The sod layer produced four sherds of salt glazed stonewares of English types and a single sherd of a tin glazed earthenware on a yellow paste body. This paste type is the same as that on tin glazed earthenware found in sealed French contexts. An English floor level and a possible intermediate or temporary floor level again produced salt glazed stonewares of English types. The French floor level in the structure produced only a single sherd, but that is of a coarse

earthenware of French type. Thus despite a small sample the stratigraphic distribution in this structure is paralleled in identification by ceramic typology.

A similar record of pottery found in operation 1 is included in Table 47. This structure was also built by the French and used by the English; the upper levels of fill and floor deposits produce English stoneware sherds and one of Chinese porcelain; these levels were assumed to represent English strata in the field. Directly on the floor, lot 2A1A7, English pottery was also found. This level had been thought of as possibly French on stratigraphic grounds but in terms of its artifact content appears to have had English debris. The tin glazed earthenware type could indicate some French refuse remnant but it is more likely that the English cleared the structure of French refuse during their occupation, at least to a great extent.

Another English-French stratigraphic comparison can be made in sub-operation 10G (See Table 48). This area was in the location of a structure erected by the English and floor deposits associated with an English hearth were found. Beneath the English hearth was a sealed layer of French refuse. The French ceramic sample is small, consisting of two sherds of white tin glazed earthenware as noted in other French contexts.

The English sample is larger, and includes white salt glazed stoneware and a large quantity of creamware, both of which were not manufactured until well after the English took possession of the site, and hence providing good typological confirmation of the stratigraphic identification. There are also some sherds of olive jar type, an indication that this pottery may have been used by both the French and the English at the site since it is found in both cultural contexts.

Other stratigraphic contexts in the site are somewhat less clear cut in their initial cultural identification. Most of the excavation lots in operation 10 are probably English although a few are definitely French. In the refuse midden fill of the ditch the largest collection of pottery was recovered; unfortunately such a midden deposit is highly susceptible to mixture. These stratified ceramic samples are discussed below.

The best stratigraphic sequence in the ditch fill is in strata Block A, consisting of excavation lots 2A6D5, 6, 7, 8 and 9. These excavation units were in the deepest part of the ditch. The uppermost level, lot 2A6D5, was in loose rubble. Lot 2A6D6, next in the sequence was in compact rubble, in a matrix of stained soil and refuse including mortar fragments and brick chips. Stratigraphically beneath this level is another brown stained midden level, 2A6D7, similar to the one

above but darker in colour. In the field this was assumed to be probably an English level but analysis of the specimens suggests a different identification. The next stratum, lot 2A6D8, lacks the characteristic mortar and brick chip content in the matrix and was a distinctly dark brown to black colour. Absence of wall debris suggested that this horizon in the ditch fill developed during an early occupational period in the history of the fort. Artifact analysis confirmed this preliminary French identification. The deepest stratified unit, 2A6D9, is a continuation of the black midden deposit but is distinguished by the presence of angular rock chips, quarry debris from the ditch construction. The level terminates on the bedrock base of the ditch, including deeper hollows and cracks in the floor.

The distribution of pot sherds and their relative percentile frequency per strata unit is recorded in Table 44. Examination of the data in the table indicates some ceramic differences in these stratified units. Few sherds were found in the upper unconsolidated rubble level which contains both French and English pottery. The sample is unreliable and this level is classed as culturally unidentifiable. Lot 2A6D6 also includes both French and English ceramics, but French

types are in relatively low percentages and English types in high percentage frequency. White salt glazed stoneware (16.7 per cent) and creamware (22.2 per cent) contrast with much lower frequencies of French Coarse Earthenware of the several sub-types of orange paste.

