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EXCAVATIONS AT CASTLE HILL

by

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## CLAY PIPES

Fragments of white clay pipes were abundant at Castle Hill and a total of 2793 specimens was recovered in the excavations. One of these was a complete pipe and only 29 others were complete or nearly complete bowls. Thus there is a very small sample of specimens sufficiently whole for accurate typological identification on the basis of bowl form.

There are, however, a larger number of bowl fragments which are sufficiently well preserved to permit a classification which is at least suggestive of the range of variation of pipes used by the French and English at Castle Hill. In some cases these fragments have attributes which permit their tentative grouping in the same class with more complete bowl specimens. Such specimens are described and tabulated separately but with the appropriate bowl type. In other cases the fragmentary examples have attributes which are not

duplicated on other specimens, and these have been described as "types". Such descriptive classes are not types in the sense of Oswald's (1961) classification system, but they are useful in the analysis of the specimens from Castle Hill.

A number of the pipe forms are associated with the French occupation at Castle Hill while a smaller number are found exclusively in the British occupation. Several of the types are found in both periods at the site.

Several specimens bear decorations on the bowls, stems or heels. Some have makers marks, names or initials, few of which can be identified. These specimens are described in separate sections. Plain stem fragments are the most numerous and are tabulated in Table 58.

The chronological association of the various types is discussed and summarized in various tables and graphs. Table 64 is a total summary of pipe bore diameter data useful for comparison with the stratigraphic identification of various excavation units within the site. Pipe bore diameter data may also be used for dating purposes by employing the Harrington (1954) and Binford (1962) systems.

Figures 95-101 illustrate the various types and decorations.

Pipe Bowls: Descriptive Types

## Type 1

This type consists of pipes which lack heels or spurs (Fig. 95a). The specimens are vaguely similar to Oswald type 9C (1955) but are not identical. In these Castle Hill specimens the bowl rim is not parallel to the stem axis, and the juncture of base of the front with the bottom of the bowl is angular rather than curved. This type more closely resembles Noel Hume's types 9 (1963: Fig. 105) or 18 (1970: Figs. 97,18).

All examples are white except one which is a mottled grey colour, especially on the stem and the base of the bowl. Two examples are smoothed but with a dull plastery finish while the remainder are smoothed and polished. The polished surfaces are irregular and vertical striations or burnishing marks can be observed both on the bowl and along the stems.

The front of the bowl is slightly outcurved and the front and base have an angular juncture. The lower portion of the back of the bowl is slightly convex while the upper portion is straighter and nearly parallel with the curvature of the front. From the side the bowl appears slightly narrower at the rim.

The mouth is round. The bowl/stem angle is 120 degrees. The top of the bowl is at a slight angle to the stem axis. The top of the bowl lip is flat. Some small lip facets, some traces of excess clay around the inside of the bowl are present.

Rouletting around the back half of the bowl below the lip is present on two of the complete specimens and absent on the other two. No other marks or decorations are present.

The only example of a complete pipe from the site is of this type (Fig. 95a). The specimen has a straight stem which terminates in a tapered secondary mouthpiece of type M2, having been whittled on the remaining portion of a once longer stem.

The four complete examples of this bowl form are all from French contexts in the Castle Hill stratigraphy.

Complete Pipe:

Provenience:	2A9E2
Dimensions (in mm.):	
Total length:	98.0
Stem length:	57.0
Bowl height:	42.0
Bowl diameter:	16.0 (int.)
Bowl diameter:	20.0 (ext.,top)
Bowl diameter:	19.0 x 20.0 (ext.)

Bowl thickness:	3.0
Stem diameter:	11.0
Bit diameter:	7.0
Bore diameter:	7/64 in.

Complete Bowls:

Provenience:	2A9E11	2A9E11	2A9F6
Dimensions (in mm.):			
Stem length:	47.0		
Bowl height:	40.0	41.0	38.0
Bowl diameter, int.:	16.0	16.0	16.0
Bowl diameter, ext., top:	22.0	22.0	22.0
Bowl diameter, ext.:	22.0	21.0x22.0	20.0x22.0
Bowl thickness:	2.0	3.0	3.0
Bore diameter:	6/64 in.	6/64 in.	9/64 in.

In addition to the four complete specimens described above, there are a large number of pipe bowl and bowl/stem fragments which probably belong to this type. They lack the top portion of the bowl and are included in this category on the basis of a significant trait of this type; the angular juncture between the front and bottom of the heel-less bowl. Specimens placed in this category all have the angular juncture despite being incomplete. One bowl fragment in this group exhibits rouletting at the back of the bowl. Three exhibit the flat lip trait. All

others listed below are indeterminate for these two traits. One example has a tapered mouthpiece of type M2.

Fragments:

Provenience	Bore diametre (in in.)	Remarks
2A2C4	-	Bowl fragment
2A5B1	6/64	"
2A9B2	-	"
2A9E2	7/64	"
2A9E11	-	"
2A9E15	-	"
2A9E15	7/64	"
2A9E15	8/64	"
2A9K14	-	"
2A2A11	5/64	Bowl/stem fragment
2A2B7	7/64	"
2A6D8	7/64	"
2A9E2	6/64	"
2A9E7	6/64	"
2A9E11	6/64	"
2A9E11	6/64	"
2A9F8	6/64	"
2A9G16	7/64	"
2A9J5	7/64	" . Bowl rouletted.
2A9J5	7/64	" . Stem 39.0 mm. long, 10.0 mm. diametre, mouthpiece 8.0 mm. diametre, tapered.



Only one specimen of this group is associated with a context which is probably English. One is from a culturally indeterminate context and all other examples are from French strata. The type therefore appears to be strongly associated with the French occupation at Castle Hill. The Harrington dating of the bore diameters would place this type in a time span of 1650-1710, while a mean date in the Binford system is 1679.

#### Type 2

This type is represented by a single specimen of a heel-less pipe similar in its general form to type 1 (Fig. 95b). It has the angular juncture between front and base of the bowl. It differs from type 1 in having a more pronounced inward curve at the lip. The lip is also tapered or rounded instead of flat. The mouth was probably rounded; the single example is split in half. The bowl/stem angle is 130 degrees.

The specimen is of white clay, smoothed and polished. It is rouletted at the back of the bowl below the lip. There is an incuse makers mark in the centre of the back of the bowl (Fig. 100k). The specimen is split in half, the left side being absent. The remaining initial is a T; probably the last initial since it is the right half of a presumed pair. Only the angled

foot of the left letter is present but it could be the lower right leg of an R or a K, perhaps an A or an X. There is no way of accurately identifying the initial but it could be, for example, RT or Robert Tippet.

The specimen is from a mixed level.

Part Bowl/Stem Fragment:

Provenience:	2A5B1
Dimensions (in mm.):	
Bowl height:	40.0
Bowl diameter:	16.0 (int.)
Bowl diameter:	21.0 (ext., top)
Bowl diameter:	23.0 (maximum)
Bore diameter:	6/64 in.

Type 3

There are no complete examples of this type of heel-less pipe (Fig. 95c) which appears to be similar in form to types 1 and 2 described above. The top of the bowl is indeterminate but the base is distinctive; it is rounded rather than angular at the juncture of the front and bottom of the bowl. It is similar in this respect to Oswald 9c and Noel Hume type 13 (Oswald 1961) (Noel Hume 1963: Fig. 105).

The clay is white and smoothed; some specimens are polished. The bowl/stem angle in the one determinate specimen is 120-130 degrees. The type is best illustrated by a single specimen which has a complete stem with secondary mouthpiece of type M3 which has a notched bit.

Part Bowl/Complete Stem:

Provenience:	2A6D7
Dimensions (in mm.):	
Total length:	76.0
Stem length:	44.0
Bowl height:	-
Bowl diameter, int.:	15.0+
Bowl diameter, ext.:	-
Stem diameter:	12.0
Mouthpiece diameter:	8.0
Bore diameter:	5/64 in.

Several part bowl/stem fragments probably belong to this same type on the basis of the curvature of the base of the bowl. Many specimens of this type appear to have broken close to this point and classification is difficult. The type is found in both French and English contexts at Castle Hill and may have been more frequent during the British period on the basis of relative percentage seriation (Table 55), but the difficulty in reliable classification of the fragments of this type must be kept in

mind. Two examples have decorated stems of type 2. This design includes the probably Dutch pendant triangle motif.

Part Bowl/Stem Fragments:

Provenience	Bore diameter (in in.)	Remarks*
2A3A1	6/64	Possibly of this type.
2A6D6	5/64	Definite type.
2A6D7	5/64	Definite type. Decorated stem.
2A6D7	5/64	Definite type. Decorated stem.
2A6D7	5/64	Definite type.
2A9E2	6/64	Possibly of this type.
2A10C6	6/64	Probably of this type.
2A10D14	5/64	Probably of this type.
2A10E12	5/64	Definite type.

\*Probably and possibly under remarks above indicate questionable fragmentary specimens.

Assuming that all specimens tabulated above belong to a single type, the mean bore date for the group is 1729 and the Harrington period is 1710-50. This would be in agreement with the seriation (Table 55) suggestion that the type may have increased in relative frequency

during the English period at Castle Hill. However, in absolute numbers, more specimens are from French or probably French contexts.

#### Type 4

This type is represented by one complete bowl (Fig. 95d) and three fragments; all share a distinctive decoration on the sides of the bowl. The form is most similar to Oswald type 6c (1961). The type is from French contexts at Castle Hill.

The pipe is constricted at the bowl/stem juncture and the bowl flares outward from this point to reach a maximum diameter about one-third of the distance up the bowl. From that point to the lip the front and back of the bowl are parallel with slight inward pinching at the lip. The bowl/stem angle is 125 degrees. The top of the bowl is at an angle to the stem axis. The lip is rounded or domed and its exterior is slightly beveled inward.

There is a small low heel, oval in outline, at the base of the bowl/stem juncture point. The front of the bowl curves outward projecting forward of the heel.

The specimens are white clay, well smoothed but with a dull plastery finish. There are no makers marks. A large moulded design (Fig. 95d) consisting of a face

surrounded by sun rays is found on both right and left sides of the bowl.

Complete Bowl:

Provenience:	2A9E11
Dimensions (in mm.):	
Bowl height:	38.0
Bowl diametre, int.:	17.0
Bowl diametre, ext., top:	20.0-21.0
Bowl diametre, maximum:	22.0
Bowl thickness:	3.0
Bore diametre:	5/64 in.

In addition to the complete bowl described above there are three fragments which belong to this type. Two are large enough to determine that the general bowl shape and heel form are the same as the complete specimen; they lack the tops of the bowl. The third example is a small fragment of the bowl wall which bears the distinctive sun-face design.

Bowl Fragments:

Provenience:	Bore Diametre
	( in in.)
2A5C2	5/64
2A9K14	5/64
2A9E2	-

Bore diametres suggest a date span of 1710-50, partly consistent with the French association at Castle

Hill. The sample is too small for a mean bore diameter date to be reliable, but it is 1740. The mean date is too "late" for the known pre-1713 association of the type.

#### Type 5

These small pipe bowls are similar in general form to the ones described as type 4 above, but are much smaller in size (Fig. 95e). They are most similar to Oswald (1961) type 6c and are associated with French contexts at Castle Hill.

The pipes are white, except for one grey mottled specimen, and are smoothed and well polished. At the base of the bowl there is a round heel of well defined projection; makers symbols are found on the base of the heel (Fig. 101).

The bowl is constricted at the juncture with the stem and projects forward of the heel, then curves upward. The back is convex; the largest diameter is one-third of the distance up from the bottom of the bowl and from that point to the lip the sides of the bowl are parallel on front and back. The bowl/stem angle is 130 degrees, and the top of the bowl is at an angle to the stem axis. The lips are rounded or domed and have very delicate rouletting at the lip perimeter.

None of the specimens is a complete bowl although two are nearly complete. Bowl height is ca. 28.0 mm.-32.0 mm., exterior bowl diameters are 16.0 mm.-17.0 mm. at the top. The heels are 2.0 mm.-4.0 mm. long and 5.0 mm.-7.0 mm. in diameter.

In addition to the moulded mark on the base (bottom) of the heel, one specimen has a moulded pattern of dots and lines on the sides near the base of the bowl (Fig. 95e), a Dutch design (Walker, Pers. Comm.).

Bowl Fragments:

Provenience	Bore Diameter (in in.)	Remarks
2A6D7	5/64	Nearly complete. Longest bowl
2A9E2	5/64	Nearly complete.
2A9E11	5/64	Fragment. Moulded design on bowl.
2A9E15	5/64	Fragment.
2A9E18	4/64	Fragment.
2A9J5	5/64	Nearly complete.
2A10F34	4/64	Fragment.

In addition to the bowl fragments tabulated above, three part bowl/stem fragments may also be placed in this category on the basis of the size and shape of the heel and the presence of the raised moulded design on the base



of the heel. No portion of the bowl other than the heel remains on these fragments. One specimen is a complete stem with a secondary mouthpiece of the tapered type (Type M2) and a rouletted stem decoration of type Design 7 (Fig. 99d). The stem is of small diameter. The identity of the mark on the bottom of the heel is good evidence that this stem was probably associated with the bowl form described and makes possible a more complete reconstruction of this type of pipe.

Part Bowl/Stem Fragments:

Prov.	Bore Diameter (in in.)	Heel Length	Heel Diameter	Remarks
2A4A4	5/64	1.0	6.0	
2A6D7	6/64	2.0	6.0	
2A9E2	4/64	2.0	6.0	Rouletted stem.

The Harrington date span is 1710-50 and the Binford mean date is 1748. The general period is consistent with the French association of the type, but the mean date is not. However, the mean dates for decorated stems are generally "late" possibly because they may be pipes of Dutch origin.

Type 6

Pipe bowls of this type (Fig. 95f) are similar in general characteristics to those described as type 5 but

they differ in the form of the heel. The heels are irregular, smaller, rounded and lack the marking on the base which is a consistent trait in type 5. One example has a plain, irregular, somewhat flattened heel; one has a small diameter heel with two raised dots on one side, and the third has a rounded heel with three raised dots on one side. The latter specimen also has a pattern of raised dots on each side of the bowl at the base, the pattern consisting of six dots encircling a central dot, a Dutch design (Walter, Pers. Comm.). This bowl is slightly larger than the others. The bowl/stem angle is 130 degrees. Top is at angle to stem axis.

None of the specimens is complete although the decorated bowl is lacking only a small portion near the rim.

Bowl Fragments:

	Bore Diameter	
Provenience	(in in.)	Remarks
2A9E2	5/64	Plain, flat heel similar to type 5 but lacks decoration. 3.0 mm. long heel; 6.0 mm. diam. heel
2A9E11	5/64	Small tapered heel. Two dots on one side. Heel 3.0 mm. long, 5.0 mm. diameter.

2A9E15	5/64	Dimensions (in mm.):
		Bowl length: 28.0
		Bowl diam.: 15.0 (int.)
		Bowl diam.: 17.0 (ext.)
		Heel length: 4.0
		Heel diam.: 6.0
		Moulded design, raised dots on bowl side. Bowl top rouletted, at back below rim.

The frequency of the bore diametres suggests the period 1710-50 in Harrington's system, more consistent with the French association of the type at Castle Hill than the mean bore date of 1740.

#### Type 7

This bowl type (Fig. 95g) is also similar to Oswald's (1961) type 6c but differs from types 5 and 6 described above in that it has a larger mouth and lacks the parallel sides. It does have a small well defined heel. The type is represented by a single example from a French context at Castle Hill.

The specimen is white, smoothed and has a moulded design on each side (Fig. 95g). The design is raised and is in the form of lines and dots; the "Mulberry Tree" pattern (Walker, Pers. Comm.), an English pattern.

The heel is small, slightly tapered and round. The front of the bowl curves upward and away from the heel. The back of the bowl has a slight convex curve. Near the rim the front of the bowl curves inward. The bowl/stem angle is 110 degrees; the top of the bowl is at an angle relative to the stem axis.

Complete Bowl:

Provenience:	2A2C7
Dimensions (in mm.):	
Bowl height:	36.5
Bowl diameter, int.:	13.7
Bowl diameter, ext.:	19.0
Bowl thickness:	2.5
Heel length:	3.0
Heel diameter:	4.1
Stem diameter:	9.2
Bore diameter:	4/64 in.

The small bore diameter would suggest a date later than the French association at Castle Hill. The specimen is from a French floor deposit in the powder magazine.

Type 8

This "type" is not represented by any complete pipe bowls (Fig. 95h). Three bowl fragments and eight bowl/stem fragments have been grouped in this class because

they share a characteristic bowl/heel contour at the front base of the bowl. The heel is well defined at the back where it joins the stem. On the front the heel curves directly into the contour of the bowl. In this trait these specimens stand out as a distinctive group in the collection from Castle Hill. The type has a strong association with the French occupation of the site.

Bowl Fragments:

	Heel length	Heel Diam.
Prov.	( in mm.)	( in mm.)
2A9D3	3.0	5.0
2A9E2	-	5.0 x 8.0
2A9E2	-	5.0 x ?

Part Bowl/Stem Fragments:

	Heel length	Heel Diam.	Bore Diam.	Remarks
Prov.	( in mm.)	( in mm.)	( in in.)	
2A5C13	2.0	8.0 x 9.0	5/64	
2A9B3	3.0	5.0 x 7.0	6/64	Mortar stained
2A9E11	3.0	5.0 x 8.0	6/64	
2A9E11	3.0	6.0 x 8.0	6/64	
2A9E15	3.0	6.0 x 8.0	6/64	
2A9F5	4.0	5.0 x 7.0	8/64	Mortar stained
2A9G10	5.0	5.0	7/64	
2A10B12	1.0	5.0 x 7.0+	4/64	

The bore diametres suggest a date of ca. 1680-1710 in Harrington's system and a mean bore date of 1702, both of which are consistent with the French association of the type at Castle Hill.

#### Type 9

This type is represented by a single pipe bowl (Fig. 95i) from which the front is missing. The back of the bowl is short and convex. The rim is tapered to a thin rounded edge. The specimen has a very large heel which is flared at its base on the front. On the back it slopes giving it a forward thrust appearance when viewed from the side. The bowl/stem angle is about 110 degrees but can only be estimated due to the incomplete nature of the specimen.

The pipe is smooth, has a dull finish, and is slightly brownish in colour.

A small stub of the stem remains and appears to have been carefully tapered by whittling. Too short to have been used as is, the "complete" stem was presumably tapered for insertion into a tube of some sort.

The specimen is from a French context at Castle Hill.

Bowl Fragment:

Provenience:	2A9E15
Dimensions (in mm.):	
Stem length:	11.0
Bit diameter:	7.0
Bowl height:	30.0
Bowl thickness:	4.0
Heel length:	2.0-5.0
Heel diameter:	11.0 x 14.0
Bore diameter:	9/64 in.

## Type 10

This type is also represented by a single fragmentary bowl (Fig. 95j). Like type 9 it probably had a small bulbous bowl. The back of the bowl is convex and constricted near the mouth. The lip has a sharp inner edge and is rounded on the outer side. Fine diagonal striations can be seen over much of the bowl surface. The surface is smoothed and polished, white in colour.

There is a well defined heel at the base of the bowl. It is round and flares out at the base so that it is larger in diameter at the bottom than at the top. The bottom of the heel is flat except for a mould seam groove.

The specimen is from a probably French context at Castle Hill.

Bowl Fragment:

Provenience:	2A6D7
Dimensions (in mm.):	
Bowl height:	30.0
Bowl thickness:	5.0
Heel length:	5.0
Heel diameter:	11.0
Bore diameter:	7/64 in.

Type 11

This type is represented by a single fragment of a bowl (Fig. 95k) and is difficult to classify. It is quite similar to the specimen described as type 10 except that the back of the convex bowl is straight at the top rather than incurved. The heel is round and flared at the bottom. The specimen has a mottled reddish colour both on the surface and in section. The lip is flattened but slightly rounded and has a ridge of excess clay on the interior in one place. It is probably French.

Bowl Fragment:

Provenience:	2A6D7
Dimensions (in mm.):	
Bowl height:	31.0
Bowl thickness:	3.0
Heel length:	4.0



Heel diametre:	? x 11.0
Bore diametre:	6/64 in.

## Type 12

This type consists of one nearly complete bowl (Fig. 951) and one split fragment which is probably of the same form. The complete specimen is white and smoothed but dull finished. The surface is partly chipped away.

The bowl has a constricted base and a slightly concave back. The front projects out from the large heel, curves upward, and is incurved at the top. The top is angled relative to the stem axis and the bowl/stem angle is 115 degrees. The mouth is round. The lip is domed. The heel is slightly tapered but flares at the bottom and is oval in shape. It is from a French context.

Bowl Fragment:

Provenience:	2A7A14
Dimensions (in mm.):	
Bowl height:	36.0
Bowl diametre, int.:	15.0
Bowl diametre, ext.:	21.0
Bowl thickness:	4.0
Heel length:	5.0
Heel diametre:	9.0 x 11.0
Bore diametre:	5/64 in.

A second example is a split bowl fragment, possibly of this type but less than half a bowl and indeterminate as to the complete shape of the heel. In other traits the bowl is similar to the one described above. The specimen is from a probably English context.

Bowl Fragment:

Provenience:	2A6D6
Heel length:	5.0
Heel diameter:	? x 10.0
Bore diameter:	5/64 in.

Type 13

Three examples of this type (Fig. 96a) have been found in the collection. Two are complete while the third is missing the lip at the front of the bowl. The clay is white on the exterior with some grey mottled spots; the cross-section is dark grey. The surface is smoothed and highly polished.

The specimens have elongated bowls and large heels. The bowl/stem angle is 130 degrees and the top of the bowl is at an angle to the stem axis. The back of the bowl is convex and the front curves markedly at the lip. The mouth is round. One example is slightly larger in diameter than the other two. The lip is domed and is encircled by a rouletted line below and parallel

to the lip. The large oval heel has a polished flat bottom and is flared at the base.

Complete Bowl/Stem Fragment:

Provenience:	2A6A6	2A4A1	2A9G3
Dimensions (in mm.):			
Bowl height:	38.0	42.0	38.0
Bowl diameter, int.:	15.0	18.0	14.0
Bowl diameter, ext.:	22.8	23.0	20.0
Bowl thickness:	2.5	2.5	3.0
Heel length:	5.5	5.5	4.5
Heel diameter:	9.0x10.0	11.0	9.0x12.0
Bore diameter:	6/64 in.	6/64 in.	7/64 in.

In addition to the above specimens three part bowl/stem fragments may also belong to this type. The tops are missing but in heel form, surface finish and shape of the lower bowl they appear to be of the same type.

Part Bowl/Stem Fragment:

Provenience:	2A3A6	2A6D-	2A9K14
Dimensions (in mm.):			
Heel length:	4.0	5.0	4.0
Heel diameter:	10.0x13.0	10.0x11.0	12.0
Bore diameter:	6/64 in.	6/64 in.	6/64 in.

Three specimens are from indeterminate contexts, two are from French levels and one is from a probably English lot. The frequency of bore diameters suggests a

Harrington date span of ca. 1680-1710 and the mean bore date is 1698.

#### Type 14

Three incomplete fragments (Fig. 96b) have been grouped together in this type; the front of the bowl is missing in all examples and cannot be described. The back of the bowl is distinctive in having a pronounced convex bulge in the middle and a slight constriction below the slightly flared rim. The heel at the base of the bowl is large, oval and flared at the bottom. The lip is chipped on two specimens; flat on the third. Two examples are white, one mottled grey and tan, and all are smoothed and polished. The bowl/stem angle is 130 degrees. The tops of the bowls were probably at an angle to the stem axis but are incomplete.

#### Bowl Fragments:

Provenience:	2A6D6	2A6D7	2A6D10
Dimensions (in mm.):			
Bowl height:	34.0	32.0	30.0
Heel length:	4.0	5.0	4.0
Heel diameter:	9.0x12.0	9.0x11.0	9.0x11.0
Bore diameter:	6/64 in.	7/64 in.	5/64 in.

One specimen is from a probable French level and two from probably English contexts. The mean bore date is 1702.

#### Type 15

This type is represented by a single incomplete fragment (Fig. 96c). The specimen is white, smoothed and well polished. The back half of the bowl and its large heel are intact.

The bowl is large and has a bowl/stem angle of 130 degrees. The top is angled relative to the stem axis. The bowl was round and has a convex back which is slightly pinched in toward the lip. The lip is rounded with irregular beveled tapering on both interior and exterior.

The large heel is longer at the front than at the back and is flared at the bottom; it is nearly round.

#### Bowl/Stem Fragment:

Provenience:	2A6E7
Dimensions (in mm.):	
Bowl height:	38.0
Bowl diameter, int.:	16.0
Bowl diameter, ext.:	22.0
Bowl diameter, maximum:	22.8
Heel length:	2.0-6.0
Heel diameter:	9.0x10.0
Bore diameter:	7/64 in.

The specimen is from an indeterminate context at Castle Hill.

#### Type 16

The rim and most of the front of this single fragmentary specimen is missing (Fig. 96d). It is white with brown staining and a smoothed plastery but not polished surface. The back of the bowl is slightly convex and the bowl was large. The heel is large, oval and flared at the bottom. There is a single raised dot on the right side of the heel. The front of the heel is longer than the back.

#### Bowl Fragment:

Provenience:	2A10E23-2A10E24 crossmend
Dimensions (in mm.):	
Heel length:	3.0-6.0
Heel diametre:	9.0x11.0
Bore diametre:	9/64 in.

The specimen is from an English context.

#### Type 17

Two incomplete specimens have been grouped in this type (Figs. 96e;100p). The bowl shapes varied slightly but are generally similar; both specimens share the trait of the same makers mark on the heel.

One specimen from 2A6D12 has a grey mottled colour; the other is white. Both are smoothed and polished.

The specimen from 2A6D12 has a nearly straight back, 30.0 mm. long, which terminates in a flat lip. The top of the bowl is indeterminate but may have been at an angle to the stem axis. The bowl/stem angle is 120 degrees in both specimens. The specimen from 2A4A1 has a slightly concave back but is incomplete. It may have been slightly more tubular and forward projecting than the other specimen.

The heels are small and round. The example from lot 2A4A2 has a raised letter W on the left and P on the right. The one from 2A6D12 has a raised W on the left; the right side of the heel is split but the specimen may belong to the same category.

Bowl Fragments:

Provenience:	2A4A2	2A6D12
Dimensions (in mm.):		
Heel length:	2.0	5.0
Heel diameter:	8.0x9.0	8.0
Bore diameter:	5/64 in.	4/64 in.

One is from a mixed level while the other is from a probable English lot.

## Type 18

Three bowl fragments, missing the tops, have been grouped together in this descriptive type (Fig. 96f). Two specimens are white and one is cream coloured. All are smoothed but have a dull finish.

The remnant bowl contour suggests that the bowls were flaring and had the largest diameter at or near the mouth. All have flat lip traces remaining; the cream coloured specimen (2A6D6) is beveled on the lip interior. The top of the bowl was probably at an angle to the stem axis; the bowl/stem angle is approximately 130 degrees.

The specimens have medium sized heels, flat bottomed, oval and flared at the base.

Bowl Fragments:

Provenience:	2A6A5	2A6D6	2A6D7
Dimensions (in mm.):			
Bowl height:	37.0	34.0	34.0
Bowl thickness:	3.0	3.0	4.0
Heel length:	4.0	4.0	5.0
Heel diameter:	6.0x8.0	7.0x9.0	7.0x9.0
Bore diameter:	5/64 in.	6/64 in.	5/64 in.

These specimens are from both French and English contexts at Castle Hill.



## Type 19

This type consists of a single fragmentary bowl (Fig. 96g). It is grey both on the surface and in section; its surface is smoothed and slightly polished.

The bowl was apparently small, but only the back remains. The back is convex.

The specimen was separated as a descriptive type because the heel differs from others. It is relatively long, and is a narrow oval, with a mold seam on front and back. It is longer in front than at the back and has a flaring base.

Makers initials are located on the sides of the heel, but both letters are partly chipped away. The one on the left could be a T and the one on the right could be a front bar of a D; however, a precise identification is not possible.

Bowl Fragment:

Provenience:	2A6D12
Dimensions (in mm.):	
Heel length:	2.0-5.0
Heel diameter:	5.0x10.0
Bore diameter:	5/64 in.

The specimen is from a probably English context.

## Type 20

Three small bowl base fragments have been grouped together in this descriptive type because the long narrow heel differs from others in the collection (Fig. 96h).

The heel is long, well defined, oval in section and has a mold seam on the front, bottom and back. It is smaller in diameter in relation to its length than other examples. Heel diameter is larger than the diameter of spurs.

Bowl Fragment:

Provenience:	2A10D20	2A6D11	2A6D11
Dimensions (in mm.):			
Heel length:	6.0	4.5	4.5
Heel diameter:	5.0x6.0	5.0x8.0	5.0x6.0
Bore diameter:	4/64 in.	4/64 in.	5/64 in.

All three examples are from probable English contexts.

## Type 21

This type consists of a single complete bowl (Fig. 96i). The specimen is white, smoothed and polished.

The pipe has a large bowl with a pronounced forward bulge on the front similar to Oswald (1961) type 11b.

The back is straight and the top of the bowl is parallel to the axis of the stem. The bowl/stem angle is 120 degrees. The most distinctive feature is the bulging bowl front; it curves inward in the upper one-third of the bowl giving it a distinctive profile. The large heel is flared at the bottom.

Complete Bowl:

Provenience:	2A2C4
Dimensions (in mm.):	
Bowl height:	45.0
Bowl diameter, int.:	17.0
Bowl diameter, ext.:	23.0
Bowl diameter, maximum:	26.0
Bowl thickness:	2.0
Heel length:	5.5
Heel diameter:	8.5x11.0
Bore diameter:	6/64 in.

The specimen is from a French context at Castle Hill.

Type 22

One complete pipe bowl and one fragment are grouped in this type category (Fig. 96j). There is a similarity to Oswald (1961) type 9a. The specimens are white, smoothed and polished.

The most complete example has a slightly convex back. The front curves inward at the top. The bowl is nearly tubular but front and back are not parallel. The bowl top is parallel to the stem axis and the bowl/stem angle is 115 degrees. The specimen has a flaring heel.

Bowl/Stem:

Provenience:	2A10A10
Dimensions (in mm.):	
Bowl height:	43.0
Bowl diameter, int.:	15.0
Bowl diameter, ext.:	20.0
Bowl diameter, maximum:	20.0
Bowl thickness:	2.2
Heel length:	5.5
Heel diameter:	8.0x10.0
Bore diameter:	5/64 in.

The fragmentary example has a slightly convex back, although it is nearly straight. There is a mold seam on the back and a trace of roulette decoration on the back below the lip. The bowl/stem angle is 120 degrees. The front curves outward but is too incomplete to determine its contour. The lip is thinned by beveling and has a narrow flat top. The specimen has a large heel which flares at the bottom. The heel has a raised dot on the right side.

Bowl/Stem Fragment:

Provenience:	2A11A1
Dimensions (in mm.):	
Bowl height:	40.0
Bowl thickness:	3.0
Heel length:	3.0-5.0
Heel diameter:	9.0x10.0
Bore diameter:	7/64 in.

The specimens are from an indeterminate and a French context at Castle Hill.

## Type 23

The specimens grouped in this type (Fig. 97a) are pipes with long tubular bowls and short large heels; they are similar to Oswald type 9B. They are white, smoothed, polished to slightly polished. The bowl tops are parallel to the stem axis and the bowl/stem angle is 120 degrees.

The back of the bowl is straight to very slightly concave and the front is curved; front and back are nearly parallel when viewed in profile. In one example the front of the bowl rises slightly above the plane parallel to the stem axis.

The lips are flat. The bowl mouth is round. The large heels are relatively short and are straight sided

or taper toward the bottom; flaring of the heel base is faint or absent. This is a trait of assistance in identifying incomplete specimens which may belong to this type.

Two of the complete examples bear makers initials on the sides of the heel; an H on the left and an S on the right. The HS initials serve to identify some fragments as probably also belonging to this type.

Complete Bowls:

Provenience:	2A6D6	2A6D6	2A6D6	2A6D6	2A6D7
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Dimensions(in mm.):

Bowl diam.,int.:	35.0	39.0	38.0	37.0	39.0
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Bowl diam.,ext.:	15.0	15.0	15.0	16.0	14.0
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Bowl diam.,max.:	19.0	20.0	20.0	20.0	18.0
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Bowl thickness:	3.0	3.0	2.0	2.0	2.0
-----------------	-----	-----	-----	-----	-----

Heel length:	5.0	4.0	3.0	3.0	3.0
--------------	-----	-----	-----	-----	-----

Heel diametre:	8x9.0	8x9.0	8x9.0	8.0	8.0
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Bore diam.(inin.):	6/64	7/64	6/64	5/64	4/64
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Remarks:				HS	HS
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Provenience:	2A6D7	2A6D7
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Bowl diam.,int.:	38.0	42.0
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Bowl diam.,ext.:	16.0	16.0
------------------	------	------

Bowl diam.,max.:	21.0	22.0
------------------	------	------

Bowl thickness:	3.0	3.0
-----------------	-----	-----

Heel length:	2.5	3.0
--------------	-----	-----

Heel diametre:	8x9.0	7x10.0
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Bore diametre:	5/64	6/64
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(in in.)

Five part bowl/stem fragments have been included in this group on the basis of the shape of the heel and the presence of the HS letters on the heel. These examples lack any trace of the bowl above the heel.

Part Bowl/Stem Fragments:

Provenience:	2A6A9	2A6D4	2A6D7	2A6D7	2A6D9
Dimensions(in mm.):					
Heel length:	2.0	3.0	2.0	3.0	3.0
Heel diametre:	7x9.0	8.0	8.0	7x9.0	7x9.0
Bore diam.(in in.):	6/64	5/64	4/64	-	5/64
Remarks:	HS	HS	HS	HS (?)	HS

These specimens are found in both probably French and probably English contexts at Castle Hill; four are English and the remaining eight are French. The relative percentage frequency is slightly higher in the English association than in the French despite the larger number of specimens from French contexts.

The bore diametre date span would be circa 1680-1750, consistent with the association described above. The mean bore date is 1727.

Other possible examples of this type are listed as type 24 and as type 35 below.

Type 24

This descriptive category of specimens (Fig. 97b) consists of a series of incomplete pipe bowl fragments

which may belong to type 23 described immediately above. They are missing the tops of the bowls and hence lack significant characteristics for accurate classification. On the basis of surface finish, bowl contour or profile and heel size and shape they are similar to type 23. They have been tabulated as a separate type to avoid possible confusion.

Bowl Fragments:

Provenience	Bore Diametre (/64 in.)	Heel Length (in mm)	Heel Diametre (in mm)	Remarks
2A5A1	3/64	3.0	5.0	
2A7A3	6/64	-	-	Bowl height: 47.0 Bowl diametre,int: 18.0 Bowl diametre,ext: 22.0
2A6D4	5/64	2.0	9.0	
2A6D6	-	-	-	Right side only; split.
2A6D6	5/64	4.0	9.0	
2A6D6	5/64	3.0	8x10.0	
2A6D7	6/64	5.0	7x9.0	
2A6D7	5/64	3.0	8.0	
2A6D13	5/64	2.0	9.0	Stem length: 50.0 Mouthpiece type Squared off and tooth marked.



2A11A1	6/64	4.0	8x10.0	Clay folded up on right side of heel.
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These specimens are from one indeterminate, five English and four French contexts within the site. The mean bore date for the group is 1736.

#### Type 25

A single complete bowl represents this type (Fig. 97c). The specimen is white, smoothed and highly polished.

The top of the bowl is parallel to the stem axis and the bowl/stem angle is 120 degrees. The back of the bowl is slightly convex while the curved front parallels the profile of the back to form a tubular pipe. The mouth is round and the lip is flat. The specimen is similar to type 23 but differs in the slightly convex back and in the small diameter of the heel.

#### Complete Bowl:

Provenience:	2A6D6
Dimensions (in mm.):	
Bowl height:	37.0
Bowl diameter, int.:	16.0
Bowl diameter, ext.:	21.0
Heel length:	3.0
Heel diameter:	6.0
Bore diameter:	5/64 in.

The specimen is from a probable English context.

#### Type 26

This type is represented on one example with a bowl (Fig. 97d) complete enough for description and three fragments included on the basis of their distinctive spurs as probable representatives of the type. Several stem fragments probably also belong to this group because they bear the same makers stamp.

The clay is white, smoothed and highly polished. The lower back of the bowl has a pronounced convex bulge. The upper back is slightly concave, giving the back a distinctive contour. The front of the bowl is missing, but the remnant of the lip suggests that the top of the bowl was parallel to the stem axis. The bowl/stem angle is 130 degrees.

At the base of the bowl the pipe has a well made tapering spur. The spur is short and has a flat beveled bottom which slopes up to the back.

On the top of the stem, 20.0 mm. back of the bowl, is an incuse makers stamp, circular in form, with the name Robert Sayer. Similar marks are found on several stem fragments (Fig. 100b).

Part Bowl/Stem:

Provenience:	2A6D7
Dimensions (in mm.):	
Bowl height:	37.0
Bowl diameter, max.:	21.0
Bowl thickness:	2.0
Spur length:	6.0
Spur diameter:	3.0-6.0 tapered
Bore diameter:	6/64 in.

There are also three small bowl fragments which have the same highly polished surface finish and the same short tapered, beveled spurs. They probably represent the same type of pipe but lack the definitive characteristics of the bowl due to their fragmentary nature.

Bowl Fragments:

Provenience:	2A5C13	2A6A9	2A6D7
Dimensions (in mm.):			
Spur length:	6.0	6.0	7.0
Spur diameter:	4.0-6.0	4.0-6.0	3.0-6.0
Bore diameter:	6/64 in.	6/64 in.	6/64 in.

The context of the specimens suggests that type 26 is associated with the French occupation at Castle Hill. Its makers name suggests an English origin. Bore date span would indicate manufacture during the 1680-1710

period, consistent with the cultural association at the site. The mean bore date is 1702.

#### Type 27

This type is represented by a single incomplete specimen; the top of the bowl is missing (Fig. 97e).

The clay is dirty white and the surface is smoothed and slightly polished. The back of the bowl is convex, the front curves upward. The pipe has a short tapered spur.

##### Bowl Fragment:

Provenience:	2A6D6
Dimensions (in mm.):	
Bowl diameter, ext.:	21.0
Bowl thickness:	3.0
Spur length:	5.0
Spur diameter:	2.0-4.0
Bore diameter:	4/64 in.

The specimen is from a probable English context.

#### Type 28

This type is represented by a single fragment of bowl with a spur (Fig. 97f). The colour is greyish white, the surface is smoothed and polished. The back of the bowl is slightly convex and ends in a flat lip. The top of the bowl was probably at an angle to the stem axis but is indeterminant. The bowl/stem angle is 130 degrees.

The bottom of the front is curved. There is a tapered spur at the bottom. The bottom of the spur is slightly rounded. The initials H on the left and R on the right are in raised form (Figs. 6-15).

Bowl Fragment:

Provenience:	2A6D15
Dimensions (in mm.):	
Bowl height:	37.0
Bowl diameter, ext.:	21.0
Spur length:	6.0
Spur diameter:	3.0-5.0
Bore diameter:	4/64 in.

The specimen is from a probable **French** context.

Type 29

This descriptive type is represented by a single pipe fragment, greyish white in colour and smoothed but dull (Fig. 97g).

The back of the bowl is slightly convex but too short to determine the profile; the back does appear to rise more nearly vertical than other spur fragments and may have had a bowl/stem angle of 100 or 110 degrees although this is only a rough estimate. Both front and top of the bowl are missing.

There is a tapered spur at the bottom. Raised

letters are found on the spur; a B on the left hand side. The letter or mark on the right is difficult to read. It may be an I with a central crossbar (Fig. 100n).

Bowl/Stem Fragment:

Provenience:	2A6D6
Dimensions (in mm.):	
Spur length:	10.0
Spur diametre:	2.5-6.0
Bore diametre:	4/64 in.

Like other pipe bowl fragments with spurs, this one is from a probably English context.

Type 30

Several part bowl/stem fragments are grouped in this category for descriptive purposes (Fig. 97h). The fragments are all too small to determine bowl form; they were probably different types. They are grouped here because they retain complete spurs, partial spurs or scars indicative of missing spurs. Since spurs appear to be associated with the English period at Castle Hill it is significant to tabulate such fragmentary specimens as a group.

Part Bowl/Stem Fragments:

(Dimensions in mm. except bore diametre in /64 in.)

Provenience:	2A2A10	2A3B2	2A5A1	2A6D6
Spur length:	8.0	-	-	7.0
Spur diametre:	5.0	5.0	4.0	4.0
Bore diametre:	4/64	4/64	5/64	5/64
Provenience:	2A6D10	2A6D10	2A6D11	2A6D12
Spur length:	8.5	-	-	-
Spur diametre:	5.0	5.0	5.0	4.0
Bore diametre:	4/64	4/64	4/64	5/64
Provenience:	2A6D12	2A6D14	2A10E10	2A10F31
Spur length:	-	-	8.0	9.0
Spur diametre:	6.0	5.0	3.7	5.0
Bore diametre:	5/64	3/64	4/64	4/64

Two specimens in this group are from mixed lots while the remaining 10 are from probable English contexts. The probable bore date span for this group is 1710-1800 and the mean bore date is 1769; both are consistent with the English stratigraphic association of spur fragments.

## Type 31

Two incomplete bowl fragments are described in this type. The clay is white, smoothed and has a dull finish (Fig. 97i). The back of the bowl is missing but the front fragment projects forward of the heel at a bowl/stem angle

estimated at circa 140-150 degrees. Only a trace of the lip is present; it is flat.

In addition to the forward projecting bowl the type is characterized by the diminutive size of the heel. The heel is oval with an indentation at the back giving it an almost heart shaped appearance.

Bowl Fragment:

Provenience: 2A9F8

Dimensions (in mm.):

Heel length: 2.0

Heel diameter: 4.5

Bore diameter: 5/64 in.

A second group of bowl fragments, too small to determine the shape of the bowl, is tabulated here because of the size and shape of the heel.

Bowl/Stem Fragments:

Provenience: 2A9C1 2A9E15 2A9K14 2A11A1

Dimensions (in mm.):

Heel length: 1.0 2.5 1.0 2.0

Heel diameter: 4.0 6.0 5.0 4.0

Bore diameter: 5/64 in. 6/64 in. 5/64 in. -

One type 31 fragment is from an indeterminate context; all others are from French occupational levels at Castle Hill. The bore date span is 1710-50 and the mean bore date is 1731.



## Type 32

This type consists of two bowl fragments with distinctive spurs (Fig. 97j). The bowl form cannot be described.

The spurs are short and rounded on the bottom; one is bent prior to firing. The specimens are not identical, but they are different from the other examples with spurs described above.

Part Bowl/Stem Fragments:

Provenience:	2A6D8	2A6D12
Dimensions (in mm.):		
Spur length:	4.0	7.0
Spur diameter:	4.5	5.2
Bore diameter:	5/64 in.	5/64 in.
Remarks:		Bent

One is probably French, the bent example is probably English.

## Type 33

This type is based on two incomplete bowl fragments with distinctive heels (Fig. 97k). The specimens are off white in colour and smooth but with a dull finish. Both are the lower back and base of pipe bowls. The back is convex but the rest of the bowl form is indeterminate. The bowls were probably of small size.

The heels are very short, the back being only slightly projected from the stem. They are flat, and slightly indented to give them a heart shaped outline.

Bowl Fragments:

Provenience:	2A9J5	2A9J5
Dimensions (in mm.):		
Heel length:	1.0-2.0	1.0-2.0
Heel diametre:	6.0x7.0	6.0x7.0
Bore diametre:	5/64 in.	5/64 in.

The specimens are from a French context.

The pipe fragments described above in types 1-33 are examples which are sufficiently distinctive to be classified as descriptive types. A number of part bowl/stem fragments are also present in the collection. These can be classified on the basis of the shape of the heel. In some cases the heel form may be indicative of one of the previously described examples but most of these specimens are too fragmentary to be accurately classified. They are tabulated below in descriptive types based on heel form. The final category, "type" 38, includes bowl bases which are indeterminate for heel form due to splitting and other breakage. These heel form "types" are included because, with types 1-33, they make up

a total sample of pipe bowls and bowl bases. Such a sample constitutes the pipe fragments representative of the total number of identifiable individual pipes recovered. By comparing these in terms of their associations with the French and English occupations, the relative frequency of different pipe forms during the occupations of Castle Hill can be determined. To obtain a minimum number of pipes count, it is important to include the partially classifiable fragments in such a comparison even though they are indeterminate in some respects.

#### Type 34.

This type consists of bowl fragments and bowl/stem fragments which have large flaring heels (Fig. 971). Several types described above have heels of such form and these fragments could be examples of the following "types": 11, 13, 14, 15, 16, 21 and 22.