In contrast, lot 2A6D7 contains only 1.3 per cent white salt glazed stoneware and 1.3 per cent creamware in contrast to larger quantities of olive jar and orange paste coarse earthenwares. It is obvious that the contents of 2A6D6 and 2A6D7 contain materials from both occupations, but also that 2A6D7 is predominantly French material and 2A6D6 is predominantly English. Thus these two lots can be assigned "probable" cultural identifications and used in comparative analyses as long as the probable mixture is kept in mind. It is important to use these lots in comparative occupational study because the ditch midden produced such a large proportion of the artifacts from the site.

Beneath 2A6D7 is the black stained midden stratum, 2A6D8. This level lacks English pot sherds and is unquestionably French as is 2A6D9, the lower portion of the same stratum. The lowest level contained a large number of olive jar sherds and one tin glazed

earthenware of yellow paste and bluish-white glaze. The latter is most frequently found in English or probably English contexts in the site (note its high frequency in 2A6D6); this sherd could be intrusive in 2A6D9.

Some notable ceramic trends are revealed by this stratigraphic sequence. Olive jars are present in both occupations but markedly decrease in frequency in the English period. White, pink and orange paste coarse earthenwares are more frequent in French levels and decrease, although midden mixture in this strata block confuses this picture. Other stratigraphic units discussed earlier support the interpretation of the ditch fill with respect to these types. Brown salt glazed utility stoneware, cream coloured salt glazed stoneware, and Rhenish stoneware are all found only in the upper, English, levels. The same cultural association is true of fine white salt glazed stoneware and creamware although some sherds of these late pottery types are found in lower ditch levels. Yellow paste tin glazed earthenware with white coloured glaze is found in both periods while that with bluish-white glaze is probably more frequent in the English occupation. Chinese porcelain is associated with levels identified as English.

Although the ditch midden levels in strata block A exhibit some mixture, the ceramic trends parallel the typological identifications of the pottery types.

Detailed study of the ceramic content of the various excavation lots in strata blocks B and C in the ditch fill, coupled with the stratigraphic data, permit the cultural identification of most of these units. In some cases the field guess as to cultural association was modified. Most of the ditch midden lots were finally identified as probably English, the only French lots being the deeper ones in strata block A, the bottom of the original test excavation (2A6D4) and the bottom level of strata block B (2A6D15.) Other parts of the ditch, upon excavation, were found not to be so deep and to contain a sloping central ridge which supported the bridge pillars. This probably led to the concentration of earlier refuse in the deepest part of the ditch, excavated as strata block A.

In Table 47 the ceramic contents of the entire ditch are summarized. The uppermost level, unconsolidated rubble, includes lots 2A6D1, 5, 10 and 16. The ceramic frequencies of this unit as a total indicate a deposit primarily associated with the English occupation. The next stratum, midden refuse lots individually identified as probably English, includes lots 2A6D2, 3, 6, 11, 12, 13, 14 and 20. Midden levels of probable French origin are 2A6D7, 8 and the bottom fill of the

ditch, levels which can only be French are 2A6D4, 9 and 15. With larger samples of pottery from combining these lots than were available in the single best strata block A, the cultural differences in the ceramic contents of the ditch strata are much more apparent and clear cut than in the strata block alone. The general conclusions outlined in the discussion of strata block A are not changed and hence will not be repeated. The relative percentages of pottery types in the combined ditch sample are probably a better reflection of the popularity of various ceramics at the site.

Another complex area of excavation was the interior of the redoubt, excavated as operation 10. Horizontally it was subdivided into sub-operations based on a grid system. Vertically the sub-operations were excavated in stratified units of the sod or turf level, the underlying rubble zone and the occupational zone beneath the rubble. The occupational zone was further subdivided into arbitrary vertical lots. Thus a larger number of excavation lots were employed in the excavation of operation 10. The pottery sample in each lot is often small. In Table 44 the ceramic contents of the individual lots are recorded. These were used in making the probable cultural identification of each lot. In Table 48 the ceramic contents of various combined excavation lots is presented.