	Heel	Heel	Bore
	Length	Diametre	Diametre
Provenience	(in mm)	(in mm)	(in /64 in)
2A sf.	2.0	11.0	-
2A3A1	4.0	9.0x11.0	5/64
2A5C3	4.0	9.0	6/64
2A5C13	6.0	7.0x10.0	5/64
2A6A9	5.0	8.0x10.0	7/64

2A6D6	4.0	9.0x11.0	5/64
2A6D6	4.0	7.0x12.0	6/64
2A6D6	4.0	9.0	5/64
2A6D7	4.0	9.0x12.0	6/64
2A8B1	3.5	8.0x12.0	7/64
2A9E2	6.0	10.0x12.0	-
2A9E11	4.0	11.0	-
2A9E11	3.0	12.0	7/64
2A9E11	4.0	12.0	7/64
2A9E11	6.0	9.0x12.0	-
2A9E11	5.0	10.0x12.0	6/64
2A9E14	4.0	8.0x11.0	-
2A9E15	4.0	8.0x11.0	-
2A9J2	5.0	8.0x9.0	5/64
2A9K14	4.0	11.0	7/64
2A10C7	5.0	9.0x10.0	6/64
2A10D20	4.0	10.0	6/64
2A6D6	3.0	8.0x10.0	6/64

These examples are from both French and English contexts at Castle Hill; seven English, 12 French and the remainder indeterminate. The relative frequency (Table 55) of the category is about the same in each occupation. The mean bore date for the group of specimens is 1702.

## Type 35

This type consists of fragments which have large heels which are relatively short and have straight or tapered sides, lacking the flare at the bottom (Fig. 97m). In these traits they are similar to the heels on pipes of types 23 and 24 described above.

Provenience	Heel Length (in mm)	Heel Diametre (in mm)	Bore Diametre (in /64 in)
2A3A4			
2A4A2	2.0	8.0x10.0	6/64
2A6A4	4.0	10.0	6/64
2A6D6	4.0	9.0x?	6/64
2A6D6	3.0	8.0x11.0	5/64
2A6D7	4.0	7.0x9.0	5/64
2A6D7	3.0	8.0x10.0	6/64
2A6D7	3.0	8.0x?	6/64
2A6D7	3.0	9.0	5/64
2A6D7	4.0	8.0	6/64
2A6D7	3.0	9.0	5/64
2A6E7	3.0	8.0x9.0	5/64
2A10D14	3.0	8.0	5/64
2A10D21	2.0	8.0x10.0	6/64
2A11A1	4.0	8.0x9.0	6/64

Four specimens are from probable English contexts, seven are from probable French levels and the rest indeterminate lots. The mean bore date for the group is 1721.

#### Type 36

This small group of specimens has been tabulated separately because they have tapered to straight sided heels which are somewhat smaller in diametre than those described in type 35 (Fig. 97n). These specimens probably belong in type 35 but could represent a different type of heel.

	Heel	Heel	Bore
	Length	Diametre	Diametre
Provenience	(in mm)	(in mm)	(in /64 in)
2A5A1	2.0	5.0x7.0	5/64
2A5C3	3.0	6.0	4/64
2A6D6	2.0	6.0x7.0	5/64
2A6D6	4.0	7.0	5/64

Two examples are from mixed lots while two are from probable English contexts. The mean bore date is 1750.

#### Type 37

A small group of specimens is tabulated separately because they may be examples of heel-less pipes similar

to types 1, 2 and 3. They are broken off at the base of the bowl just at the critical point necessary to determine whether they were heel-less with absolute certainty. They are possible fragments of this pipe form and like the others have an association with both occupations but most are from French levels.

Provenience	Bore Diametre (in in.)
2A3A4	6/64
2A5C5	6/64
2A6D7	6/64
2A6D12	5/64
2A9E2	6/64
2A9E11	6/64
2A9E11	6/64
2A9E11	6/64
2A9E13	7/64

#### Type 38

These specimens are bowl fragments, part bowl/ stem fragments and other examples which exhibit traces of heels but which are too fragmentary for further classification.

Provenience	Bore Diametre (in in.)
2A---	6/64
2A1A7	6/64
2A2A10	4/64
2A2A11	7/64
2A2A12	7/64
2A2C7	5/64
2A3A1	6/64
2A5A1	5/64
2A5A1	7/64
2A5C13	5/64
2A6A1	-
2A6A9	5/64
2A6A9	5/64
2A6D6	-
2A6D6	5/64
2A6D6	4/64
2A6D6	5/64
2A6D6	5/64
2A6D6	6/64
2A6D7	5/64
2A6D7	5/64
2A6D7	5/64
2A6D11	5/64
2A6D-	-



2A6E7	5/64
2A9A2	7/64
2A9A2	9/64
2A9B2	6/64
2A9Ds f	-
2A9E2	7/64
2A9E2	6/64
2A9E2	6/64
2A9E2	7/64
2A9E7	6/64
2A9E13	7/64
2A9E15	6/64
2A9E15	7/64
2A9F3	6/64
2A9K9	6/64
2A10A9	5/64
2A10B11	4/64
2A10B21	5/64
2A10B23	5/64
2A10B25	6/64
2A10F23	5/64
2A10H12	4/64
2A11A1	6/64
2A11A1	5/64
2A11A1	5/64
2A13A3	6/64

In order to compare the distribution of pipe bowl forms in the French and English periods at Castle Hill it is necessary to include in the comparative samples all available specimens; otherwise the sample is too small for meaningful results. Even at best there are few complete pipes. Two kinds of lumping have been used to obtain a sample of maximum size.

The first kind of lumping involves combining specimens from lots into two groups classified as either French or English. There are so few specimens from definite English lots that to represent that occupation at all means reliance upon the "probable" English contexts as well. Hence in the comparative tables the French sample includes specimens from both "definite" and "probable" French contexts and the English sample includes both "definite" and "probable" English provenience specimens. The tables also include specimens from mixed or culturally indeterminate contexts; a few pipe bowl types are found only in such contexts and therefore cannot be reliably associated with either occupation of the site.

The second kind of lumping is made clear by separate tabulations as well as a combined tabulation.

There are several levels of reliability in the classification of the pipe bowls. The first of these is represented by the few pipe bowls which are either complete or so nearly complete that their form can be determined without question (Table 52). In addition to such specimens, of which there were only 31 in the collection, an effort was also made to classify more fragmentary specimens; several of the distinctive pipe forms are represented only by such incomplete fragments. In other cases such specimens would change the relative frequency of the types if they were not included in a comparison of the culturally associated specimens. Such "probable" fragments are tabulated separately so that they will not be confused with more complete examples (Table 53). However, in a cultural comparison they should be included in order to give a better representative picture of the pipe forms in use at different periods at Castle Hill.

In addition to the above examples are a large number of pipe specimens which are less complete but which still include some traits which do not appear on any of the more complete examples and thus represent still different pipe forms used at the site. Despite their fragmentary nature it would seem important to include these forms in the comparative study

as well. These are termed "possible" fragments in the tabulation (Table 54). This category also includes a large number of specimens classified only on the basis of the form of the heel. In some cases these may be related to a restricted number of possible bowl forms while others are indeterminate. These have been included in the descriptions of pipe fragments as separate "types". These specimens are also included in the "possible" category in the tabulation so that the comparison between French and English pipes can be based on the maximum number of specimens of pipe bowls available. Table 55 combines the data in Tables 52, 53 and 54. This procedure should provide a more realistic relative percentage of pipes, their "popularity" in the two occupations. Since the tabulations and provenience data are all available in the text other researchers can utilize these data as they see fit in other comparative studies.

#### Interpretation of Pipe Bowl Form Data

Table 52 is based on complete or nearly complete examples of pipes. The distribution of these examples in culturally identified levels indicates that types 1, 3, 4, 5, 6, 7, 12, 21, 22 and 26 are found in French

or probable French contexts. Types 14 and 25 are found in English or probable English levels. Types 13 and 23 are present during both occupations but exhibit an increase in relative frequency during the English period.

Table 53 is based on examples which are fragmentary and hence cannot be as reliably classified as the specimens tabulated in Table 52. These "probable" type examples and types modify some of the distribution conclusions based on complete examples alone. Types 4, 5, 6, 8, 9, 10, 11, 14, 28 and 31 are found in French contexts; adding a few to the previous listing. English associated specimens include types 12, 19, 27 and 30. Types found in both French and English contexts are 1, 3, 18 and 24. Of these type 1 decreases in relative percentage in the English period while the others appear to increase in popularity.

Additional fragments were also classified as "possible" type examples and types and tabulated in Table 54. Of these types 5, 13, 23, 26, 31 and 33 are found in the French associations only while types 20, 29, 30 and 36 appear only in English contexts. Types 32, 34, 35, 37 and 38 are found in both contexts. Types 32 and 34 increase some during the English period while 35, 37 and 38 decrease.

The most complete representation of the relative popularity of the various pipe forms in the French and English occupations is presented in Table 55 which combines the data from Tables 52, 53 and 54. In the distribution some types are known only from culturally unidentified levels. These are types 2 and 15. Types found only in French or probably French contexts are 4, 5, 6, 7, 8, 9, 10, 11 and 21. Types found in English or probably English associations are 16, 17, 19, 20, 25, 27, 29, 30 and 36. Those found in both occupations are types 1, 3, 12, 13, 14, 18, 23, 24, 32, 34, 35, 37 and 38. Some of these are most frequent in the French period and decrease in the English period: types 1, 37 and 38 exhibit this pattern. A larger number of types present in both contexts show an increase in relative frequency during the English period. These are types 3, 12, 13, 14, 18, 23, 24, 32 and 35. Type 35 appears in almost the same relative percentage in both periods, and types 13 and 23, although increasing, do so only slightly and are essentially unchanged.

Unfortunately the sample of classifiable pipe bowls from definite English contexts is too small for meaningful comparative study, and the probable English contexts must include some French material as intrusive or mixed specimens. It is possible, therefore, that these

relative frequency comparisons indicate some cultural overlap of types which were actually restricted to one or the other of the two occupations. On the other hand, the time period of the two occupations is continuous, the French were using both Dutch and English pipes, and it is not unexpected that some of the same pipe forms would be present in both occupations.

There are some striking trends, however. The heel-less pipes are clearly associated with the French period except the type 3 form with the more rounded base which appears to be increasing in popularity. These data suggest that the rounded base was replacing the more angular type 1 form. There is also a more frequent association of heels which are large in diameter and flaring with the French period as opposed to large but straight sided or slightly tapered heels being somewhat more common in the English period.

Pipes with spurs rather than heels show a strong association with the English period. Type 38 which consists of some indeterminate fragments is not unexpectedly present in fairly large amounts in both periods.

The occupation of Castle Hill encompasses a relatively short span of time and the cultural associations of the pipe bowl forms, despite their fragmentary nature, will probably have some comparative value.

## Bowl Fragments

A large number of pipe bowl fragments which are too small for classification were recovered from the site. These are tabulated below in several different categories.

Bowl rim fragments, Plain:

These specimens are fragments of pipe bowl rims which lack any trace of decoration. They are tabulated below in groups based on the shape of the bowl lip.

Provenience	Number of Specimens	Lip Shape
2A---	1	Flat
2A6D?	1	Flat
2A5A1	1	Flat
2A6A5	1	Flat
2A6A9	1	Flat
2A6D4	1	Flat
2A6D6	7	Flat
2A6D7	6	Flat
2A6D8	2	Flat
2A6D10	2	Flat
2A6D12	4	Flat
2A6D18	1	Flat
2A7A3	1	Flat
2A8B1	1	Flat



Provenience	Number of Specimens	Lip Shape
2A9Ds f	1	Flat
2A9E2	4	Flat
2A9E10	1	Flat
2A9E11	6	Flat
2A9E14	1	Flat
2A9E15	2	Flat
2A9J5	1	Flat
2A10B9	1	Flat
2A10D11	1	Flat
2A10D12	1	Flat
2A10D21	1	Flat
2A10D22	1	Flat
2A10E12	1	Flat
2A10F31	2	Flat
2A11A1	2	Flat
2A6D6	1	Rounded
2A6D7	3	Rounded
2A9E10	1	Rounded
2A9E11	1	Rounded
2A9E15	3	Rounded
2A9F6	1	Rounded
2A9J5	1	Rounded
2A9K14	1	Rounded
2A10A5	1	Rounded

Provenience	Number of Specimens	Lip Shape
2A10D21	1	Rounded
2A5C13	1	Interior beveled
2A6D6	3	Interior beveled
2A6D10	1	Interior beveled
2A9E2	1	Interior beveled
2A9K14	2	Interior beveled
2A5A1	1	Exterior beveled
2A9E14	1	Exterior beveled

Bowl rim fragments, Rouletted:

These specimens are fragments of bowl rims which bear traces of rouletting around the rim below the lip. Rouletting is indicative of Dutch manufacture (Walker 1967) and appears on a number of the pipe bowl types previously described. The bowl rim fragments are further classified according to the lip shape.

Provenience	Number of Specimens	Lip Shape
2A3A6	1	Indeterminate
2A3A6	1	Indeterminate
2A9E2	1	Indeterminate
2A9E15	1	Indeterminate
2A5C2	1	Flat
2A9E2	2	Flat
2A9E11	1	Flat

Provenience	Number of Specimens	Lip Shape
2A9E15	3	Flat
2A10B21	1	Flat
2A6D7	2	Rounded
2A6D8	1	Rounded
2A9E1	1	Rounded
2A9E2	3	Rounded
2A9E11	3	Rounded
2A9E13	1	Rounded
2A9E14	1	Rounded
2A9E15	3	Rounded
2A9K9	1	Rounded
2A9K14	1	Rounded
2A10B25	1	Rounded
2A10B26	1	Rounded
2A10G10	1	Rounded
2A10H3	1	Rounded
2A2A13	1	Interior beveled
2A3A1	1	Interior beveled
2A9E11	1	Interior beveled
2A9K12	1	Interior beveled

Bowl rim fragments, Grooved:

A small proportion of the bowl rim fragments are grooved rather than rouletted at the top of the back bowl rim.

Provenience	Number of Specimens	Lip Shape
2A5A1	1	Flat
2A6D7	1	Flat
2A9E2	1	Flat
2A6D8	1	Rounded
2A6D9	1	Rounded
2A9E2	2	Rounded
2A5C13	1	Exterior Beveled

Bowl fragments; Non-Rim:

A large number of bowl fragments from the bowl wall were also present. These specimens lack any portion of the base or top of the bowl although a few retain a sufficient segment of stem to determine stem hole diameter.

Provenience	Number of Specimens	Bore Diameter if Present (in in.)
2A---	1	
2A3A1	1	
2A3A6	1	5/64
2A3A6	1	6/64
2A4A1	1	
2A5A1	5	
2A5A1	2	4/64
2A5A1	1	6/64
2A5C2	1	

Provenience	Number of Specimens	Bore Diametre if Present ( in in.)
2A6A9	3	
2A6D1	1	
2A6D2	1	5/64
2A6D4	1	
2A6D6	3	
2A6D7	8	
2A6D10	2	5/64
2A6D11	2	
2A6D12	8	
2A6D12	1	4/64
2A6D15	1	7/64
2A6D--	1	
2A6E2	1	
2A6E7	1	
2A8B1	1	
2A9Asf	1	
2A9Ds f	1	
2A9E2	15	
2A9E7	1	
2A9E10	2	
2A9E11	11	
2A9E14	1	
2A9E15	12	
2A9J2	1	

Provenience	Number of Specimens	Bore Diametre if Present (in in.)
2A9J5	1	5/64
2A9K14	3	
2A9K14	1	7/64
2A10A5	1	
2A10A6	1	
2A10B23	1	
2A10B23	1	6/64
2A10C7	1	
2A10D12	1	5/64
2A10E1	1	5/64
2A10E12	1	
2A10F7	1	
2A10F7	1	5/64
2A10F28	1	
2A10G5	1	
2A11A1	1	
2A12A-	1	

Although the bowl fragments cannot be identified as to type they have classified according to presence or absence of rouletting and grooving and according to the shape of the lip; flat, rounded, interior beveled and exterior beveled. The cultural associations of these traits can be compared using the data from the

pipe bowl fragments as tabulated immediately above. In order to increase the size of the sample specimens classifiable with respect to these traits have been added from the type 1-38 tabulations.

It should be noted that the following is based on fragments for the most part and consequently subject to some error. It is assumed that entire pipe lips were similar to the small remnants on the fragments; these data are reasonably accurate. The data concerning rouletting is less reliable since pipes with rouletting are often found to have plain undecorated areas, the milling largely being found at the back of the pipe. Thus some "plain" specimens could have come from rouletted pipe bowls. Despite this problem the distribution of the trait seems to be significant.

The relative frequencies in Table 56 indicate that plain bowls more frequently have flat rims while rouletted and grooved bowls more commonly have rounded rims although the distributions are not exclusive.

It is also clear the plain bowls are relatively more common during the English period at Castle Hill during which time the grooved bowl is not found and the rouletted bowl is relatively rare. Ninety-five per cent of the English period specimens are plain and

the 4.5 per cent which exhibit rouletting may be intrusives. In contrast 55 per cent of the French specimens are plain, 38 per cent are rouletted and 6 per cent are grooved.

The most likely explanation of this pattern is that the rouletting reflects Dutch manufactured pipes (Walker 1967). The French utilized both Dutch and English pipes, while the English probably imported few if any pipes of other manufacture.

The data on the distribution of the lip shapes can be further summarized as shown in Table 57.

The relative frequencies in Table 57 suggest that the rounded lip was being replaced by the flat lip on the bowl. Interior beveling may have increased slightly while exterior beveling is not represented in the late period at Castle Hill. The most significant shift seen is the trend from rounded to flat lips.

#### Mould Marks on the Interior of Pipe Bowls

Many of the pipe bowls have different mould marks on the interior of the bowl, generally at the bottom but in some cases rising onto the sides of the bowl. An attempt to classify these marks was made, but they do not appear to be associated with particular bowl



forms in most cases. In the tabulation below only specimens complete enough to be classifiable were utilized.

#### Plain Conical

Specimens in this category have plain, conical, unmarked interior bowl bottoms or, sometimes, a very small flat spot at the bottom of the interior up to 2.5 mm. in diameter. There appears to be a continuum from conical to blunt conical interiors and hence a range of variation was allowed.

#### Small Circular Indentation

Specimens in this category have a small circular flat spot or indentation at the bottom of the bowl interior. The spot is ca. 5.0 mm. in diameter. The stem bore hole may or may not intrude into the indentation.

#### Large Circular Indentation

Specimens in this category have large flat interior indentations between about 5.0 mm. and 1.0 mm. in diameter. There is a continuum between the small and the large categories. The stem bore hole may or may not intrude into the flat indentation.

#### Circular Indentation with X

Other examples of interior mould marks with a circular pattern included crossed raised lines or an X in the flat area.

Circular Indentation with Side Ridges

In a few examples there are raised lines running up the interior of the pipe bowl wall from the flat basal circle.

These interior mould marks are tabulated below.

Bowl Type	Plain Conical	Small Circular	Large Circular	Circular w/X	Raised Lines
1	9	7	1		
2	1				
3	5		1		
4	1				
5	6				
6	3				
7	1				
8	2	3	1		
9		1			
10	1				
11	1				
12		1			
13	3		1		
14	3				
15	1				
16	1				
17	1	1			
18	3				
19	1				

Bowl Type	Plain Conical	Small Circular	Large Circular	Circular w/X	Raised Lines
20		1			
21	1				
22	1				
23	2	2	6	1	
24	2	2	3		
25		1			
26	4				
27	1				
28			1		
29					
30	8				2
31	1				
32					
33					
34					
35	1		1		
36		1	1		
37					
38		1		1	

#### Stem Fragments

A large number of plain pipe stem fragments were recovered in the excavations. They are primarily useful

in bore diameter dating of various stratigraphic units within the site and are tabulated in Table 58 according to excavation unit and bore diameter.

The bore diameter of the plain stems tabulated in Table 58 is combined with other bore diameter data from other type categories in a summary in Table 64 for overall dating analysis of the site stratigraphy.

#### Stained and Painted Pipe Stem Fragments

A small number of specimens have traces of stain or paint. The painted or stained area ranges from small patches to extensive areas encircling the entire stem. The examples tabulated below are stem fragments only; there are other examples of stained or painted mouthpieces which are described in the analysis of the various mouthpiece types.

Provenience	Bore Diameter (in in.)	Description
2A5C13	5/64	Strong yellowish brown (7.5YR 5/7) stain over entire stem and cross section. Centre of stem around hole is dark grey. Stem may have become stained after discard.
2A6D7	5/64	Strong orange stain (5YR 8/7-5/8) over entire section and surface.

2A6D7	6/64	Small irregular patch of strong yellowish pink colour (10R 7/9) on one side of fragment.
2A6D10	4/64	Band of strong orange (5YR 7/11), slightly irregular, around stem near one end of the fragment.
2A9E11	5/64	Small stem fragment with strong reddish orange (10R 5/11), matte pigment, on roughly broken end. Colour on cross section only; applied after stem broken.
2A9E11	6/64	Traces of strong brownish pigment at one end encircling stem; partly worn off.
2A9F8	6/64	Brownish orange (2.5YR 5/9) stain encircles entire stem for most of length of fragment and over cross section at one end.
2A9K14	5/64	Traces, mostly worn off, of reddish brown to pink stain (10R 4/9 to 2.5R 8/5) on stem fragment.

With the exception of one specimen from 2A6D10 these stained pipe stem fragments are from French contexts at Castle Hill.

Mortar Stained Pipe Stem Fragments

Thirty-one plain pipe stem fragments were found either embedded in mortar in the walls or with heavy encrustations of mortar adhering to their surfaces. These pipe stem fragments were probably thrown away during the construction of the fort by the French or during English repair operations. They have no particular significance beyond being an indication of the activity of the workmen.

Provenience	Bore Diametre (in in.)
2A2A7	4/64
2A2A10	7/64
2A2B7	6/64
2A2C5	-
2A3B1	5/64
2A4A4	-
2A5A1	4/64
2A5B1	5/64
2A5B1	5/64
2A5B1	6/64
2A5C2	7/64
2A5C3	5/64
2A5C5	-
2A5C5	-
2A5C8	4/64
2A5C12	5/64

2A5C12	4/64
2A5C13	4/64
2A5C13	6/64
2A6Asf	5/64
2A6A4	-
2A6A9	-
2A6A9	-
2A6D2	5/64
2A6D7	5/64
2A6D18	5/64
2A6E5	5/64
2A6E7	-
2A9G10	5/64
2A9G10	5/64
2A10A10	5/64

The frequency of bore diameters for the group suggests that they represent the time span of circa 1710-50; the mean bore date is 1740. The specimens are found in French, English and indeterminate contexts within the site. They are somewhat more common in French deposits; 11 from such lots to five from English contexts. The remainder are from mixed levels.

#### Mouthpieces

A large number of pipe stem fragments were identified as mouthpieces and are described and tabulated

in this section. Only a few are "original" mouthpieces retaining the finished end of the original pipe stem. The remainder are "secondary" mouthpieces created by the smokers during the time when the pipe was in use and the stem was broken off. Such secondary pipe stem fragments can be identified as mouthpieces because they are tapered, cut, notched or toothmarked and can thus be identified as to their function. Stained or painted examples were also found; such dipping may have been done to prevent the pipe from sticking to the smokers lips (Walker 1967). Two glazed mouthpieces were also found.

Cut:

Type M1, (Fig. 98a). These specimens are stem fragments terminating in a flat cut surface similar to that illustrated by Walker (1967). These are original manufactured mouthpieces. They are flat to slightly beveled and sometimes have small projections of excess clay. Tooth scratches are present on some specimens; one such example has been worn through the stem wall to the bore hole. The fragments range in length from 16 mm. to 63 mm.

	Bore	Stem	Bit
	Diametre	Diametre	Diametre
Provenience	(in in.)	(in mm.)	(in mm.)
2A4A2	7/64	7.0	6.9
2A6B5	6/64	6.0	5.9



2A6D4	4/64	5.0	4.5
2A6D6	4/64	4.8	4.1
2A6D6	5/64	6.0	4.6
2A6D5	5/64	6.8	5.7
2A6D6	5/64	6.8	5.8
2A6D6	6/64	5.1	4.6
2A6D6	6/64	6.8	4.6
2A6D6	6/64	6.8	6.0
2A6D7	6/64	5.0	5.0
2A6D7	6/64	5.2	4.6
2A6D7	5/64	5.0	4.0
2A6D7	7/64	7.3	6.0
2A6D8	5/64	6.0	5.0
2A6D8	5/64	6.0	4.5
2A6D12	5/64	6.2	5.0
2A9A7	4/64	6.0	5.0
2A9D3	6/64	7.0	6.0
2A9E2	6/64	6.0	5.0
2A9E2	6/64	6.0	5.0
2A9E14	7/64	7.0	6.0
2A9F6	7/64	6.1	5.8
2A9F6	7/64	7.0	-
2A9K9	6/64	7.0	6.0
2A9K14	6/64	6.8	6.4
2A9J5	7/64	7.0	6.0

2A10D20	5/64	6.0	5.0
2A10E22	6/64	6.0	5.0

Ten specimens are from English lots and 18 are from French contexts. The mean bore date for the English specimens is 1729, for the French specimens 1702, and for the total group, 1713. There are no readily apparent differences in the cut stems from the two occupations.

All other types of mouthpieces identified in the collection are "secondary" mouthpieces made during the use of the pipe as its stem was gradually broken off and shortened.

Tapered:

Type M2, (Fig. 98b). This group of stem fragments consists of stems which have been tapered to a blunt point. The end of the tapered mouthpiece has been smoothed in the operation. Several of these mouthpieces are on complete stems; the only complete pipe in the collection is of this type. In several cases the stems are quite short.

Prov.	Length of Complete Stem (in mm.)	Length of Taper (in mm)	Bore Diameter (in in.)	Stem Diameter (in mm.)	Bit Diameter (in mm.)
2A3A1	28.0	12.0	7/64	10.0	9.0
2A5C13	43.0	16.0	6/64	10.0	8.0
2A6D15		24.0	7/64	12.0	5.0

2A7A15		16.0	5/64	9.0	6.0
2A9E2		26.0	7/64	11.0	9.0
2A9E7		12.0	5/64	9.0	7.0
2A9E11		20.0	7/64	9.0	8.0
2A9E11	26.0	11.0	7/64	11.0	8.0
2A9E15			6/64		8.0
2A9E15	34.0	9.0	6/64	11.0	8.5
2A9E15	21.0	8.0	7/64	12.0	7.0
2A9F8		10.0	6/64	7.0	5.5
2A9K14		25.0	7/64	12.5	8.0
2A10D14		17.0	7/64	10.0	8.0
2A10E21			5/64		
2A10E21		13.0	5/64	8.0	5.0
<hr/>					
2A9E2	57.0	11.0	7/64	11.0	7.0
2A9E2	46.0	7.0	4/64	7.0	5.0
2A9E15	10.0	10.0	8/64	10.0	7.0
2A9J5	40.0	16.0	6/64	10.0	8.0

\*Note: Specimens tabulated below line are previously listed in other descriptive categories and are re-listed here.

Fifteen of the specimens with tapered mouthpieces are from French contexts while only three are from English lots; two examples are from culturally indeterminate lots. The tapered mouthpiece is associated with pipe bowl types 1, 5 and 9. The mean bore date for the entire group is 1695.

Notched:

Type M3, (Fig. 98c). This type of secondary mouth-piece has been notched to form a bit. The notching has been done with a sharp implement, presumably a knife, although subsequent wear has obliterated the cutting facets in some cases. Most examples are notched on both top and bottom sides of the stem but a few are notched only on one side. Some specimens can be identified but are fragments.

Provenience	Bore	Stem	Diametres	
	Diametre ( in in.)		Bit ( in mm.)	Notch
2A2A9	5/64	10.0	9.0	8.5
2A3A1	6/64	11.2		8.5
2A3A1	4/64	9.0		6.8
2A3A1	6/64	11.8		9.8
2A3A1	5/64	9.0	9.0	7.0
2A3A1	7/64	11.0	10.0	
2A3A4	6/64	8.0	8.0	7.0
2A4A2	6/64	11.5		10.0
2A4A2	5/64	8.8		9.0
2A4A4	6/64	8.0	8.0	6.0
2A6A9	7/64	10.0	9.0	6.0
2A6A9	5/64			
2A6D3	4/64	9.3		8.2

2A6D6	6/64	10.0	9.0	
2A6D7	7/64	11.0	10.0	9.0
2A6D8	6/64	10.5	9.5	8.0
2A6D8	7/64	10.0	8.0	6.7
2A9E4	7/64	11.0	9.0	7.0
2A10B22	5/64	10.0		8.5
2A10E3	4/64	8.7		7.8
2A10F8	6/64	8.7		7.8
2A6D7	5/64	12.0	8.0	7.0

Complete stem: 44.0 mm. long

Note: Last specimen described in bowl type 3.

Only one example of this type of mouthpiece is on a complete stem and is associated with bowl type 3. Only three specimens are from English contexts while 10 examples are associated with French deposits. The mean bore date is 1713.

Smoothed and Faceted:

Type M4, (Fig. 98d). This form of secondary mouthpiece consists of examples which have been smoothed. Where the stem has been broken off, the rough cross section surface has been smoothed but cutting with a sharp instrument, producing small facets. Subsequent abrasion during use may have contributed to the smoothing.

Prov.	Bore	Diametres		Remarks
	Diametre (in in.)	Stem (in mm.)	Bit	
2A2A14	5/64	8.0	6.0	Stem frag.; 49.0 mm. long
2A4A1	5/64	6.0	5.0	
2A5C12	5/64	7.0	6.0	
2A6A6	5/64	10.0	10.0	
2A6A9	5/64	8.0	7.0	
2A6D6	5/64	9.0	8.0	
2A6D5	4/64	8.0	8.0	
2A6D6	4/64	7.0	7.0	
2A6D7	6/64	9.0	8.0	
2A6D7	6/64	6.0	5.0	
2A6D8	5/64	10.0	9.0	
2A6D11	5/64	7.0	7.0	
2A6D12	5/64	7.0	7.0	
2A6D13	4/64	7.0	6.0	
2A9C1	5/64	9.0	8.0	
2A9E1	5/64	6.0	5.0	
2A9E11	6/64	9.0	8.5	
2A9E15	6/64	10.0	9.0	
2A10A2	6/64	10.0	9.0	
2A10E8	5/64	9.0	8.0	
2A10F31	5/64	10.0	9.0	
2A11A1	6/64	8.0	7.0	Complete stem; 43.0 mm. long
2A6D7	5/64	10.0	8.0	Stem 45.0 mm. long. Pendant triangle decoration.
2A9E15	7/64	11.0	10.0	Stem length: 48.0 mm.

This type of mouthpiece is found in nine English and 11 French contexts; the mean bore date is 1733.

Tooth Notched:

Type M5, (Fig. 98e). This is the most common type of secondary mouthpiece and consists of specimens in which the stem has been broken off squarely and left rough. These stem fragments can be identified as mouthpieces because they bear abrasions and shallow notches or tooth marks on the stem. The depth of such wear differs.

Prov.	Bore Diametres			Remarks
	Diametre (in in.)	Stem (in mm.)	Bit	
2A2A6	7/64	11.0	9.0	
2A3A1	5/64		6.0	
2A3A1	5/64		8.0	
2A4A1	6/64	9.0	8.0	
2A4A2	7/64	11.0	10.0	
2A4A2	5/64	9.0	8.0	
2A4A4	5/64	9.4	8.9	61.0 mm. Long
2A4A11	7/64		5.0	
2A5A1	5/64	9.0	7.5	
2A5A1	6/64	10.0	9.0	
2A5A1	6/64		8.0	
2A5A1	4/64		8.0	
2A5A1	5/64		7.0	
2A5A1	6/64		8.0	

2A5C5	6/64		7.0
2A5C8	6/64	7.0	6.0
2A5C13	5/64	10.0	8.0
2A5C13	6/64		9.0
2A6A9	6/64		8.0
2A6C1	6/64	8.0	8.0
2A6D3	5/64	9.0	8.0
2A6D6	6/64	8.0	7.0
2A6D5	6/64	6.0	5.0
2A6D6	7/64	9.0	8.0
2A6D6	6/64		9.0
2A6D6	5/64		6.0
2A6D6	5/64		7.0
2A6D5	5/64		7.0
2A6D6	4/64		7.0
2A6D6	5/64		8.0
2A6D5	4/64		7.0
2A6D6	4/64		8.0
2A6D7	5/64	9.0	8.0
2A6D7	5/64	9.0	8.0
2A6D7	6/64		8.0
2A6D7	6/64		6.0
2A6D7	5/64		9.0
2A6D7	5/64		7.0
2A6D8	6/64	12.0	10.0
2A6D12	4/64	8.0	8.0



2A6D12	4/64		6.0
2A6D18	5/64		8.0
2A6E7	6/64	9.0	8.0
2A7A3	5/64		5.0
2A7A7	4/64		6.0
2A7A8	4/64		7.0
2A7A19	7/64		5.0
2A9A2	6/64		5.0
2A9A2	7/64	7.0	6.0
2A9E2	6/64	10.0	9.0
2A9E2	7/64		8.0
2A9E11	6/64		8.0
2A9E11	7/64		7.0
2A9E15	7/64		8.0
2A9E15	5/64		5.0
2A9E15	7/64		8.0
2A9E15	7/64		7.0
2A9F4	5/64		6.0
2A9G9	8/64		7.0
2A9J5	7/64		7.0
2A9J5	6/64	9.0	8.0
2A9K14	6/64		10.0
2A9K14	7/64	7.0	7.0
2A10B22	5/64	10.0	9.0
2A10D21	6/64		7.0
2A10F8	5/64	8.0	7.0

2A10H2	5/64	9.0	8.0	
2A12A2	4/64	9.0	9.0	
2A13A2	6/64		8.0	
2A9E14	7/64	10.0	9.0	Complete stem 45.0 mm. long
2A6D7	5/64	12.0	11.0	Complete stem 27.0 mm. long
2A9E11	6/64	11.0	10.0	Complete stem 32.0 mm. long
2A3B1	7/64	10.0	8.0	Complete stem 30.0 mm. long
2A3A4	6/64	10.0	9.0	Complete stem 53.0 mm. long
2A9E15	7/64	11.0	8.5	Complete stem 35.0 mm. long
2A10E13	6/64	11.0	9.0	Complete stem 53.0 mm. long

Twenty-one specimens of this type are from probably English contexts while 33 are from French contexts. The mean bore date for the entire group is 1687.

Squared off, Smoothed:

Type M6, (Fig. 98f). These stem fragments have been broken off squarely at the mouthpiece end and then smoothed to obliterate the rough surface on the cross section. The edge of the break has also been rounded slightly. These fragments can be identified as mouthpieces by the presence of tooth marks on the stem surfaces. The type differs from type M5 in the smoothing of the stem end.

Provenience	Bore Diametre (in in.)	Bit Diametre (in mm.)
2A3A1	4/64	8.0
2A5C13	4/64	7.0
2A6A1	6/64	6.0

2A6A9	5/64	6.0
2A6D6	4/64	7.0
2A6D6	4/64	7.0
2A6D6	5/64	7.0
2A6D7	5/64	6.0
2A6D7	5/64	8.0
2A6D8	5/64	8.0
2A6D9	5/64	8.0
2A6D12	4/64	7.0
2A6D12	4/64	6.0
2A6D13	7/64	5.0
2A6D15	4/64	6.0
2A9E11	6/64	6.0
2A9E15	6/64	8.0
2A9E15	8/64	6.0
2A9J5	7/64	8.0
2A9J5	6/64	6.0
2A9K14	7/64	7.0
2A10B23	5/64	9.0
2A10D14	5/64	9.0
2A10E10	4/64	6.0
2A11A1	5/64	8.0

Eight are from English contexts and 14 are from French contexts. The mean bore date for the group is 1733.

Painted:

Type M7. Five mouthpiece fragments bear traces of stain or paint. They are identical in colour of paint and stain to the painted stem fragments previously described.

Prov.	Length (in mm.)	Bore	Diametres		Description
		Diametre (in in.)	Stem (in mm.)	Bit	
2A5A1	62.0	7/64	8.0	6.0	Squared and faceted. Stain brownish orange 5YR 5/8.
2A6D6	33.0	7/64	6.0	5.0	Cut mouthpiece. Strong orange brown 2.5YR 6/12 to 5/9 brownish orange.
2A9J5	50.0	7/64	8.0	6.0	Squared off and smoothed mouthpiece. Thick opaque paint strong yellowish pink 10R 7/9 to reddish orange 10R 4/9.
2A10E3	29.0	5/64	8.0	8.0	Tooth notched mouth- piece. 10R 7/9 stain on exterior and section.
2A10F7	17.0	5/64	7.0	6.0	Squared off and smoothed mouthpiece. Strong orange yellow to moder- ate brown stain. 10YR 7/10 to 7.5YR 4/5.

Two are from English and one from a French context.

Glazed:

Type M8. Two mouthpieces which are glazed were recovered.

Prov.	Length (in mm.)	Bore		Diametres		Description
		Diametre (in in.)	Stem (in mm.)	Bit		
2A1A7	33.0	5/64	6.0	5.0	Cut type. Traces of silver glaze on mouthpiece.	
2A1A7	25.0	5/64	7.0	5.0	Squared off, tooth notched. Silver to dark yellow colour glaze.	

Both glazed specimens are from a mixed context.

The relative frequencies of the various mouthpiece types in each of the occupation periods at Castle Hill are shown in Table 59.

Type M1, the original Cut type mouthpiece appears in the same relative frequency in both occupations, a not unexpected result. Type M6, Squared off, Smoothed, also appears to be equally popular in both periods at Castle Hill. Types M2, Tapered, and M3, Notched, appear to be somewhat more popular during the French period and decrease in relative frequency during the British occupation. Types M4, Smoothed and Faceted, and M5, Tooth Notched, both increase in popularity during the English period. Type M7,

painted or stained, is most common in the English period. Type M8, glazed is known only from culturally mixed levels but is perhaps more likely to be an English trait than a French one.

In Table 60 the mouthpiece types are arranged in mean bore date sequence. There appears to be only a partial correlation between that date sequence and the seriation trends seen in Table 59.

Perhaps the most significant aspect of this analysis of the mouthpiece types is that the Tapered form, type M2, does appear to be a significant French trait at Castle Hill.

#### Decorated Pipe Stems

The majority of the pipe stem fragments recovered at Castle Hill were plain, but 116 decorated stem fragments were found. These decorated stems can be grouped into several types based on the design styles employed. Unfortunately none of the decorated stems are found with bowl remnants, so that correlation of bowl types with types of stem decoration are impossible. Some tentative correlations based on heel form will be noted, however. A total of 13 decoration types have been established for descriptive purposes; some of the more common ones include many minor variations.

The most common mode of decoration of pipe stems was rouletting and most specimens exhibit some variation of this pattern. The rouletted designs encircle and/or spiral around the pipe stem.

One mode of rouletting may be described as a double band roulette (Fig. 98 g,h). It consists of a raised ridge from which tooth-like projections protrude to both sides of the ridge. Such "double" bands of rouletting vary in width but may be classed as either narrow or wide. The narrow form has a narrow line-like ridge while the wide forms have broad ridges of varying width. There are many variants as to the number, size and shape of the projecting teeth.

Another form of rouletted decoration is here termed a single line roulette (Fig. 98i). It consists of an elevated ridge or band on the stem; it also has tooth-like projections but they protrude from only one side of the ridge. There are numerous variations in the size and shape of the projecting teeth and the direction which they point; either toward or away from the bowl.

Double band and single line patterns may be combined on a single stem.

Rouletted decorations also include stars, rectangular punctates and other forms but these are less common (Figs. 98q, 99a).

Coupled with the rouletted lines are other impressed roulette decorations. The two most significant variants are touching circles and pendant triangles (Fig. 98 j,k). The touching circle consists of two lines of indented opposed scallops aligned with points in close proximity and with raised bosses or dots in the enclosed circular field. The total effect is that of a continuous line of touching circles. The pendant triangle pattern consists of a row of impressed triangles, much larger in size than the "teeth" of the roulette line or band. The triangles, like touching circles, are located at the end of a design series and hence are "pendant" from a smooth undecorated area of stem. Both the pendant triangle and the touching circle pattern are found at the ends of stem decoration patterns; the rouletted bands and lines are found in the intermediate field area. There are also examples of opposed scallops (Fig. 98l) as a terminal pattern. This mode of decoration is similar to the touching circle except that it lacks the centre dot or boss and the scallop points are opposed to hollows forming a scalloped groove rather than touching circles.

The rouletted lines and bands are found in association with several of the end designs, but the touching circles and the pendant triangle end patterns are not



found on the same stem. Consequently these design elements form the basis of the typological classification for many of the decorated pipe stems.

The touching circle pattern was once identified as a Bristol design in contrast to the pendant triangles which were identified as Dutch (Walker 1967). Now both of these patterns of decoration can be identified as Dutch (Walker 1971: 84, 92-3).

A variety of miscellaneous designs which are unique or rare are described individually.

The stratigraphic associations of the decorated stems suggests that they may be more frequent in the French occupation at Castle Hill.

#### Design type 1.

The most common design type is that which includes the touching circles mode of decoration as an element in the pattern (Figs. 98 m,n,o). A total of 42 such specimens were present. The design consists of the touching circle motif at one or both ends with varying combinations of rouletted lines and bands in the pattern. A number of sub-types have been distinguished; these include many unique variants.

Sub-type 1A, (Fig. 98m). Sub-type A is a design which has a row of touching circles at each end of the decorative pattern. Various combinations of narrow

and wide double band roulette lines are located between the rows of touching circles. Specimens noted in the tabulation below as "incomplete" lack the second row of touching circles but can be included as possible representatives of the type because of the similarity in the pattern of interior rouletted bands.

Provenience	Bore	Remarks
	Diametre (in in.)	
2A1A4	6/64	
2A6E2	5/64	
2A9C1	4/64	
2A9E2	5/64	
2A9E15	5/64	
2A9J5	4/64	
2A10E21	5/64	
2A3C2	6/64	Incomplete
2A6D-	6/64	Incomplete
2A9E15	4/64	Incomplete
2A9G10	5/64	Incomplete
2A9J4	4/64	Incomplete
2A9K14	4/64	Incomplete
2A10E22	6/64	Incomplete

Two specimens are from English contexts while eight are in French levels. The bore date calculated for this sub-type is 1740.

Sub-type 1B, (Fig. 98n). Sub-type B has touching circles at the ends; the decoration between the two end rows are double bands of roulette lines placed close together. They have a pronounced spiral in the best example. The overall effect is a design which appears to be more heavily rouletted but it probably forms a continuum with sub-type A. Most of the specimens are incomplete, having only one end row of the touching circles remaining; they have been placed in this category on the basis of the close spacing of the rouletted lines and bands.

Provenience	Bore	
	Diametre (in in.)	Remarks
2A9Dsf	6/64	Complete
2A3A5	5/64	Incomplete
2A9E15	5/64	Incomplete
2A9G6	5/64	Incomplete
2A9G14	5/64	Incomplete
2A9J1	6/64	Incomplete
2A9J2	5/64	Incomplete

The bore date calculated for this group is 1730. There is a strong association of the type with the French occupation.

Sub-type 1C, (Fig. 98o). Sub-type C consists of a different design incorporating the touching circle element at one end and the scalloped groove element at the other. The intervening space is filled with variations of the rouletted line and double band motifs. The incomplete specimens lack the end of the pattern; those included here are specimens retaining the distinctive scalloped groove at one end.

Provenience	Bore	Remarks
	Diametre (in in.)	
2A4A1	5/64	
2A9E2	4/64	
2A9E2	4/64	
2A10A9	5/64	
2A10B23	4/64	
2A10C11	4/64	
2A5B1	4/64	Incomplete
2A10C4	4/64	Incomplete

The bore date for the group is 1769 but there is a strong association of the type with the French occupation.

Sub-type 1D. Sub-type D includes fragments of decorated pipe stems which have a row of touching circles

present but are too fragmentary to determine which of the other sub-types is represented. They have but a single row or only traces of the roulette lines or bands in addition to the terminal circle motif.

Provenience	Bore Diametre (in in.)
2A5A2	5/64
2A6A9	5/64
2A6D7	4/64
2A6D7	5/64
2A6D8	5/64
2A9F4	4/64
2A9J1	5/64
2A9J5	4/64
2A9K10	5/64
2A9K14	4/64
2A10C9	4/64
2A10B23	5/64
2A10G10	4/64

The mean bore date for the group is 1758. There is a strong association of the sub-type with French contexts.

Combining all of the sub-types as Design Type 1 produces a mean bore date for the entire design as 1749.

The percentage frequency of various bore diametres is:

4/64 in.	39.5
5/64 in.	44.1
6/64 in.	16.4

which would suggest a date bracket of circa 1710-50.

More than half of these specimens are from French contexts and less than 20 per cent of the group are from English levels. The design type may be present in both occupations but is certainly more common in the French period.

The late bore diameter average date of 1749 on specimens most frequently found in a pre-1713 context at Castle Hill suggests that the bore diameter trends on decorated pipe stems may not be the same as those on undecorated specimens.

Design Type 2:

Another frequently occurring pattern of pipe stem decoration is one which employs a combination of pendant triangles and rouletted lines and double bands (Fig. 98p). The simple roulette line motif is infrequent, however. The pendant triangle element is located at the end of the design sequence. None of the specimens exhibits a complete pattern so the design element at the opposite end of the decoration is unknown.