A glance at this table will indicate that on the basis of ceramic content virtually all of the refuse in the interior of the redoubt is of the English period of occupation. Only lots from very deep areas of deposition within the interior, in Occupation zones V to X, could be identified as French on the basis of ceramic content alone. These deeper lots are from portions of the interior where the elevation of bedrock is considerably lower than it is in the main area of the interior. There were occasional pockets of French refuse; note the concentration of French stoneware in occupation zone III. This is largely confined to a single excavation unit which, in other analyses of the site materials, is therefore included as a probable French level. Some mixture of French ceramics in predominantly English levels, in deeper arbitrary levels, occupation zones III and IV is evident, but the amount is not great and individual lots can again be culturally identified for further analysis.

Basically the ceramic distribution indicates that the interior of the redoubt provides the best sample of English materials at the site, with some intrusive French materials and some French levels. Other data of an architectural nature, indicate that the English leveled the interior to an arbitrary elevation as a

preliminary to their construction program. The ceramic data offer some support to that conclusion. The operation 10 data suggests that the relative frequency of olive jar sherds is much higher in deeper levels and in the upper levels its percentage is considerable lower than found in probable English levels in the ditch midden. It seems likely that this pottery type was perhaps not as popular during the English period as the ditch data suggest although it does seem likely that the English made some use of this type.

A few other minor stratified units of excavation at the site which included ceramic samples are recorded in Table 49. These excavations in operations 5C and 3A are in the rubble talus surrounding the exterior walls. Such deposits are almost surely mixed in their content, a conclusion borne out by the pottery samples.

Several other stratified excavation units also produced pottery samples but do not require special tabulation or combination of lots to reconstruct the stratigraphic units. The ceramic contents are thus to be found in Table 44 for the excavation units discussed below.

Excavation units 2A4A1, 2 and 4 form a stratified sequence in that order from top to bottom. Ceramic contents suggest all of these rubble talus levels are mixed.

Located in the rampart fill, lots 2A9J1 and 9J5 are

superimposed, 9J1 being uppermost. Both are French deposits, both on the basis of stratigraphy and ceramic content.

In rubble talus lots 2A6A6 and 6A7 are leach mortar levels beneath exterior wall rubble in lots 6A1 and 6A5. The lower lots appear to be mixed, the upper contain English ceramics.

Operation 11 was a narrow test trench excavated in the glacis beyond the ditch. The superimposed levels of turf (2A11A1) and clay resting on bedrock (2A11A2) both contain French ceramics.

Operation 12 was an excavation in a dry-wall construction presumed to have been of English origin. The three lots containing pottery are superimposed in the following sequence: 2A12A1/2A12A2/2A12A5. All contain French ceramics, but the sample is very small. This does not necessarily demonstrate a French origin for the structure but is suggestive. The historical evidence for English origin may be more significant than the pottery.

Operation 13 was a test of an area presumed to be the locus of the historically recorded French mortar platform. The sequence is 2A13A2/13A3/13A4 and 13A5. Pottery of both French and English origin was collected from these levels; such a mixture could be predicted for such an area of the site and is not surprising.

On the basis of ceramic typology, some distinctive ceramic wares such as creamware can be of great value in confirming the cultural identification of excavation units in the site since some pottery types such as this one could only be of English origin at Castle Hill. However, because of possible intrusion and mixture, typology must be used with some care in cultural identification. Stratigraphy alone is also indicative of the cultural origin of some units within the site. A combination of these data, along with the evidence of pottery popularity or frequency trends in stratified units formed a basis for making a cultural identification of excavation units in the site. Because of a variety of factors the reliability of such identification varies, yet it is necessary in many cases to use some less reliably identified lots for comparative purposes or abandon cultural comparison for want of an adequate sample. Therefore, for the ceramic comparisons and for other analyses of artifacts in the site, comparisons were based on available samples. Those identified as definite French or English are most reliable. Other units were classed as probable French or English. These are reported separately in analyses as a means of controlling the reliability factor. For a maximum sample for cultural comparisons the definite and probable data are combined for a total French and

English sample. It must be borne in mind that this total inevitably includes a small number of culturally mixed materials, but reference to the definite category can help to eliminate this problem. Tabulations also include data from culturally indeterminate lots and a site total.