Provenience	Bore Diametre (in in.)
2A4A2	5/64
2A5C1	6/64
2A6D5	5/64
2A6D7	5/64
2A6D7	5/64
2A6D7	5/64
2A6D7	5/64
2A6D7	5/64
2A6D7	5/64
2A6D7	6/64
2A9G4	5/64
2A9J5	5/64
2A10B13	5/64
2A13A3	5/64

Pipe bore dating of this group of specimens suggests a date bracket of circa 1710-50 and a mean date of 1734. Sixty-nine per cent of the specimens are from French levels and the remainder from mixed or indeterminate strata. Walker indicates that designs of this type are Dutch (Walker 1967). Two examples from Castle Hill are on fragmentary type 3 pipe bowls, a heel-less form.

Design Type 3:

Design type three is represented by 17 specimens (Figs. 98q, 100e). It is a distinctive pattern which

incorporates the pendant triangle motif at one end. The design includes a pattern of alternating raised diagonal lines consisting of zig-zag lines alternating with lines of smooth dots and lines of four and five pointed stars. A typical pattern begins with the pendant triangles, followed by the following sequence: zig-zag/dots/zig-zag/stars/zig-zag/dots/zig-zag/stars. When viewed from the side the design has an appearance of spiraling around the stem; however, the decorative pattern is absent from both top and bottom of the stem. Mould seams may sometimes be found in the top or bottom area but these sections have been smoothed. The design thus consists of two panels of diagonal decorations.

A sub-type can be distinguished by the addition of a crowned letter at the end of the decorative panel. The crown is above the letter and bears a fleur-de-lis. The crowned letter appears on each panel, the letters being an I on one side and an O on the other. Due to the fragmentary nature of the specimens it is difficult to determine which letter was on the right and which on the left. Since none of the specimens is complete it is not possible to tell if all decorated stems of this type also included the crown and letter but it is not unlikely that this was the case. One specimen also exhibits traces of red paint.



Provenience	Bore	
	Diametre	Remarks
	(in in.)	
2A2A11	6/64	
2A9A2	6/64	
2A9E2	6/64	
2A9E11	6/64	
2A9E11	6/64	
2A9J5	5/64	
2A9J5	6/64	
2A9K14	6/64	
2A9K14	6/64	
2A10B23	5/64	
2A10B25	6/64	
2A6E2	6/64	Crowned Letter
2A7A1	6/64	Crowned Letter
2A9Asf	6/64	Crowned Letter
2A9E11	6/64	Crowned Letter
2A9E12	6/64	Crowned Letter
2A10B22	6/64	Crowned Letter

A bore date estimate suggests a time span of circa 1680-1710 and a mean bore date for the total category of 1707. The mean date for specimens lacking the crown and letter is 1710 in contrast to those with the letter of 1702. All of these dates are consistent with the association of 81 per cent of these specimens with French levels.

All others are from mixed or indeterminate strata.

Design Type 4:

This type is a simple design consisting of one, two or three encircling rows of rectangular punctate roulettes (Fig. 99a). The rows are widely spaces. One specimen included is different, having the same type of punctate but a short longitudinal run rather than encircling; probably an accidental marking.

Provenience	Bore Diametre (in in.)
2A2A13	7/64
2A3A4	7/64
2A3B2	6/64
2A5C13	6/64
2A6D-	7/64
2A6D6	6/64
2A6D6	7/64
2A6D7	6/64
2A6D7	6/64
2A6D7	6/64
2A6D11	-
2A9E11	6/64
2A10C2	6/64

This type appears in both French and English contexts. The bore diametres suggest a date span of circa

1680-1710 and the mean bore date for the group is 1688. Four examples are from probably English contexts while five are in French associations.

Design Type 5:

This design type is based on only three specimens but is a distinctive one consisting of a wide groove which spirals around the stem (Fig. 99b). A line of rouletted teeth or punctates line one edge of the spiral groove.

	Bore Diametre (in in.)
Provenience	
2A6A1	5/64
2A6D6	5/64
2A7A4	7/64

A pipe bore mean date of 1717 can be calculated and a date bracket of 1710-50 suggested although the sample is very small. Two of the three specimens are from English contexts while the third is indeterminate.

Design Type 6:

Design type 6 is a distinctive one consisting of a cross formed by small raised bosses or dots on the pipe stem (Fig. 99c). Such a cross appears on opposite sides of the stem in each example.

Provenience	Bore Diametre (in in.)
2A4A1	6/64
2A6A9	6/64

One specimen is from a mixed level, the other from a probably French context; bore diametres suggest a date bracket of circa 1680-1710 and a mean date of 1702, both consistent with the cultural association.

#### Miscellaneous Designs

Design types 7-13 are each represented by single specimens with designs unique in the Castle Hill collection. They are described below as individual specimens.

#### Design Type 7:

This specimen is a complete stem with a tapered mouthpiece (Type M2) (Fig. 99d). The stem is very short and the bowl is missing. The specimen retains a heel, however, which is similar in its decoration to those found on type 5 pipe bowls. The stem design consists of a row of half circles and dots; similar to the touching circles motif but lacking one of the opposed scallop rows. The decoration also includes three narrow double band roulettes in a scalloped and rouletted line.

Provenience:	2A9E2
Bore Diametre:	4/64 in.

This example is from a French stratigraphic level.

Design Type 8:

This specimen has a remnant of a small bar and dot pattern which has been nearly obliterated (Fig. 99e).

Provenience: 2A4A1

Bore diameter: 6/64 in.

Design Type 9:

This stem has two raised hearts, located on opposite sides, as decoration (Fig. 99f).

Provenience: 2A9E15

Bore diameter: 5/64 in.

This specimen is from a French stratigraphic level.

Design Type 10:

This specimen bears a fragment of a complex spiraling roulette design (Fig. 99g).

Provenience: 2A9E15

Bore diameter: 6/64 in.

This example is from a French stratum.

Design Type 11:

This example is included with decorations although it may not be a decoration (Fig. 99h). The stem bears a deep longitudinal groove.

Provenience: 2A9E11

Bore diameter: 6/64 in.

The stem is from a French level in the site.

Design Type 12:

This specimen bears a fragment of a design consisting of opposed triangles formed by raised lines (Fig. 99i). Raised dots are located in the triangular fields.

Provenience: 2A3A1

Bore diametres: 5/64 in.

This specimen is from a mixed context.

Design Type 13:

This specimen is decorated with three bands of opposed scallops which form three impressed zig-zag bands encircling the stem (Fig. 99j).

Provenience: 2A5A1

Bore diameter: 7/64 in.

Conclusions: Stem Decorations:

A comparison of relative frequencies of the various pipe stem decoration design types is shown in Table 61 in which specimens associated with the occupations are tabulated. The tabulations are presented according to the degree of certainty of identification of the various excavation units in the site. However, there is only one specimen associated with an unquestionable English level and the cultural comparison can only be made by combining the probable identification units for a percentage comparison.

Most of the decorated pipe stems in the collection at Castle Hill are from the French levels and this may indicate that stem decoration was more popular during that period than later.

A few of the design types are found only in one of the two occupations at the fort. Type 5 is known only from an English or probably English context, and types 1B, 2, 3, 6, 7, 9, 10, and 11 are found only in French contexts. Three design types, 8, 12 and 13 are represented only by specimens from culturally mixed or indeterminate contexts. The other examples are present in both occupations but exhibit different "popularity" based on their relative percentage frequency.

Design type 1A is found in both periods in nearly equal relative percentages, although somewhat higher in the English period. Type 1C shows a larger relative percentage increase in the English period while Design type 1D shows a marked decrease. If the four sub-types 1A-1D are combined in a single Design type 1 group, the type constitutes almost 46 per cent of the total decorated stems in French associations and 50 per cent of the decorated stems in English contexts.

Design type 4, simple rouletted punctates, shows a marked percentage increase in the English period but is not absent in the French contexts.

The association of design type 2, including the pendant triangle motif, is indicative of the French use of Dutch manufactured pipes. Design type 3, also strongly associated only with the French period, is likewise one which includes the pendant triangle motif. It also, in some examples, bears a crowned letter with fleur-de-lis.

In the case of several types, 1B, 2, 7 and 9, the calculated mean pipe bore dates are indicative of later dates than the cultural association at Castle Hill would suggest. Type 2, for example, has a mean bore date of 1734 but occurs only in pre-1713 cultural associations. The Harrington time-span approach gives a suggested period of 1710-50 for the type which is more consistent with its association. It would appear that the bore date of 1730 for design type 1B is also later than its usual stratigraphic association.

If the bore diameter dates reflect relative chronology, the miscellaneous types of design appear to be relatively early. Chronologically followed by type 3 which combines pendant triangles with dots and stars. Type 2 follows with pendant triangles and rouletted lines. Type 4 with rouletting alone and then the various sub-types comprising design type 1, the touching circle motif, would appear as the more recent stem decoration.



This style has a long life span and overlaps some of the others.

Since most of the decorated stems are from the French period, and bore dates are not consistent with the stratigraphic position in the site, it would appear that any conclusion concerning a possible chronological sequence based on bore diameters as above is highly speculative at best.

#### Makers Marks

A number of makers marks are found on pipe stem and bowl fragments from Castle Hill. They occur on the sides and tops of stems, on the sides and bottoms of heels and on the bowls. Many of these have been described in connection with bowl form or stem decoration types described earlier. There are, however, additional specimens bearing makers names which could not be described in the categories already treated. These are listed first below, then the marks previously described are summarized again.

##### Name 1.

This type is one of several which consist of makers names (Fig. 100a). In this case the name "Allen" is found between scalloped and dotted roulette borders in a band encircling the stem. The name can be read by

rotating the stem. The name "Allen" is clear but was also preceded by an illegible first name. On one specimen three letters can be read: "OLD", making the most complete example read "OLD ALLEN". The area at the beginning of the name band is smooth to irregular and it cannot be determined whether there were additional letters or not. The name could have been, for example, Harold Allen, but this is conjecture.

	Bore Diameter (in in.)
Provenience	
2A3A1	4/64
2A4A1	5/64
2A6D6	5/64
2A6D6	5/64
2A6D6	5/64
2A6D7	5/64
2A9F9	5/64
2A6E7	5/64

The bore frequencies suggest a period of circa 1710-50 for these stems and a mean date of 1745. Three examples are from indeterminate contexts, three from probably English levels while one is probably French and the other is from a sealed French rampart fill level. The type may have been present in both periods of

occupation. The name suggests an English origin, there being a Wm. Allen (1707-36) listed as a London maker and Henry Allen at Leicester (1745) (Oswald 1960: 56,57).

Name 2.

Another common makers name on Castle Hill specimens is that of 'Robert Sayer' (Fig. 100b). The name appears in a circular stamp incised in the top of the stem. One example is associated with a bowl of type 26.

Provenience	Bore Diameter (in in.)	Remarks
2A4A11	6/64	
2A5A1	6/64	
2A5C13	6/64	
2A6D7	6/64	
2A6D7	6/64	
2A6D7	6/64	
2A6D7	6/64	
2A6D7	6/64	On bowl type 26

The makers name would appear to be English but the type is associated with the French occupation at the site as well as in mixed levels; never in English contexts alone. The bore diameters suggest a date bracket of circa 1680-1710 and a mean date of 1702; both

consistent with the stratigraphic position of the type. The type is not known from sealed French strata, but from probable French contexts.

Richard Sayers is listed as a Newbury maker about 1700 (Oswald 1960: 94). Two similar makers names from much later periods are Edward Sayer of Hull 1826 and Tom Sayers of Birmingham 1849 (Oswald 1960: 91,95).

Name 3.

This makers name is also incised or impressed, appearing in a small circle on the pipe stem (Fig. 100c). The name is "Rich Tylee". The design includes a gauntlet below the name.

	Bore
	Diametre
Provenience	(in in.)
2A3A1	5/64
2A6E5	5/64

The bore diametres suggest the specimens may be from the 1710-50 period. One is from a mixed context while the one from 6E5 is from within the masonry wall core and is probably a relic of the French construction period. The makers name may be English.

Name 4.

This is another example of a makers name impressed on the stem of the pipe (Fig. 100d). In this case the name is within a long narrow rectangular block oriented

along the long axis of the stem. The name is incomplete but sufficiently present to be read as "[JA]MES EATON LIVERPOOL". Oswald (1960: 69) lists James Eton as a Liverpool maker in 1757. The spelling is different but this may be one of his pipes.

	Bore
	Diametre
Provenience	(in in.)
2A4A4	4/64

The specimen is clearly of English manufacture. It was recovered from a mixed level of rubble but is probably from the English occupation.

Name 5.

This specimen bears a longitudinally oriented makers name which is illegible. It is possibly another Eaton pipe.

	Bore
	Diametre
Provenience	(in in.)
2A6D?	4/64

The specimen was found on a backdirt pile.

Name 6.

In addition to the names described as one to five above, there are several makers initial categories which have already been described but are tabulated here again (Fig. 100e). The first of these includes the initials

IO (or perhaps OI) associated with a crown and fleur-de-lis and rouletted stem design type 3. This is probably of Dutch origin.

Provenience	Bore Diametre (in in.)
2A6E2	6/64
2A7A1	6/64
2A9Asf	6/64
2A9E11	6/64
2A9E12	6/64
2A10B22	6/64

It is associated with the French occupation.

Oswald (1960: 84,85) mentions several English makers using the IO initials. One of these, Jane Overton of Broseley, is dated circa 1700 while the others are all too late for the French occupation. If these pipes were made in England they include the pendant triangle motif which has been identified by Walker (1967) as a Dutch design.

Name 7.

This single example consists of the front half of a pipe bowl (Fig. 100f). The top of the bowl may have been parallel to the stem but the specimen is too incomplete to be sure on this point. The bowl lip is flat. On the right side of the fragment, near its centre, is a trace

of a moulded design. The decoration consisted of a raised circle. Only a small segment of the edge of the raised circle remains; a trace of a letter (?) inside the circle is present but cannot be identified.

Provenience: 2A2B9

The specimen is from a French context.

Name 8.

This specimen is a fragment of the back of a pipe bowl (Fig. 100g) too fragmentary for classification, although the top of the bowl may have been at an angle relative to the stem axis. The lip is rounded. On the back of the bowl is a raised circle within which is a raised hand. The mark could have been moulded but was probably impressed.

Provenience: 2A2C7

The specimen is from a French context.

Name 9.

This is a small fragment of a pipe bowl (Fig. 100h) which bears an impressed or incised pair of crude letters which may be either RT or KT, the top of the initial letter being possibly incomplete. If an RT, the maker could be Robert Tippet, 1660 or Robert Tippet (Jnr.), 1678, both of Bristol (Oswald 1960: 97). A second specimen is less clear, but may be an RT.

Provenience:	2A10D21	RT
Provenience:	2A6D7	Illegible, could be RT (See Bowl Type 2).

The specimen is from a context judged probably English.

Name 10.

Another small fragment of pipe bowl has a makers name embossed on a raised circle moulded with the pipe (Fig. 100j). The name is "H. Edwards". Oswald (1960: 68) lists Henry Edwards as a Bristol maker circa 1699-1715, Walker (Pers. Comm.) dates the maker 1699-1727.

Provenience: 2A10E7

The specimen is from an English context which appears to be consistent with the apparent name.

Another example of makers marks or initials located on the back of the pipe bowl has already been noted in the description of bowl types. It is listed again here as name 11 in the tabulation below.

Name 11.

This example is incised or incuse in the back of the bowl (Fig. 100k). The left initial is nearly gone, only the angled foot of an A or X or some similar letter remaining adjacent to the legible T. If an RT, for example, the specimen could be made by Robert Tippet,



but it cannot be identified. It is on a type 2 bowl and is from a mixed context. It is not the same form as the possible RT letters noted above in Name 9.

Provenience: 2A5B1

Several types of makers marks or initials located on the sides of pipe heels or spurs have already been described in the bowl type descriptions. They are listed here again.

Name 12.

These initials are found on the sides of the heel on bowl type 19 (Fig. 100m). The initials are difficult to read but appear to be TD. The specimens are from a probably English context. Oswald (1960: 68) lists several makers with these initials; Thomas Dennis 1734 of Bristol and Thomas Dormer 1763 and 1768 of London are of the period which would be consistent with the Castle Hill context.

Name 13.

Another set of initials located on the sides of the pipe heel are HS, found on bowl type 23 which is associated with both French and English contexts at the site (Fig. 100l). Oswald (1960: 92) lists several makers with these initials within the chronological period consistent with the Castle Hill contexts: Humphrey Sharpe 1690 of Chester, Henry Skinner 1703 of London, Humphrey

Sharpe 1707 of Liverpool, Humphrey Simkins 1711 of London, H. Sefton 1717 of Nottingham and Henry Strutt 1739 of Romford. Sharpe, Skinner and Sefton are perhaps the most likely makers.

Name 14.

The initials BI are found on the sides of the spur on bowl type 29 (Fig. 100n). The second mark or initial appears to be an I with a cross bar, which could be an ornate I or a J. The specimen is from an English context but the mark has not been identified.

Name 15.

Another set of initials found on the sides of the stem of a type 28 bowl is HR (Fig. 100o). The specimen is from a probably English context at the site. Oswald (1960: 89) lists Henry Richards as a Bristol maker in 1774 and this would be consistent with the Castle Hill context dating.

Name 16.

Located on the sides of a small heel on bowl type 17 are the initials WP (Fig. 100p). The type is probably English at Castle Hill. Oswald (1960: 88) lists several possible makers using this set of initials. William Partridge 1680-1742 of Brosley, William Pink 1722 of Redenhall, William Palmer 1724 of Hull, William Porter 1724-54 of Hull, William

Pearce 1733 of Bristol, William Pout 1734 of Canterbury, William Plaxton 1739 of York, William Parker 1754 of Folkestone, William Pearce 1784 of Bristol and William Preston 1790 of Liverpool are the most likely possibilities.

Several examples of makers marks embossed or moulded on the bottom of pipe heels are found on bowls of type 5. These are relisted below. The first example is the first of two initials; the others are figures or symbols. These examples are from French contexts.

Name 17.

This example has a letter E; the second letter is obliterated (Fig. 101a).

Provenience: 2A6D7

This specimen is from a probably French context.

Name 18.

This incomplete example is an embossed design consisting of two human figures (Fig. 101b). The lower half is missing; the figures may represent a man and a woman.

Provenience: 2A9E15

This specimen is from a French context.

Name 19.

This mark consists of an embossed sheaf of arrows on the bottom of a round heel (Fig. 101c).

Provenience: 2A10F34

This lot is indeterminate as to its cultural association.

Name 20.

This mark consists of a raised circle within which is a raised oval with three internal dots (Fig. 101d). A surmounting motif consists of three raised dots connected by lines.

Provenience: 2A6D7

The specimen is from a probable French context.

Name 21.

This mark consists of a raised circle within which there is a curvilinear U shaped design (Fig. 101e). Two examples are clear, the others are partly illegible but are probably the same design.

Provenience: 2A9E2

2A9E11

2A9E18

2A9J5

All four of these specimens are from sealed French rampart fill strata.

Name 22.

This example is too fragmentary for accurate description (Fig. 101f). However the heel is similar in shape to the more complete examples described above and has a small remnant of an impressed outer circle on the base of the heel.

Provenience: 2A4A4

The specimen is from a mixed context at the site.

There is no question about the primary association of marks of "name" types 17-22 with the French occupation at the site.

A seriation based on the cultural association of the several makers names and marks is presented in Table 63. The sample is too small for reliability but some interesting variations in the association of the several forms of makers names are indicated.

Some of the types of makers marks cannot be associated with either occupation on stratigraphic grounds. These are types 4, 5, 11, 19 and 22. Several types appear to be characteristic of the French occupation alone. These are types 2, 3, 6, 7, 8, 17, 18, 20 and 21. Other types are found only in English contexts. These are types 9, 10, 12, 14, 15 and 16. Type 1 is present in both occupations but is relatively more common in the English period while type 13, found in both periods is much more frequent in the French deposits.

There may be a tendency for pipes marked with makers names on the stem to be more common early in contrast to the higher relative frequency of pipes with makers initials on the sides of the heel which may be somewhat more common in the English period. Neither

of these is an exclusive trait, however, and the sample size is small. Pipes marked with symbols on the bottom of the heel do appear to be exclusively associated with the French period.

#### Bore Diametre Dating of Site Excavation Units

Among other things, the pipe stem bore diametre measurements can be used for dating excavation units within the site. These dates may be employed to evaluate the stratigraphic identifications of the various excavated lots, and strengthen or modify such conclusions. In Table 64 all bore diametres from each excavation unit are tabulated. This includes the bore diametre data on plain stems from Table 58 as well as the bore diametre data from the pipe bowls, mouthpiece specimens, decorated stems and so forth.

Bore dates calculated for the various types of cultural association are tabulated in Table 65.

Bore dates calculated for the individual lots from single excavation units will be found included in the summary Table 1 in which the stratigraphic evaluation, pipe dates, ceramics and other identification evidence are summarized.

As discussed earlier, in the stratigraphy of the site some excavated strata could be identified as

definite French or English levels. Others were known to be mixed or potentially mixed but to include primarily materials from one or the other occupation. These lots were designated as "probably" English and "probably" French. Still other lots were from contexts which were too badly mixed for cultural classification or were from surface or back-dirt reexcavation or other circumstances which made them Mixed or indeterminate lots. For many sampling purposes useful in the comparison of French vs. English artifact assemblages the number of specimens from definite contexts was very small, so most comparisons had to be based on a total English and total French sample combining the definite and probable context specimens for comparative purposes. This undoubtedly results in some mixture of materials from the occupations. However, as the pipe stem bore data show, the mixing is probably not too serious a problem.

There is good correspondence between the mean bore dates and the cultural classification of lots. In addition, the mixed or indeterminate lots produce a date comparable to the site total date, an indication that they do include materials from both occupations.

In Table 66 the dates from Table 65 are arranged

in chronological sequence. The arrangement results in good separation of the English and French contexts.

It should be noted that the bore dates for the probable French lots, taken as a unit, are an approximate span of 1680-1750 and a mean of 1718, the latter being later than the 1713 termination of the French occupation at the site. Several factors may account for this. The French utilized both English and Dutch pipes and the dating system does not necessarily work with the same factors with Dutch as with English specimens. In addition several examples from the French contexts in the site are specimens or samples which produce bore diameter dates much later than the known occupation period due to the presence of many specimens with small bores. There may be some intrusive specimens in probable units.

The definite French lots, taken as a unit, produce dates consistent with the known history of French occupation; hence late intrusive specimens in probable contexts may affect their dating.

The main significance of the dates for English contexts is similar; the dates correspond to the known occupation period.

These data from Castle Hill provide a sample of pipe material from a known historical period and the



correspondence of bore dates with the known periods of occupation can be tested. Such tests of bore dating may prove useful to those who wish to assess the potential validity of bore dates for sites which lack corresponding historical time markers.

More important for Castle Hill archaeological problems is the pipe bore dating evidence for various significant stratigraphic units in the site. In Tables 67 through 84 these data are presented. In these tables lots excavated as separate units within major stratigraphic zones are combined to provide a bore date for the major stratigraphic member.

In operation 1 the sample of pipe stems is too small to produce a reliable stem bore diameter date. Assuming the dates in Table 67 are accurate, however, it would appear that the floor deposits date to the English period of occupation and that the rubble fill contains material from the collapsed masonry walls and hence appears "earlier" despite its stratigraphic position. Similar conclusions based on the larger sample from operation 2 would confirm this hypothesis, but the small sample size still places some doubt on the operation 1 data. Despite the small sample size the dates are consistent with other interpretations of the stratigraphy.

The pipe stem bore dates from operation 2 consist of small samples from the rubble fill lots, from the English floor and from the French floor levels. The dates for the English and French floors are consistent with the known occupation. The rubble zone has an "earlier" date despite its stratigraphic superposition above the English floor. The rubble zone consisted largely of the collapsed masonry walls and arch of the magazine which had been constructed by the French. Many pipe stems with mortar stains adhering were found in French wall construction contexts throughout the site and would appear to have been cast into the matrix of the wall during its construction. After the English occupation the walls and roof fell into the structure; this sequence of events would account for the pipe stem dating results. The rubble levels in the magazine were judged to be probably French on the basis of stratigraphic analysis and the pipe stem date for the rubble level bears this out. It must be recognized, however, that this level is subject to some mixture, unlike the French floor deposits which are sealed beneath the English floor level and hence are definite French levels.

Operation 3 was the excavation of the north curtain wall. Lots 2A3A1 and 3A3 were from the talus of wall rubble outside the line of the wall. These lots were

stratigraphically above lots 2A3A4 and 3A5, also wall rubble deposits. Lot 2A3A2 was material found within the rampart fill behind the masonry wall while 2A3A6 was a rubble level from immediately above the remnant of standing masonry. Lot 2A3A2 must be of the French construction period when the earthen rampart was built and its date bears out this stratigraphic interpretation. Lots 2A3A1, 3A3 and 3A6 consist of wall and rampart fill materials deposited through the collapse of the wall. The pipe stem dates suggest that these deposits may date to the English occupation, during which time these levels were probably an exposed surface; however, they must also be assumed to contain French debris from the wall construction and rampart filling period; hence on stratigraphic grounds these levels must be regarded as mixed. The pipe stem dates suggest they may contain primarily English refuse, but these lots were classified as mixed to preclude undue mixing of specimens in the analysis. Lots 2A3A4 and 3A5, also rubble, appear on stratigraphic grounds to be the result of the earliest stages of refuse deposition and wall collapse; on this basis they are regarded as probably French deposits although they may contain a mixture of specimens. The pipe stem dates bear out this conclusion.

Several lots were excavated in the talus rubble.

along the west curtain wall in operation 4. As seen in Table 70 those that produced pipe stem fragments exhibit an inconsistent pattern of dates. The stratigraphic analysis suggested that most of the rubble along the wall represented a relatively later period of collapse but probably too great a degree of mixture exists to regard any lot as a reliable deposit of only a single occupation. The pipe stem dates tend to confirm this conclusion, and the total of the rubble level lots produces a date of 1716, close to the mean site date of 1720, again suggestive of the mixture of these levels. This is not unexpected in that area of the site where the talus slope was very steep.

Lot 2A4All was from within the standing masonry of the remnant of the west curtain wall and on stratigraphic grounds must therefore represent the initial French construction period. Despite the small sample size the pipe stem dating bears out this conclusion.

The pipe stem dating of the rubble strata along the south curtain wall, excavated as operation 5, likewise indicates that these deposits were badly mixed as a result of the disturbance of the wall collapse.

Although some of these stratified lots produce pipe stem dates consistent with their relative stratigraphic position, for example 2A5C1 and 5C2, the results are generally more suggestive of mixture of specimens

than of a consistently dated stratigraphy. The same is true of the stratified mortar deposits found in a small area beneath the wall rubble talus. Totaling the pipe stems from the rubble vs. those from the mortar drip from wall construction does produce dates consistent with the relative sequence although not with the chronology of the site. The stratigraphic analysis suggested that there could have been a meaningful sequence in these deposits but the analysis of the specimens recovered from these lots suggests that considerable mixture took place as a result of the wall collapse.

In sub-operation 6B the rubble filling an original French room was removed in arbitrary excavation levels. It was assumed for stratigraphic and structural reasons that this filling had been done by the English as part of their repair of the Fort. Too few pipe stems for significant stratigraphic study were found. The total of pipe stems from the sub-operation 6B excavations produced a mean date of 1694, based on only five specimens. Possibly the English filled this feature with French refuse.

The pipe stem samples from the various stratified lots in sub-operation 6E are too small for reliable

dating results. Most of the lots were classified as mixed and could not be culturally identified although 2A6E5 is French and 2A6E9 is probably French in origin.

The stratigraphy of the fill of the fortification ditch excavated as sub-operation 6D included several definite layers but also included much evidence of artifact mixture; modern bottle glass was found in the lowest levels, having filtered downward through the refuse fill of the ditch. However, some levels could be identified as French or probably French; these were the deepest deposits, some in the quarried cracks in bedrock in the ditch bottom and including the darkest black stained refuse levels. The brown, more compact levels above the black refuse deposits were assumed in the field to be of English origin and most probably are although there are exceptions determined on the basis of ceramic and other artifact seriation study. The ditch was excavated in a test trench and three strata blocks. The dates calculated for these levels are shown in Table 73.

Due to the nature of the shape of the bottom of the ditch it was concluded that only strata block A represented a really good section of the stratigraphy; blocks B and C were affected by the slope of the floor and the location of the original bridge entering the

site. In strata block A lots 6D8 and 6D9 could be identified as probably French. Lot 6D7 was also classified as probably French although it must be assumed to contain considerable mixture of specimens. However lot 6D7 can be termed predominantly French as opposed to lot 6D6 which is likewise mixed but can be classified as probably English. Lots 6D4 and 6D15 could be classified as probably French on stratigraphic grounds and the remainder of the ditch fill appeared to be primarily English refuse. The upper levels of loose rubble were in some cases regarded as too mixed for tentative cultural identification.

The pipe stem dating from the ditch lots is generally consistent with the cultural identification accorded the various excavation units. In strata block A, however, the only inconsistent dates are that for lots 2A6D7 and 2A6D9. The dates for 6D4 and 6D15 are too late but the samples are very small whereas those from the strata block A sequence are mostly large numbers of pipe stem specimens (except 6D9). (See Table 64 for actual counts by size in /64 inches).

The pipe stem sample is small for operation 7, the guard room, which was used by both French and English at the site. The dates are consistent with the stratigraphic identification of the lots. The only inconsistent

date is that for the uppermost level of rubble fill; the early date may be due to materials which were in the wall core, built by the French; in any event these levels are regarded as mixed on stratigraphic grounds.

The combined dates for lots 2A8A1, 8A2 and 8B1 is 1740, indicating that the entranceway fill is largely of the English period.

In the excavation of the southeast demi-bastion, sub-operation 9E, a complex series of stratified rampart fill deposits was found. Included within the sequence of relatively sterile clay and rubble were three levels of occupational refuse, interpreted as periods when the rampart fill served as a working platform during the construction of the walls. All of these levels were interpreted as being of French origin and the pipe stem dates clearly confirm this conclusion. The data are presented in Table 75.

The dates for the rampart fills in sub-operation 9E are very consistent with one another and with the period of French construction of this feature. No pipe stems were found in the intrusive English stairway, but English potsherds confirm its identification.

There is a much larger sample of pipe stem fragments from each of the occupational zones within the



bastion fill, another indication that these refuse laden layers were probably open surface levels for longer periods of time. They probably mark different levels of working platforms as the walls were erected.

Total sample for all the bastion fill levels produces a date of 1698 which is consistent with the known history of construction.

Another sample of rampart fill pipes was recovered in the excavation of the west gun platform in test trench 9D and sub-operations 9F and 9G. There is a complicated sequence of deposits of rampart fill in this area, including some dark stained refuse laden occupation refuse and an old turf line. In Table 76 the various excavation lots in these three sub-operations have been combined to provide a sample of pipe stems from major stratigraphic layers in the west rampart fill.

The results of this analysis of pipe bore diameters indicates that the pipe stem dates are in close agreement with the archaeological interpretation of the stratigraphy as representing the original French construction period. The date derived for the total of the various levels within the rampart fill is 1696, a date which corresponds with the known history of construction. It is also almost the same as the 1698 date for similar fill deposits in sub-operation 9E.

It is perhaps worth mentioning that, if historical records were not available for Castle Hill, the pipe stem dates would have provided a reasonably accurate guide to dating the construction of the fort. Another point that deserves some consideration is that despite the small sample sizes the pipe stem dates correspond remarkably well to known historical dates at Castle Hill, although there are some notable exceptions. In general, however, it would appear that even a small sample of pipe stems has some real dating value if used with caution.

Another area of rampart fill for which pipe stem dates are available is sub-operation 2A9J.

These dates also reflect the French construction period although they are not as early as those on rampart fills discussed above. The lot 2A9J5 is particularly interesting because it is a level which included dark refuse stained soil, brick rubble and other material suggestive of a use of refuse in rampart construction. This area was excavated as a means of looking for traces of steps or a ramp leading up to the ramparts, a feature not clearly shown on the earliest maps of the Castle but present on later ones. It is possible that construction of this area was completed very late in the French construction period. The pipe stem dates would support such an hypothesis.

Another rampart fill area excavated was in sub-operation 9K. This area was on the south side of the interior of the redoubt and was excavated to expose the east end of the south interior revetment wall and to search for possible steps leading to the ramparts. The lots in the sub-operation were numbered in sequence from top to bottom; several of these have been combined in the pipe stem analysis in Table 78. Lot 2A9K14 is a dark occupation level similar to 9E2 and 9E11.

Like 2A9J, this sub-operation produces dates which suggest that construction of this portion of the fort may have been completed somewhat later than the primary bastion and rampart fills.

The upper levels may reflect some English repair work having been done, if the 1725 date is accurate; this would be near the stair area in 9E, an intrusive English feature.

Within the interior of the redoubt, sub-operation 10G was within an area where the English added a structure adjacent to the French guardhouse. An English hearth platform was found in the area and beneath it was a dark stained French refuse level. In Table 79 the few pipe stems from these stratified units are tabulated.

Although the date for the French occupation level is slightly later than the 1713 historical termination of that period, there is clearly a difference in the pipe stem dating of the French as opposed to the English levels. The dates for the English levels are quite consistent with the known occupation, confirming the interpretation of the stratigraphy.

In operation 10, the excavation of the interior of the redoubt, several sub-operations based on grid locations were utilized. Three major stratigraphic zones were found in the interior. These were the turf and surface zones, beneath which was a layer of rocky rubble, the rubble zone, and finally an occupational zone consisting of dark stained refuse laden soil. The occupational zone was excavated in arbitrary levels as well as being separated from the rubble level. Since the interior of the redoubt is relatively level these units have approximately the same elevation throughout the interior although there are some fluctuations. In most areas there were only three arbitrary units within the occupational refuse before the bedrock base was found. In a few cases the quarried bedrock surface had hollows which formed a slightly deeper occupational zone. In the southeast corner in sub-operation 10B bedrock was much deeper and several additional levels could be excavated

in the occupational debris; the lower ones are clearly of the French period and are continuous with 2A10G10, 2A9K14 and 2A9E2. It was hoped that, although clear French strata were not visible as in most other parts of the interior, the arbitrary excavation unit approach might help to segregate earlier materials in this area. However, it appears that, on the basis of the artifacts found, most of the interior deposits are probably of English origin. It must be assumed that they do contain some mixed French materials but these are probably minimal. The pipe stem dating data bear out this analysis of the stratigraphy.

As noted in Table 80 the dates of the various combined sub-operation levels indicate that the bulk of the fill within the redoubt interior is of English origin. This is consistent with the knowledge that they did considerable leveling of French structures prior to building the blockhouse. The deeper occupation zones thought to be French on stratigraphic grounds do have a pipe stem date consistent with the French period.

A narrow trench excavated across the glacis east of the fortification ditch appears on the basis of the pipe stem dates to be associated with the French occupation. The turf/surface level must have been an

open surface during the English period, but may have been kept relatively free of trash which was mainly thrown into the adjacent ditch.

Operation 2A12 was carried out to examine the dry masonry salient beyond the salient angle of the northeast bastion. The excavations provide only a small sample of pipe stems.

The sample is too small for reliable dating but the possibility that the wall may date to the French period must not be ignored.

Operation 13 was the test excavation of the area of the mortar platform located north of the northwest demi-bastion; it was a feature of the French occupation. The sample of pipe stems is too small for reliable dating; it is possible that the correct area was not located by the test trench since the pipe stem dates are too late for the expected feature.

Excavations related to operation 12, following the dry-wall salient, indicated that it formed a dry-wall counterscarp on the east face of the fortification ditch opposite the east wall of the northeast bastion. These data suggest that the dry-wall may be part of the late French construction in which the ditch was completed.

The pipe stem dates from these levels are partly

consistent with the presumed identification of the strata. The old sod level 6A8 was apparently an open surface during part of the French period. The sample from the wall is too small for accurate dating but is in the French period if correct. The ditch fill, although 1718 is slightly after the 1713 termination date, is apparently largely a French deposit. The mortar zone 6A7 was thought to represent the French construction period while 6A6 mortar appears to have leached out of the walls prior to the final collapse of the structure of the northeast bastion; if the pipe stem dates are correct this took place during the English occupation. The final collapse of the magazine wall dropped large amounts of rubble into the ditch. The early date, 1719, on this zone may be due to pipe stem fragments built into the matrix of the wall which later collapsed; at least a similar pattern of early dates for upper rubble levels is true in the interior of the bastion as well as here outside its walls.

#### Summary and Conclusions

Pipe bowls and pipe bowl fragments found in the Castle Hill excavations have been classified in 38 descriptive types. These include types based on whole

or nearly complete pipe bowls and types based on bowl fragments which are sufficiently distinctive to permit descriptive classification although they cannot be fully identified. The pipe bowl forms are illustrated in Figures 95, 96 and 97 and tabulated in Table 55 which presents a comparison of the relative frequency of the different forms in the French and English occupations. A summary of the pipe bowl forms associated with the French and English occupations may be found in the text.

There appears to be a somewhat greater variety of pipe forms in the French as opposed to the English occupation. The French appear to have been using pipes of both Dutch and English manufacture. In most cases the pipe bore dating corresponds well with the cultural association and occupation time span. However, there are some examples in which the pipes are clearly from French occupational debris but produce bore dates corresponding to the English period at the site.

In addition to the classifiable bowl fragments, a large number of small bowl fragments was present in the collection. These were pieces too small for classification based on bowl shape; they could be classified in terms of lip profile and the presence



of rouletted milling around the exterior of the bowl top. The cultural distribution of these traits is presented in Tables 56 and 57. Rouletting and grooved bowl tops exhibit a strong association with the French occupation at Castle Hill and this would appear to reflect the Dutch origin of these pipes. Flat lip profiles are more common in the English occupation than in French specimens.

A large number of plain pipe stem fragments were present in the collection. The distribution of these in the various excavation units or lots is presented in Table 58. These data are subsequently used in pipe bore dating of stratigraphic units within the site.

A small number of stem fragments which are painted or stained were identified; with only one exception they were associated with the French occupation.

A few plain pipe stem fragments which have mortar adhering to their surfaces were described and tabulated separately. They are found in both French and English contexts within the site, but are more common in French contexts. These appear to be pipe fragments which were discarded during the construction of the walls and cast into the masonry structure by the workmen. Since English construction was mainly in timber, most of

these specimens were probably from the French construction period. In several structures the excavations revealed an earlier pipe stem bore diameter date for the upper rubble levels than for English floors beneath the collapsed roofs and walls. Often these pipe stems included mortar stained examples.

An additional category of plain pipe stem fragments are those which could be identified as mouthpieces. A small number were cut or original mouthpieces of manufacture; a larger number were secondary mouthpieces identified by either purposeful or accidental modifications which formed a new bit. These are illustrated in Figure 98. Six basic types were described. In addition another category of painted mouthpieces was identified and two additional examples were glazed, making a total of eight mouthpiece types. Most are found in both occupations but tapered and notched appear to be more common in the French period. The cultural distributions are tabulated in Tables 59 and 60 and fully discussed in the text.

A number of pipe stems which bore decorations were found and classified. These types are tabulated in Tables 61 and 62 and illustrated in Figures 98 and 99. A total of 13 stem design types was described; however, there are almost as many minute variations as there are stems. A greater variety and number of decorated stems

is found in the French period, but they are not unknown from the English period and some types are present in both occupations. Some designs include the touching circle motif, while others exhibit the pendant triangle element, a Dutch characteristic. The latter are found in French contexts in the site, but often with "late" bore dates.

Twenty-two different makers names, initials or marks located on the stems, heels or bowls were identified. These are illustrated in Figures 100 and 101 and tabulated in Table 63. These indicate that several presumably English makers products were associated with the French period, another good indication that the French were using English manufactured pipes at Castle Hill. Unfortunately none of the makers names or initials can be reliably identified in the available comparative sources.

In Tables 64, 65 and 66 all pipe stem bore diameter data are tabulated and examined with respect to the overall distribution and bore diameter dates for the occupations at the site. In Tables 67 through 84 the bore diameter dating of various stratigraphic sequences within the site is presented and discussed. These conclusions are too involved to repeat here. With few

exceptions the pipe bore dates correspond very well with the prior field identifications of the various stratigraphic units. Even relatively small samples appear to produce dates consistent with stratigraphic identifications.

## GLASS ARTIFACTS

Glass bottles and other glass artifacts are described and interpreted in this chapter.

### Glass Bottles

The artifact collection from Castle Hill includes a large number of glass bottle sherds, primarily from wine or spirit bottles. The specimens are from stratigraphic contexts representing both the French and English occupations of the fort and provide some useful comparative data.

There are no whole bottles in the collection, not an unexpected condition considering the rocky nature of the site location and the amount of rock rubble in the excavations. One nearly complete miniature bottle and one restorable bottle were found. Two bottle seals, a total of 49 finish sherds and 107 base fragments large enough to classify were also present. An additional 1191 sherds from necks, bodies and bases were recovered. The total glass bottle sample consists of

1351 specimens. Modern glass fragments, abundant in some parts of the site, are tabulated as intrusive specimens and are not included in this chapter.

The fragmentary nature of the specimens in the collection makes it difficult to classify them in terms of whole bottle types such as those defined by Noel Hume (1961; 1969) or McKearin and McKearin (1941). The collection was therefore classified in terms of distinctive characteristics of the constituent fragments. When such attributes were also noted as features of the types in Noel Hume's classification the similarity is noted as a part of the type description in this report. The illustrations in Noel Hume (1961) were useful in this comparison, but difficult to use, and the noted similarities are sometimes tenuous.

Another difficulty in providing cultural identification for the types used in describing this collection lies in the culturally mixed nature of many of the excavation units; many could not be associated reliably with only one occupational component of the site. There are some stratigraphically sealed French occupation levels and some relatively unmixed British occupational zones. Although not all of the descriptive types can be associated with such culturally unmixed levels, some of

them do provide good cultural associations for bottle sherds, and these are of assistance in confirming the probable occupational origin of the bottle types.

An additional clue to the cultural identification of some of the bottle sherds can be taken from the specimens themselves in some cases. The distinctive green hued metal of French glass identified at Louisbourg (Marwitt 1967) can be used as a trait to help identify French material at Castle Hill. Direct examination of Louisbourg material was also possible, and some of the Castle Hill specimens are almost certainly of French origins on these grounds. The stratigraphic association of many such specimens further confirms this identification. Colours were determined with a Nickerson Color Fan (Munsell Color Company). The green coloured bottles apparently result from a manufacturing process which employs wood as fuel in contrast to the dark bottles produced in coal fired furnaces (Scoville 1968: 11).

The degree of correspondence between Castle Hill types, their cultural contexts, comparative studies and the date ranges of the most similar Noel Hume types is sufficiently good as to suggest that the sherd type classification used to describe these specimens is a reasonable one.

The specimens were grouped into 47 type categories based on combinations of a variety of attributes. Finish and neck specimens were grouped on the basis of neck profile and lip and string rim form. Bases were classified in terms of body form and kickup shapes. Body sherds were grouped according to area of the bottle, e.g., neck, shoulder, body and kickup fragments. The lack of whole bottles made it difficult to associate finish, body and base types. However, similarities in shape, size, metal and other attributes made it possible to infer probable associations. In the sequence of description, finishes, bases and bodies which are possibly related are described together to suggest whole bottle units, rather than describing all finishes, for example, in a single section.

Detailed type descriptions are presented below, but may best be utilized if the significance of the descriptive sequence is understood. Sherd type groups 1 through 17 are representative of the French occupation at Castle Hill. Types 18-21, 36-39 may be of either French or English origin while types 22-35, 40-47 are representative of the English occupation at the site. These cultural identifications of the types are made on the basis of their formal characteristics and the stratigraphic context, or both, of the constituent sherds.



## Miniature Bottles (1)

Description: Two miniature bottles were found, one nearly complete, the other fragmentary (Fig. 102a).

The more complete specimen consists of the body and neck of a bottle similar in form to the early oval wine bottle shapes. The neck of the miniature is vertical; the rim is missing. The body is basically oval in section but has slightly flattened sides on four opposed quadrants; the "corners" are rounded. The general appearance is not that of a flat sided bottle, despite the presence of detectable flattening. The kickup is conical and has an encircling pontil scar just above the base of the bottle. The metal is a very light yellowish green (2.5G 9/3) colour. The conical form of the kickup and the colour of the metal of the miniature bottles suggest that these specimens may be of French origin, an interpretation confirmed by their stratigraphic provenience in French refuse levels.

Provenience:	2A9F7
Dimensions (in mm.):	
Body diameter:	30.0
Neck diameter:	13.0
Extant Height:	28.0

Kickup height:	7.0
Kickup diameter:	13.0
Thickness of metal at neck:	2.0

The second miniature specimen consists of a small fragment probably from the shoulder of the body. It is very light yellowish green (2.5G 9/2).

Provenience:	2A9E2
Dimensions (in mm.):	13.0 x 18.0
Thickness of metal:	1.6

#### Tubular Neck (2)

Description: This specimen is a small finish sherd of a bottle with a tubular neck of small diameter (Fig. 102b). The rim is plain and direct, lacks a string rim, and the lip has been tooled smooth. The lip is slightly rounded and has a barely noticeable thickening on the exterior, probably produced by the tooling. The metal is a very light bluish green (2.5BG 9/2) colour and is clear, with small bubbles and diagonal stress lines. The specimen is similar to one illustrated by Noel Hume (1961: Fig. 5, No. 25) and identified as a French bottle of about 1720-60, from Rosewell (Noel Hume 1962: Fig. 29 No. 6). It could also be a finish from a square sectioned bottle (Noel Hume 1969; Fig. 15). The specimen from Castle Hill is too small to determine its body form.