Table 50 summarizes the pottery recovered from Castle Hill in terms of the cultural identifications outlined above. Table 50 is reported in terms of sherd counts. In addition, Table 51 summarizes the pottery in cultural terms but based on vessel counts rather than sherds. For some purposes the sherd counts are the most useful data, while for other comparative studies the vessel frequencies may prove more useful, hence both are provided.

In utilizing Table 51 it should be kept in mind that this is an estimated vessel count and that many of the "vessels" are represented by only a very few or even a single sherd. Both cross-mended and "grouped" sherds were combined into probable vessel units, thus a single vessel unit may contain sherds from several different provenience lots in the site. In assigning vessels to English or French contexts for Table 51 the most frequent provenience was used for assignment even if use of some other sherd as the indicator would

have changed the cultural assignment of the vessel unit. The vessel unit tabulation in Table 51 thus inevitable contains some probable mixing. Hence the relative frequency of pottery types based on the cultural assignment of vessel units is an approximation. Given the nature of the site it is impossible to completely eliminate the problem of intrusive or mixed specimen proveniences.

On the basis of the site total data it appears that the English utilized more pottery at the site than did the French. Sherd counts indicate a total of 1173 sherds from English contexts and 808 from French levels. In vessel unit terms there were 272 vessels in English contexts and only 150 in French associations. This may be in part due to the nature of the pottery, the English having more delicate thin ware like white salt glazed stoneware of a fragile nature and also using more plates, cups and other service vessels while the French apparently leaned more heavily towards coarse olive jars and bowls.

The French ceramic complex includes the following wares: olive jars, white, pink and orange paste coarse earthenwares, possibly German salt glazed stoneware, French stoneware, tin glazed earthenware with an orange paste, and yellow paste tin glazed earthenware with a white glaze either plain or as a background for decoration. In contrast the English ceramic complex includes

the following pottery types: olive jars, salt glazed stonewares, brown and cream utilitarian types, German salt glazed stoneware, white salt glazed stoneware of fine quality both turned and pressed, miscellaneous stonewares such as Nottingham, etc., creamware, tin glazed earthenware of yellow paste and white glaze, tin glazed earthenware of yellow paste with bluish-white glaze, Chinese porcelain and English porcelain.

The ceramic complexes at Castle Hill can be compared with those from Fort Michilimackinac. Fort Michilimackinac was established about 1715 by the French who turned it over to the British. The latter occupation lasted from about 1761 until 1781 (Maxwell and Binford 1961: 113). The French occupation there is later than that period at Castle Hill but the English occupation encompasses approximately the same time span. The ceramics from Fort Michilimackinac have been described (Miller and Stone 1970).

There appears to be a greater variety of ceramic wares, types and forms at Fort Michilimackinac than at Castle Hill. This is particularly true of the English ceramic complex. The same basic types or wares are found at Castle Hill but fewer variations of decoration and form are present. The French complex at Castle Hill includes some types apparently not present at Fort

Michilimackinac, French stoneware and olive jars, for example. Otherwise there appears to be more variety in faience than at Castle Hill.

An examination of ceramics from the Fortress of Louisbourg in the archaeological laboratory at that site provides the same general impression; relative to Louisbourg, Castle Hill had similar ceramics but in much less variety.

These data may suggest that Castle Hill was somewhat removed from the mainstream of traffic, but it must be remembered that the function of the site was different and this may account for some of the differences.