Provenience:	2A6A9
Estimated diametre of neck:	25.0 mm.
Thickness:	5.0 mm.

## Flanged Finish (3)

Description: These specimens of bottle finishes have everted mouths forming wide, flat flange-like rims (Fig. 102c). The short tubular necks taper, becoming smaller in diametre above the shoulder of the body. One specimen includes a small segment of the rounded shoulder which indicates a cylindrical body of small diametre. The specimens are made of thin (2.0 mm.) clear metal, very pale green and very light yellowish green in colour. The colour of the metal and the estimated body diametre suggest that these finish forms may have been associated with type 4 bases described below and illustrated in Figure 102 e,f,g. The colour of the metal suggests that these specimens may be of French origin. Noel Hume illustrates similar rim forms as pharmaceutical bottles of 1660 to 1780 (Noel Hume 1969: Figs. 7,8,10,12,13,17).

Provenience:	2A4A1	2A5C6	2A6D6
Dimensions (in mm.):			
Rim-shoulder height:	16.0	13.0	12.0
Exterior diametre, rim:	29.4	28.0	27.0
Thickness of rim:	1.8-3.8	2.6	2.0

Interior diameter, mouth:	11.0	11.5	11.0
Height of neck:	13.0	11.0	8.6
Neck diameter, top:	17.0	17.5	18.6
Neck diameter, bottom:	15.0	16.4	16.5
Estimated body diameter:	-	45.0	-
Colour:	2.5G 9/3	7.5G 9/2	7.5G 9/2
Illustration:	Fig. 102	Fig. 102	Fig. 102

#### Cylindrical Base, Conical Kickup

Description: These specimens are the basal portions of cylindrical bottles with conical kickups (Fig. 102 e, f,g). The bottom is a smoothly rounded curve created by the recurve from the vertical bottle wall to the indentation of the kickup. The kickups on the several specimens are all similar in their conical form, but differ in detail. One specimen (2A6D5) has a conical kickup which is slightly shouldered, giving a nipple-like appearance at the top of the cone. A shelf-like pontil mark encircles 3/4 of the interior of the kickup 9.0 mm. above the base. A second example (2A6D6) has a lower conical kickup which is bulged on one side, giving it a faintly domed appearance. No pontil mark is visible except for a basal scar which is probably a chip. Specimen 2A6D12 has a well formed conical kickup with a pontil scar encircling 3/4 of the kickup close (1.5 mm. above) to the base. A fourth

example (2A6D11) has a conical kickup with a nipple-like tip, but no evidence of a pontil mark. Unlike the other specimens this one is of a clear white metal. In all cases the conical kickup has a pointed indentation at the tip on the exterior surface, indicating the use of an almost pointed tool in the formation of the kickup. Base diametres of these and other specimens in the report are that of the resting surface.

One specimen is made of a clear white metal, the others of very pale green and very light yellowish green coloured metal. The metal is clear and has only rare small bubbles. The colour of the metal and the base diametres suggest the possible correlation of these bases with the flanged rims described above. These specimens are probably of French origin at Castle Hill. Similar kickups of 1675 and 1710 are illustrated as pharmaceutical bottles by Noel Hume (1969: Figs. 17,8,9).

Provenience	Diametre (in mm.)	Height of	
		Kickup (in mm.)	Colour
2A6D5	42.0	25.0	2.5BG 9/2
2A6D6	40.0	29.6	7.5G 9/2
2A6D11	47.0 (Est.)	27.0	Clear White
2A6D12	47.0	25.9	2.5G 9/3

## Cylindrical Base, Domed Kickup (5)

Description: This specimen is the fragment of a base of a cylindrical bottle (Fig. 102h). The distinctive kickup has a low vertical side and a low domed top. There is a trace of a pontil scar in the centre of the kickup, but it is incomplete. There are several concentric indented lines on the exterior surface of the kickup. A remnant of the wall indicates that the body had vertical sides. On the interior, the space formed by the recurve between the outer wall and the kickup is U shaped. The metal is yellowish green and contains some bubble. The associated rim type is unknown. The metal suggests that the specimen is of French origin.

Provenience:	2A6D6-6D7 (Crossmend)
Estimated base diameter:	80.0 mm.
Height of kickup:	21.9 mm.
Colour:	2.5G 8/6

## Bodysherds (6)

These body sherds are curved sections of cylindrical bottles. They are made of metal similar to that of the flanged rims and conical kickup bases described above. These body sherds may have come from bottles of these two types but such an association cannot be demonstrated.

The specimens from 2A9E2 and 2A9E15 are from French stratigraphic deposits.

Provenience	Quantity	Colour
2A9E15	2	2.5 BG 9/2 Very pale green
2A6A9	1	7.5 BG 9/1 Greenish white
2A6D6	7	7.5 BG 9/1 Greenish white
2A6D8	1	7.5 BG 9/1 Greenish white
2A6D14	1	7.5 BG 9/1 Greenish white
2A7A3	1	7.5 BG 9/1 Greenish white
2A9E2	1	7.5 BG 9/1 Greenish white

#### Everted Flaring (7)

Description: These finish specimens are of a form often called a "gin bottle" (Fig. 102i). They have short necks formed by a constriction between the shoulder of the bottle and the everted, flaring rim. The neck is hardly more than the recurved area between rim and shoulder. The rims have rounded lips and lack string rims. One has a chipped protrusion which could be the remnant of a spout but is more likely an irregularity in the finish. One specimen has a smooth surface while the other is made of a granular appearing metal. Both are moderate yellow green in colour. Neither specimen is preserved below the neck and vessel form is indeterminate.

The specimen from 2A9E2 is from a French refuse deposit; the similarity in form suggests both specimens may be of French origin at the site.

The rims are similar to those on bottles illustrated by Noel Hume (1961: 106, Fig. 6) and described as everted lips on square sectioned bottles of 18th century date.

Provenience:	2A9A1	2A9E2
Dimensions (in mm.):		
Rim-shoulder height:	13.0	14.0
Neck diameter:	23.0	22.9
Exterior diameter of rim:	36.8	34.0
Thickness of rim:	4.0	5.5
Interior diameter of neck:	13.9	11.4
Colour:	2.5GY 5/5	2.5GY 5/5

#### Bodysherds (8)

Description: These thin body sherds are made of a metal with a granulated texture perhaps due to deterioration of the metal (Noel Hume 1961: 109). In this respect they resemble one of the everted flaring rims described above, although they are of different colour. One of these body sherds is from 2A9E2, a French stratigraphic layer. The metal is dark greenish yellow to light olive (10Y 5/5) in colour.



Provenience	Quantity
2A6D6	1
2A6E2	1
2A9E2	1
2A10B12	1
2A10F23	1

#### Bases, Squared Sectioned Bottles (9)

Description: Approximately one-half of the base of a large square bottle was found in lot 2A2C8, a French occupational zone in the powder magazine (Fig. 102j). It measures 101.7 mm. along the one complete side. The corners are right angled and rounded while the side panels are slightly indented between the corners. The base is a very low dome shape on the interior of the bottle and has a slightly indented kickup on the exterior. There is a pontil mark consisting of a circular ring of glass 31.0 mm. in diameter in the centre of the kickup. The kickup is 6.0 mm. high. The metal is a very light yellowish green (2.5G 9/3) and has rare small bubbles.

Provenience: 2A2C8

Several additional fragments of square sectioned bottle bases were recovered but are too fragmentary to produce meaningful dimensions. These specimens are listed below. Lots 2A9E1 and 2A10B24 are French lots.

Provenience	Quantity	Colour and Remarks
2A6E2	1	White, partially opaque, slightly ground surfaces
2A6D7	1	Heavy patina, colour indeterminate
2A9E1	1	Light olive 10Y 5/5
2A10B24	1	Moderate yellow green 2.5GY 5/5
2A10F7	1	Heavy patina, colour indeterminate
2A10G4	1	Light olive 10Y 5/5

Square Bottle Base, Domed Kickup (10)

Description: These specimens differ from the square sectioned bases described above (9) both in their form and in their smaller size (Fig. 102k). They are probably pharmaceutical bottles. These bases have low domed kickups which are higher in relation to bottle size when compared with the kickups of larger specimens. On the exterior the kickups are domed and more indented than on the large base.

One specimen, from lot 2A6D2, is made of a clear white metal and has remnants of two right angled corners. The measurement of the one complete side is 35.0 mm. This specimen has a pronounced domed kickup, 6.0 mm. high, and a pontil scar consisting of a thin lip of glass.

A second example is a small square base, 47.0 mm. x 47.0 mm. in size and a domed kickup 6.0 mm. high. The kickup bears a circular indented line 28.0 mm. in

diametre. The metal is a brilliant bluish green (10G 6/8) and includes numerous small bubbles and looped stress lines. The specimen was recovered from the dirt pile of operation 2A6D, the fortification ditch.

Provenience	Quantity	Colour
2A6D2	1	Clear white
2A6D dirtpile	1	Brilliant bluish green 10G 6/8

Bodysherds, Flat Panel (11)

Description: These body sherds are flat and were presumably broken from square sectioned bottles. The metal is brilliant bluish green (10G 6/8) similar to the square base described above, and these body sherds may be derived from small square based bottles of that type although this association cannot be demonstrated. The specimens from lots in sub-operation 2A9E are all from French stratigraphic deposits.

Provenience	Quantity
2A5A1	1
2A6D7	1
2A9E2	4
2A9E11	2
2A9E15	1

## Bodysherds, Clear White (12)

Description: These body sherds are from small bottles made of clear white metal similar to that of both the cylindrical and square sectioned bottle body sherds described above. These body sherds might have come from such forms but the association cannot be demonstrated.

Provenience	Quantity	Remarks
2A6D6	1	Flat sherd with right angle corner; from small square bottle.
2A6D6	1	Neck sherd with remnant of rounded shoulder and possible everted rim.
2A6D6	1	Rounded shoulder sherd.
2A6D7	1	Lower body sherd from small cylindrical bottle.
2A6D12	1	Curved neck sherd

## Bodysherds, Flat Panel (13)

Description: These body sherds are from square sectioned bottles or from other bottle forms which also have flat side panels.

One group includes sherds with large rounded corners. A large example, Figure 103b, is a remnant which

contains parts of two flat side panels. These are oriented at right angles, so the complete specimen probably had four flat sides and rounded corners. The body was rounded at the shoulder and at the base so the flat side panels were oval in shape. The metal is a light yellow green (7.5G 9/4). Lot 2A9E11 is a French deposit.

Provenience	Quantity
2A2C7	1
2A4A2	1
2A5C4	1
2A9E11	2

Another group of specimens are from bottles with a rounded shoulder and flat side panels but otherwise indeterminate form. The metal is yellowish green (2.5G 3/3 to 2.5G 9/3). All are from French deposits.

Provenience	Quantity
2A9E15	4
2A9E16	1

Several other sherds are from square sectioned bottles with small right angled corners (Fig. 103a) and slightly indented side panels. In most cases only a trace of the corner remains and the form is indeterminate, though probably square sectioned. Most of these specimens are from French deposits.

Provenience	Quantity	Colour and Remarks
2A9E11	1	7.5GY 4/4, moderate olive green. This sherd is a basal corner from a square sectioned bottle.
2A6D6	1	7.5GY 4/4, moderate olive green.
2A9E2	1	7.5GY 4/4, moderate olive green.
2A9F8	1	5GY 5/6, moderate yellow green.
2A9J5	2	5GY 4/3, moderate olive green.
2A9E2	2	5GY 5/6, moderate yellow green.
2A9E8	2	5GY 5/6, moderate yellow green.
2A9F6	1	5GY 5/6, moderate yellow green.
2A9G8	1	5GY 5/6, moderate yellow green.
2A9J5	1	5GY 5/6, moderate yellow green.

Another group consists of flat panel body sherds from square sectioned bottles which are made of metal of various yellow green hues. Nearly all are from French stratigraphic deposits in the site.

Provenience	Quantity	Colour
2A6D7	4	2.5GY 9/8
2A6D8	3	2.5GY 9/8
2A6E7	1	2.5GY 9/8
2A9D3	1	2.5GY 9/8
2A9E2	1	2.5GY 9/8
2A9E2	1	10Y 5/5
2A9E2	3	7.5Y 6/7
2A9E7	1	10Y 5/5

2A9E8	2	10Y 5/5
2A9E11	12	7.5GY 4/4
2A9E13	1	5GY 4/3
2A9E15	1	7.5GY 4/4
2A9F6	1	2.5GY 9/8
2A9G3	1	10Y 6/7
2A9G5	1	7.5GY 4/4
2A9J5	2	5GY 4/3

Several flat body sherds made of a granulated appearing metal were also recovered. Those from operation 2A9 lots are from French deposits in the site.

Provenience	Quantity	Colour
2A5C9	1	2.5GY 5/5
2A5C12	1	2.5GY 5/5
2A6E3	1	2.5GY 5/5
2A9E8	1	2.5GY 5/5
2A9E2	1	10GY 7/8
2A9G3	1	10GY 7/8

Additional flat body sherds, distinguished by the colour of the metal, are listed below. Those from sub-operation 2A9E are from French deposits.

Provenience	Quantity	Colour
2A6D6	2	7.5Y 5/5
2A9E2	1	7.5Y 5/5
2A9E4	1	7.5Y 5/5

2A9E11	1	7.5Y 5/5
2A10E3	1	7.5Y 5/5

Some slightly rounded body sherds from the shoulders of bottles were also included in this category of body sherds on the basis of colour.

They are from French deposits.

Provenience	Quantity	Colour
2A9E2	3	5GY 5/6
2A9J5	1	5GY 5/6
2A9E4	1	7.5Y 5/5
2A9E15	1	7.5Y 5/5

Finish, Flanged String Rim, Tooled Lip (14)

Description: This specimen is a small fragment, half of a bottle finish (Fig. 103c). It includes a small remnant of the neck which indicates that the neck probably had a tapered straight to slightly concave profile, but it is too fragmentary to classify accurately. The lip and string rim are regular and well made. The mouth is slightly everted and the lip is downtooled toward the exterior. The string rim is close to the lip and is a flat flange form with a parallel top and bottom surface and a rounded edge. The metal is light olive (10Y 5/5) and includes small bubbles. The specimen may be similar to those illustrated by Noel Hume (1961: Fig. 3, Nos. 5,8), types



which fall into the 1685-1715 time span. This specimen is from a French stratigraphic deposit at Castle Hill.

Provenience:	2A9E14
Dimensions (in mm.):	
Mouth diametre, exterior:	28.0 estimated
Interior diametre at lip:	15.0
Diametre at string rim:	33.0 estimated
Thickness of string rim:	4.0
Distance, top of string rim to lip:	5.0

Finish, Flanged String Rim (15)

Description: These specimens are finish fragments of bottles with tapering straight to concave necks (Fig. 103d). The flange-like string rims are close to the lip. The lips are everted at the orifice but are un-tooled and sharp or only slightly smoothed in places. The string rim encircles the neck below the lip; they have nearly parallel top and bottom surfaces and rounded edges. The string rims are irregular in their diametre and protrude varying distances at different points on the circumference. The specimens are light olive to dark greenish yellow in colour.

The distribution of these specimens in stratigraphic deposits suggests that they might be either of French or English origin at Castle Hill. They are most similar to numbers 5 and 6 illustrated by Noel Hume (1961: Fig. 3) of the 1690-1710 period and No. 10 (Noel Hume 1961: Fig. 4) of circa 1720-30.

Provenience:	2A6A1	2A6A9	2A6D6	2A6D7
Dimensions (in mm.):				
Exterior diam., mouth:	29.4	25.0*	30.0*	28.0*
Interior diam., lip:	20.0	14.0*	22.8*	20.0
Exterior diam., string rim:	35.8	33.0*	38.0*	34.6
Thickness, string rim:	3.9	3.0	3.1	3.7
Top of string rim to lip:	4.9	4.8	4.1	5.0
Exterior diam., neck, below string rim:	28.0	-	-	27.0
Colour:	7.5Y 5/5	10Y 6/7	10Y 6/7	10Y 5/5

\*Estimated dimension

Finish, V Beveled String Rim (16)

Description: These finishes are fragments of bottles with tapered, straight sided or slightly concave necks (Fig. 103e). One example, 2A6D8, has a complete concave tapered, short neck. The mouths of these finishes are slightly everted at the lip, and the lip is tooled smooth and slightly beveled. A V shaped beveled string rim has

been applied just below the lip. The string rim, beveled in cross-section, is irregular in diameter and in orientation, one side being closer to the lip than the other. The second example of the type is a small fragment. Both specimens are made of a dark greenish yellow (7.5Y 6/7) metal. The specimens are most similar to the rim form in an example illustrated by Noel Hume (1961: Fig. 3, No. 9) of about 1705-20.

Provenience:	2A6D6-6D8	2A10D23
	Crossmend	
Dimensions (in mm.):		
Mouth diameter, exterior:	27.5	30.0 est.
Interior diameter at lip:	17.4	22.8 est.
Diameter of string rim:	33.6	41.0 est.
Thickness of string rim:	5.9	6.0
Distance, top of string rim to lip:	3.6	2.8
Neck diameter, below string rim:	24.2	-
Neck diameter, middle:	32.5	-
Neck diameter at shoulder:	45.6	-
Neck length:	63.7	-

## Finish, V Beveled String Rim (17)

Description: Two finish fragments which are similar to those described above (as type 16) differ in that the string rim is located slightly farther below the lip (Fig. 103f). The fragments are too small to provide complete neck data but are straight sided, tapered forms. The lips are untooled and slightly everted. The string rims are V shaped in cross-section. The metal is dark greenish yellow (7.5Y 6/7). The specimen from 2A6D7 which cross-mends with a fragment recovered from the operation 6D dirt pile is beginning to develop a different colour when viewed in cross-section; from that angle it has a laminated dark blue/light blue colour.

Provenience:	2A6D7-6D? Crossmend	2A6D7
Dimensions (in mm.):		
Mouth diameter, exterior:	28.6	20.0 est.
Interior diameter at lip:	19.1	13.2 est.
Diameter of string rim:	35.6	29.0 est.
Thickness of string rim:	6.3	6.2
Distance, top of string rim to lip:	7.5	4.9
Neck diameter below string rim:	25.0	-

## Bottle Base, Oval Form, Conical Domed Kickup (18)

Description: These specimens are base and kickup fragments of bottles which had globular bodies of oval cross-section (Marwitt 1966: Fig. 3, No. 5). The specimens grouped in this type are further distinguished by having low domed to hemispherical to rounded "conical" kickups (Fig. 104a,b). Most of the sherds in this group are incomplete and would have been classified as indeterminate form if the remnants of the kickup had been smaller. These examples retain a sufficiently large portion of the kickup to be sure that its form was domed to conical. The other distinguishing feature of these basal fragments is the broad rounded U shaped contour on the interior of the base where the wall recurves to form the kickup. The broad U shaped contour in this area of the base distinguished these specimens from fragments of bases from cylindrical bodied bottles in which the contour is a sharp angle rather than a broad rounded U shape.

Only one of these specimens retains more than a few millimetres of the body wall. In that specimen, 2A6A9, the body diameter was estimated as larger than about 150.0 mm. On the same specimen the base of the bottle exhibits a scratched ring which indicates the resting point of the bottle base. On this particular

specimen the basal ring diameter is 100.0 mm. All other specimens in this type are too fragmentary to estimate body diameter and the diameters recorded are for the scratched resting point.

One specimen with a low domed kickup bears traces of a circular pontil scar (2A6A9) while an example with a more conical kickup (2A3A5) has a sharp indented tool mark in the tip of the cone-like kickup. The most hemispherical domed kickup (2A6D4) bears only faint basal indentations. With one exception these specimens are made of a metal of light olive colour.

Associated rim types cannot be determined, and it is not possible to determine which variety of oval vertical sectioned body was characteristic of these basal fragments. Kickups of this shape are similar to ones illustrated by Noel Hume (1961: Fig. 3, Nos. 4, 5 and 7: Fig. 4, Nos. 10, 13), types which together suggest a possible date range of circa 1675 to 1730 for these specimens from Castle Hill. Specimens from 2A9E are from French levels.

Provenience	Est. foot	Kickup	Colour	Remarks
	diameter	Height		
2A3A4	120.0*	?	7.5Y 5/5	
2A3A5-10C2 crossmend	120.0*	32.0+*	7.5Y 5/5	Conical kickup, granular metal. Indented pontil.

2A5C13	110.0*	21.0+*	7.5Y 5/5	
2A6A9	100.0*	18.0	7.5Y 5/5	Circular pontil scar?
2A6A9	?	?	10Y 5/5	
2A6D4	90.0+*	32.2	10Y 5/5	Hemispherical kickup.
2A6D6	?	28.7+*	7.5Y 5/5	
2A6E6	110.0*	?	7.5Y 5/5	
2A9E10	?	?	10Y 5/5	
2A9E15	?	?	2.5GY 5/5	
2A10C3	110.0*	?	7.5Y 5/5	
2A10J1	110.0*	25.9	7.5Y 5/5	

All dimensions in mm.

\*Estimated

?=Indeterminate

Base, Oval Form, Semi-bell Shaped Kickup (19)

Description: These basal fragments of oval sectioned bottles are similar to those described above (type 18) in being distinguished by the broad U shaped contour formed by the recurve of the vessel wall at the base to form the kickup (Fig. 104c). The distinctive feature of these bases is that the kickup has a low, domed, semi-bell shaped section. The kickup appears to have a flattened top when viewed in cross-section.

This is further marked by the presence at this point of a circular pontil mark impression. These specimens are, then, identified by the presence of this line and the flattened top of the kickup, a shape which can be described as semi-bell shaped. Most of these specimens are fragmentary but retain a sufficient portion of the kickup for classification. It is not possible to estimate body diameter for these specimens. Basal diameter was estimated on the scratched resting point of the bottle base.

The metal is dark greenish yellow to light olive with the exception of two examples of moderate yellow green colour. It is notable that the majority of these bases have metal which makes them appear dark blue in colour when viewed in cross-section, or as laminated dark/light blue in section. The development of the blue colour may be related to the presence of iron (Angus-Butterworth 1958: 375).

The associated body shape and rim form cannot be determined. These bases are similar to ones on bottles illustrated by Noel Hume (1961: Fig. 3, Nos. 6, 8, 9) with an estimated date range of about 1685-1720. One specimen is from a French stratigraphic level at Castle Hill.