Looking at the ceramic complexes from a point of view of similarities, in contrast, Castle Hill does offer some parallels with Fort Michilimackinac. In general the French ceramic complex at the site is composed of coarse earthenwares and includes only small quantities of faience and no fine ceramics. In contrast to the French complex the English ceramics at Castle Hill are more varied and contain wares of types which had recently become popular in England, cream coloured earthenware, for example. The English ceramics, although not of outstanding quality, do give an impression of at least being up to date and more

refined than the French materials at the site. Similar differences have been observed in the ceramics associated with the French and English periods at Fort Michilimackinac where they may be due to such factors as the social class of the occupants of the site as well as economic and transportation factors (Miller and Stone 1970: 99).

At Castle Hill the supply factor was similar for both French and English since the colony and its forts could be supplied directly from the sea in connection with the fishery. There was, however, a period from 1709 to 1713 when the French supply line was seriously impaired by an English blockade. It is possible to compare French materials from before and after the blockade in an effort to determine what effect the blockade might have had.

Pre-blockade deposits are those from the rampart fill levels which must have been in place prior to 1697 when construction of the walls reached the cordon level. Ceramics from sub-operation 9E have been used in this analysis. French refuse deposited after the British blockade began is found in the ditch fill; French strata from sub-operation 6D meet this requirement. The ditch was still incomplete in 1709, the year the blockade began, and it may therefore be presumed that refuse in this feature

was from the blockade period. Pipe stems from 9E produce a bore diameter date of 1698 (Table 75) while those from French levels in the ditch produce dates ranging from 1707 to 1721 (Table 73). These dates correspond reasonably well with the historical interpretation of these excavation units.

Although the same basic ceramic types are present in both pre- and post-blockade French deposits, there are some differences in relative frequencies which may be of significance. The basic ceramic data are recorded in Tables 45 and 47. Some grouping of the data in those tables clarifies the ceramic trends in relative percentages as summarized for convenience below:

	Olive Jars	Coarse Earthenware	Tin-glazed Earthenware	French Stoneware	Intrusives
Post-blockade	66.0	27.2	4.8	-	1.8
Pre-blockade	9.8	71.8	16.2	1.5	0.4

It appears from these data that there was a decrease in the relative percentage of coarse earthenware, tin-glazed earthenware and French stoneware while the relative proportion of olive jars increased during the blockade period. It is possible that the English blockade did affect the relative frequency of French pottery types.

It is difficult to devise a test of this hypothesis without excavation data from a better sample of the post-blockade period than that afforded by the ditch fill.

It can be shown that ceramic frequencies from other rampart fill deposits of pre-blockade date are similar to those found in 9E (see Table 46).

Although the blockade is here postulated as a possible cause of these ceramic shifts, other alternatives could be suggested. The differences could be temporal ones, or some unknown factor of a difference in the types of pottery in use early and late in the French period at the site might account for the shift and be unrelated to the blockade. Excavations in the town of Placentia have never been conducted and might be expected to provide some comparative data.

Another method of checking on the validity of this hypothesis is to examine other artifact categories. A similar analysis of pre- and post-blockade distributions of bottle sherd types and pipe bowl forms also reveals differences in the relative frequencies of such artifacts in a comparison of sub-operations 9E and 6D (see, for example, Tables 90 and 91). Bottle types 1, 7, 9, 14 and 18 are present in pre-blockade French contexts while types 5, 9, 15, 16, 17, 19 and 20 are present in post-blockade deposits. Pipe bowl types which decrease in relative percentage after the blockade are types 1, 4, 5, 6, 8, 9, 31, 34, 37 and 38 while types 3, 10, 14, 18, 23, 24, 26, 28, 32 and 35 increase. These changes in bottle and pipe forms are more easily interpreted as

chronological changes in form rather than as the result of supply problems or pressures created by the blockade. The differences in ceramics before and after the blockade involve changes in relative frequency rather than replacement of forms as is the case with bottles and pipes. Ceramic changes therefore may reflect differential availability of pottery types, and this could be partly due to the blockade.

Without additional data it is difficult to further evaluate the hypothesis that the English blockade may have affected French material culture, particularly ceramics, at the site. There is much less question about the influence of the blockade on the French food supply and diet as will be shown in the analysis of faunal remains.