Provenience	Est. foot Diametre	Kickup Height	Colour	x = blue cross-section
2A6A9	12.0*	30.3	7.5Y 5/5	
2A6A9	?	?	7.5Y 5/5	X
2A6A9	?	?	7.5Y 5/5	X
2A6D6	?	?	10Y 5/5	X
2A6D6	?	?	7.5Y 5/5	
2A6D7	100.0+*	?	7.5Y 5/5	X
2A6D7	?	?	2.5GY 7/10	X
2A6D7	?	?	?	X
2A6D7	?	?	10Y 5/5	
2A6E7	110.0*	?	7.5Y 6/7	X
2A6E7	100.0*	?	7.5Y 6/7	X
2A6E7	?	?	7.5Y 5/5	X
2A6E7	?	?	7.5Y 5/5	X
2A9K14	110.0*	25.0*	10Y 5/5	
2A10B10	?	?	7.5Y 7/9	
2A10C6	?	?	7.5Y 5/5	
2A6D6-6D7- -6D8-6D6	110.0*	21.0*	2.5GY 5/5	X
crossmend				
2A6D6	?	?	2.5GY 5/5	

All dimensions are in mm.

\*Estimated

?=Indeterminate

Base, Oval Form, Indeterminate Kickup (20)

Description: These specimens are identified as basal fragments of bottles with oval sectioned bodies by the presence of the broad U shaped contour between vessel wall and the kickup (Fig. 104d). These fragments are too small to determine which of the two types of kickup described above (18, 19) was present originally. The metal ranges from dark greenish yellow to light olive, with a few moderate yellow green examples present.

Quantity and Colour

Provenience	2.5GY 5/5	10Y 5/5	7.5Y 5/5	7.5Y 6/7
2A1A7		1		
2A5C12				1
2A5C13		1		
2A6D (dirtpile)			2	
2A6D4		2	1	1
2A6D6	6			2
2A6D7		2	3	6
2A6D8	1			
2A6E6				1
2A6E7			1	1
2A7A3				1
2A7A10				1
2A9G11			1	
2A10A1				1

Provenience	Quantity and Colour			
	2.5GY 5/5	10Y 5/5	7.5Y 5/5	7.5Y 6/7
2A10B18				1
2A10B19				1
2A10B27			1	
2A10C9				1
2A10E13			1	
2A10E22			1	1
2A11A1			1	
2A13A6				1

Finish, Thick Beveled String Rim (21)

Description: This finish and neck fragment has a tapered neck with slightly concave to straight sides (Fig. 106a). The mouth is everted and the lip has been smoothed and beveled by downtooling. A broad, thick string rim has been added just below the lip. The top edge of the string rim is rounded and bulges outward from the lip. The bottom two-thirds of the string rim is beveled and meets the curved top in a fairly sharp line. It has a cross-section which is round topped and beveled on the bottom. The string rim is irregular, especially on the bottom, which meets the neck smoothly in spots and elsewhere has a secondary beveled joint and irregular loops of glass in places. The metal is a moderate olive (7.5Y 4/3).

This specimen is similar to one illustrated by Noel Hume (1961: Fig. 4, No. 16) and another illustrated by Watkins (1948: 149, No. 38). These sources suggest a possible date in the 1750-65 time period.

Provenience:	2A3B2
Dimensions (in mm.):	
Exterior diameter, mouth:	31.1
Interior diameter at lip:	21.8
Diameter at string rim:	36.4
Top of string rim to lip:	4.5
Thickness, string rim:	10.7
Neck diameter, below string rim:	25.7
Interior diameter, neck:	18.3

#### Restorable Bottle (22)

Description: Only one bottle recovered from the site is sufficiently complete for near restoration and even this specimen lacks sherds to fully complete the body wall (Fig. 105a). However, the estimated restored height is within a few millimetres of the original form.

The specimen has a straight sided tapering neck. The string rim is downtooled, large, and has a flat bottom. The thickened lip has a beveled top and has been partially downtooled over the string rim. The mouth is slightly everted.

The base has a high bell-shaped kickup (43.0 mm.) and a ring pontil mark. The walls of the bottle are nearly vertical but sag just above the cylindrical base. The body has a rounded shoulder.

The specimen is similar to one illustrated by Noel Hume (1961: Fig. 4, No. 15) of the 1750-70 period. The specimen from Castle Hill was recovered from a floor level adjacent to an English hearth and from English deposits adjacent to the primary findspot. Provenience: 2A10G6, 10G7 and 10G11. Primarily 2A10G11.

Dimensions (in mm.):

Overall height:	240.0
Rim-shoulder height:	95.0
Neck diameter, below string rim:	28.0
Neck diameter, middle:	33.0
Neck diameter at shoulder:	40.0
Exterior diameter, rim:	39.0
Interior diameter, mouth:	18.0
Top of string rim to lip height:	12.0
Base diameter:	96.0
Kickup height:	43.0
Body thickness:	3.5-7.0
Colour:	7.5Y 5/5- 7.5Y 4/3 light to moderate olive

Finish, Rectangular String Rim, Tooled Lip, Straight Neck (23)

Description: These specimens are finish and neck fragments of bottles with tapered necks which have straight to slightly concave sides (Fig. 106b,c). The mouth is slightly everted and the lip is beveled. The lip is downtooled over the top of the string rim in some cases. The tooled lip does not extend more than slightly beyond the diameter of the string rim and generally has about the same diameter as the string rim. The string rim has a rectangular cross-section. One specimen of the neck retains a section of a rounded sloping shoulder. The type of base is indeterminate. The metal ranges from dark greenish yellow to moderate olive in colour.

These neck and rim forms are most similar to those illustrated by Noel Hume (1961: Fig. 4, Nos. 14 and 15) which have a combined estimated time span of about 1740-70. McKearin and McKearin illustrate a similar form (1941: Plate 221, No. 6) of about 1730-50.

Provenience:	2A3B2	2A6D2	2A6D6	2A6D6
Dimensions (in mm.):				
Exterior diam., mouth:	32.5	30.4	35.0	35.3
Interior diam., lip:	22.0	21.4	23.0	21.8
Exterior diam., string rim:	34.2	32.0	35.8	35.3

	2A3B2	2A6D2	2A6D6	2A6D6
Neck length:	?	73.6	78.7	?
Top of string rim to lip:	5.6	5.9	5.9	5.0
Thickness, string rim:	5.2	4.5	6.1	6.4
Neck diam., below				
string rim:	28.4	26.0	28.7	28.1
Neck diam., middle:	?	31.4	31.8	?
Neck diam., shoulder:	?	39.6	?	?
Neck diam., interior:	18.8	17.5	17.4	14.6
Colour:	7.5Y 5/5	7.5Y 4/3	7.5Y 6/7	7.5Y 5/5
Provenience:	2A6D6	2A6D11	2A11A1	
Dimensions (in mm.):				
Exterior diam., mouth:	33.1	34.0*	30.0*	
Interior diam., lip:	22.0	15.0	26.0*	
Exterior diam., string				
rim:	34.0	34.0	32.0*	
Neck length:	?	?	?	
Top of string rim to lip:	5.0	5.3	4.3	
Thickness, string rim:	6.6	5.3	4.8	
Neck diam., below				
string rim:	27.3	?	?	
Neck diam., middle:	?	?	?	
Neck diam., shoulder:	?	?	?	
Neck diam., interior:	18.4	13.0*	?	
Colour:	7.5Y 5/5	7.5Y 6/7	7.5Y 5/5	

\*Estimate ?=Indeterminate

Finish, Rectangular String Rim, Tooled Lip, Convex Neck (24)

Description: These specimens are finish and finish-neck fragments of bottles with tapering necks and are distinguished from those described above as type 23 by the convex shape of the neck (Fig. 106d). The neck is pinched in below the string rim and the upper portion of the neck is of smaller diameter, these two features giving the neck a convex profile. The mouth is slightly everted. The lip is beveled and downtooled over the top of the string rim, but has only slightly larger diameter than the string rim. The string rim is rectangular in cross-section with a slightly concave exterior face and a flat or slightly uptooled beveled base. One specimen has a remnant of a sloping rounded shoulder. Base type is indeterminate. The metal is light olive in colour.

These specimens are most similar to those illustrated by Noel Hume (1961: Fig. 4, No. 17 and Fig. 5, No. 19) and are of the 1750-70 period.

Provenience:	2A6D10	2A6D12	2A10F34-10F31- -10E16 crossmend
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Dimensions (in mm.):

Exterior diameter, lip:	33.6	33.0*	34.8
Interior diameter, lip:	21.8	22.5*	25.6



Exterior diametre,			
string rim:	34.0	35.0*	35.2
Neck length:	101.0	?	82.0
Thickness, string rim:	4.2	4.6	5.5
String rim-lip distance:	6.0	6.2	5.2
Neck diametre, below			
string rim:	29.1	?	29.4
Neck diametre, middle:	35.9	?	34.8
Neck diametre, shoulder:	39.0*	?	39.8
Neck diametre, interior:	16.6	?	18.8
Colour:	7.5Y 5/5	5Y 5/6	10Y 5/5

\*Estimated ?=Indeterminate

Finish, Rectangular String Rim, Convex Neck, Wide Lip (25)

Description: These finish and rim-neck fragments have tapered convex sides formed by pinching the neck just below the string rim (Fig. 106e). The mouth is everted and there is a shallow groove on the interior just below the lip. The top surface of the rim is beveled and downtooled over the top of the string rim. The underside of the rim top is also beveled, giving it a V shaped cross-section. The top rim has a diameter at least as large and generally larger than the diameter of the string rim. The bottom of the

rectangular cross-sectioned string rim has been up-tooled slightly in forming the inward pinch of the neck. The metal is light olive in colour.

The cross-section of the rim and neck is most similar to that illustrated by Noel Hume (1961: Fig. 5, No. 21 or 26) and identified as "European" of circa 1750-80.

	Crossmend	Crossmend	
Provenience:	2A6D6-3A2	2A6E6-6D20	2A10A1
Dimensions (in mm.):			
Exterior diameter, mouth:	37.2*	34.2	35.7
Interior diameter, lip:	21.3	18.5	21.8
Exterior diameter,			
string rim:	30.7*	31.0	35.0
Neck length:	116.0*	?	?
Top of string rim to lip:	7.5	8.5	6.1
Thickness, string rim:	5.0	6.2	5.5
Interior groove, below			
lip:	3.8	4.0	4.0
Neck diameter, below			
string rim:	27.4	24.9	28.3
Neck diameter, middle:	31.8	?	?
Neck diameter, shoulder:	34.0	?	?
Neck diameter, interior:	17.4	14.7	19.0
Colour:	7.5Y 5/5	10Y 5/5	7.5Y 5/5

\*Estimated ?=Indeterminate

Finish, Rectangular String Rim, Convex Neck, Wide Lip (26)

Description: These finish fragments and rim-neck specimens all have tapered convex necks formed by pinching inwards below the string rim (Fig. 106f). The middle of the neck also bulges outward. The mouth is slightly everted. The rim top is tooled and beveled to form a V shaped cross-section. The edge of the V shaped top extends beyond the diameter of the string rim. The string rim is rectangular in cross-section and is uptooled on the bottom edge where the neck is pinched inwards. The metal is light olive to moderate yellow green.

The rim and neck characteristics are most like those illustrated by Noel Hume (1961: Fig. 5, No. 21) but the overhanging rim is not as thick as the one illustrated by Noel Hume. The type may have a date range of 1770-1800 if the similarity to Noel Hume's type is correct.

	Crossmend			
Provenience:	2A5A2	2A6D2-6D3	2A6D6	2A10D13
Dimensions (in mm.):				
Exterior diameter, mouth:	35.0*	34.4	37.8	33.0
Interior diameter, lip:	22.0*	23.7	20.6*	21.4
Exterior diameter,				
string rim:	37.0*	32.6	?	32.3

Neck length:	?	81.0	?	91.3
Top of string rim to lip:	6.3	5.5	8.5	7.6
Thickness, string rim:	5.4	5.2	11.0	5.2
Neck diametre, below				
string rim:	?	26.1	?	27.9
Neck diametre, middle:	?	?	?	35.0
Neck diametre, shoulder:	?	?	?	36.8
Neck diametre, interior:	17.8	15.4	15.6	13.9
Colour:	10Y 5/5	7.5Y 5/5	10Y 5/5	2.5GY 5/5

\*Estimated    ?=Indeterminate

Finish, Beveled String Rim, Convex Neck (27)

Description: One of these specimens is a small fragment while the other includes a remnant of a sloping rounded shoulder (Fig. 107a). The neck is tapered and pinched in just below the string rim to give the neck a convex profile. The mouth is everted and the lip is tooled and slightly beveled but does not have as large a diametre as the string rim. The string rim is large, has a rounded top and an inward curved bottom which was slightly uptooled when it was attached to the neck and the neck was pinched inward. The metal is dark greenish yellow to light olive in colour.

The specimen most closely resembles the rim and neck form illustrated by McKearin and McKearin (1941:

Plate 221, No. 8) which has an approximate date range of about 1770-90 (McKearin and McKearin 1941: 425) or to No. 7 (McKearin and McKearin 1941: Plate 221) which has a date of about 1760-70.

Provenience:	2A5A1	2A6D2
Dimensions (in mm.):		
Exterior diameter, mouth:	32.0	31.9
Interior diameter, lip:	21.0	21.8
Exterior diameter, string rim:	38.1	37.4
Neck length:	?	83.0
Top of string rim to lip:	3.3	6.5
Thickness, string rim:	7.6	7.4
Neck diameter, below string rim:	30.5	29.0
Neck diameter, middle:	?	33.6
Neck diameter, shoulder:	?	40.8
Neck diameter, interior:	18.6	18.9
Colour:	7.5Y 6/7	10Y 5/5

?=Indeterminate

Finish, Beveled, Curved String Rim, Convex Neck (28)

Description: This fragmentary bottle finish includes the upper portion of one side of a tapered convex neck (Fig. 107b). The mouth is everted and the top of the lip is tooled smooth. The narrow string rim has a rounded top and a recurved bottom, uptooled

and constricting the neck below the string rim. The string rim has a greater diameter than the lip. The metal is light olive (10Y 5/5).

The rim is similar to one illustrated by Noel Hume (1961: Fig. 5, No. 19) except for the recurved bottom of the string rim which characterizes the Castle Hill specimen. The specimen Noel Hume illustrates falls into the 1750-70 period.

Provenience:	2A10D16
Dimensions (in mm.):	
Exterior diameter, mouth:	30.0*
Interior diameter, lip:	20.0
Exterior diameter, string rim:	32.0*
Neck length:	?
Top of string rim to lip:	6.0
Thickness, string rim:	5.5
Neck diameter, interior:	17.2*

\*Estimated ?=Indeterminate

Finish, Beveled String Rim, V Lip, Convex Neck (29)

Description: This fragment has a tapered neck with a convex profile (Fig. 107c). The mouth is everted and the lip downtooled to form a V shaped beveled cross-section. The top of the V shaped lip is slightly convex while the bottom is slightly concave. The string rim

also has a V beveled cross-section, the top being convex and the bottom slightly concave. At the top, where the string rim joins the neck, there is a slight groove. The metal is light olive (7.5Y 5/5).

The specimen is similar but not identical to one illustrated by Noel Hume (1961: Fig. 5, No. 18) of the 1750-70 period.

Provenience:	2A6D2
Dimensions (in mm.):	
Exterior diameter, mouth:	30.0*
Interior diameter, lip:	17.0*
Diameter, string rim:	32.0*
Top of string rim to lip:	7.2
Thickness, string rim:	6.2
Neck diameter, interior:	13.0*

\*Estimated

Finish, Flat Bottomed String Rim, Convex Neck (30)

Description: This rim fragment retains a small portion of the neck which was probably convex in profile since it is pinched inward just below the string rim (Fig. 107d). The mouth is everted, and the top of the lip has been smoothed and slightly beveled. The top of the string rim is located just below the lip. The string rim is beveled outward from top to

bottom, having a slightly concave profile and a flat bottom. The metal is light olive (10Y 5/5).

The specimen is similar to Noel Hume (1961: Fig. 5, No. 19) of the 1750-70 period, but differs in that the top of the string rim is very close to the lip.

Provenience:	2A5C13
Dimensions (in mm.):	
Exterior diameter, mouth:	29.6
Interior diameter, lip:	21.8
Exterior diameter, string rim:	35.4
Top of string rim to lip:	3.0
Thickness, string rim:	6.7
Neck diameter, below string rim:	28.1
Neck diameter, interior:	17.0

A second specimen is included in this category on the basis of its convex neck form and the wide flat base of the string rim. The top of the string rim and lip are missing and the specimen is too fragmentary to produce meaningful dimensions. It may have been similar to the one described above.

Provenience:	2A6D6
Diameter of string rim:	31.0 mm. (est.)
Colour:	2.5GY 5/5 moderate yellow green



## Base, Cylindrical, Bell-shaped Kickup (31)

Description: These specimens are bases and base fragments of cylindrical bottles with bell-shaped kickups (Fig. 107e). The kickups have nearly vertical sides and a domed, flattened top. The top portion of the kickup has a roughened surface and there is a ring-like pontil mark encircling the kickup at the point where its contour changes to form the bell shape. The roughened surface is indicative of a sand pontil (Jones, Pers. Comm.).

On the exterior, the vessel wall is indented, or sags slightly, just above the thicker base. The metal is light olive (7.5Y 5/5 to 10Y 5/5) in colour. The exterior surfaces of the bottles have a pebbly or orange-peel look or rippled surface probably from manufacture in a metal mold.

Additional pontil marks on the kickups include one example with a fragment of glass adhering to the top of the kickup (2A6D11) and four examples in which there is a quatrefoil pattern of four sharp indentations in the kickup top (2A6D20, 2A10B27, 2A10F12, 2A10C9). One specimen (2A10E16) has a two point indentation and another (2A6D12) has a fold of glass. These specimens all exhibit the roughened surface and kickup ring line as well as these pontil marks.

When the base is viewed in cross-section, on the interior of the bottle, the angle formed between the vertical wall of the side and the upward sloping kickup can be described as having a V to slightly rounded V shape. This is the most common section of this angle but some similar bases can be distinguished on the basis of different cross-sections in this area.

Bases with this general shape are illustrated by Noel Hume (1961: Fig. 4, No. 15, 16 and Fig. 5, No. 19) of the 1750-70 period. One base of this type was present on the single restorable specimen described above (type 22), and is probably the base form associated with various rim types of the same time period although such associations cannot be demonstrated.

These specimens may be divided into two groups on the basis of kickup height. The height is measured from the plane of the resting point of the bottle to the top of the kickup (exterior surface). The bases classified as having high kickups have heights ranging from 31.4 mm. to 56.2 mm. with a mean of 42.5 mm. Low kickups range in height from 22.0 mm. to 31.8 mm. with a mean of 27.3 mm. Not all of the specimens complete enough to classify as having bell-shaped kickups were sufficiently complete to measure the kickup height as described above. However, these specimens were complete enough to include a remnant

of the kickup pontil mark ring. The height of the pontil mark ring mark above the resting point plane or base line was measured on complete specimens and it was determined that high kickup specimens had a mean pontil mark ring height of 28.9 mm. while low kickup examples exhibited a mean of 16.7 mm. A pontil mark ring height of 22.0 mm. was arbitrarily selected as a dividing line between high and low specimens with this trait.

Using these two measurements, kickup height and pontil mark ring height, "high" bell-shaped kickups (Fig. 107e) are those with a kickup more than 30.0 mm. in height and a pontil mark ring more than 22.0 mm. above the base line. "Low" kickup specimens (Fig. 107f) are those with kickups less than 29.9 mm. high and a pontil mark ring height of less than 21.9 mm. above the base line. Only one specimen had a combination of dimensions outside these ranges; it had a kickup height of 31.8 mm. and a pontil mark ring height of 19.4 mm. and was classified as a "low" kickup sub-type.

The bases with "high" kickups tend to have larger diameters than those with lower kickups. However, there is overlapping of the range of base diameters with the "high/low" kickup classes, and kickup height is not an absolute guide to estimated diameter, nor is

diameter an absolute guide to kickup height. However, the average diameter for bottles with "high" kickups was 12.0 mm. larger than the mean diameter of "low" kickup specimens. The major difference between the high and low sub-types of bell-shaped kickups used in this description may be nothing more significant than the difference between bottles of different sizes. It could also be due to a change in the relationship between body diameter and body height (Jones 1970: Pers. Comm.).

High Kickups	Base	Kickup	Pontil Mark	
Provenience	Diam.	Height	Ring Height	Colour
2A5C5	115.0*	44.3	37.1	7.5Y 5/5
2A6A1	100.0*	54.3+*	34.0+*	7.5Y 5/5
2A6D3	80.0*	?	25.0	7.5Y 5/5
2A6D6	80.0*	46.2*	42.0	7.5Y 5/5
2A6D6	80.0*	33.3*	20.0*	7.5Y 5/5
2A6D11	90.0*	38.2*	22.1	7.5Y 5/5
2A6D12	80.0*	?	24.0	7.5Y 5/5
2A6D12	90.0*	44.2	25.0	10Y 5/5
2A6D20	90.0*	43.4	38.7	7.5Y 5/5
2A10A1	90.0*	?	33.0*	7.5Y 5/5
2A10B1	88.3	38.4	22.4	7.5Y 5/5
2A10B10	92.9	56.2	33.4	7.5Y 5/5
2A10B27	97.9	42.0	24.6	7.5Y 5/5
2A10C9	90.0*	31.4	22.9	7.5Y 5/5

2A10D12	?	?	33.0*	10Y 5/5
2A10F12	84.4	37.6	31.7	7.5Y 5/5
2A10H2	83.0*	?	21.8	7.5Y 5/5

All dimensions are in millimetres.

\*Estimated ?=Indeterminate

Low Kickups	Base	Kickup	Pontil Mark	
Provenience	Diam.	Height	Ring Height	Colour
2A6A2	80.0*	?	15.0	10Y 5/5
2A6A9	90.0*	?	15.1	10Y 5/5
2A6D6	90.0	?	13.4	7.5Y 5/5
2A6D11	78.5	24.5	13.1	7.5Y 5/5
2A6D12	80.0*	?	15.3	7.5Y 5/5
2A6D12	?	?	17.6	7.5Y 5/5
2A6D12	85.0+*	31.8	19.4	7.5Y 5/5
2A8A1	80.0*	22.0*	11.4	7.5Y 5/5
2A10A1	90.1	27.9	20.4	7.5Y 5/5
2A10C2	95.0*	26.5	19.9	7.5Y 5/5
2A10E5	90.0*	?	21.1	7.5Y 5/5
2A10E16	90.0*	29.3	16.9	7.5Y 5/5
2A10G2	?	29.2*	22.1	10Y 5/5
2A10G8	80.0*	?	18.9	7.5Y 5/5
2A10J1	80.0*	?	11.9	10Y 5/5

All dimensions are in millimetres.

\*Estimated ?=Indeterminate

Base, Trapezoidal ?, Indented, Hemispherical-shaped  
Kickup (32)

Description: This specimen is the base of a bottle with a low bell-shaped kickup (Fig. 108a). Very little of the vessel wall is remaining and it is difficult to determine the form of the body of the bottle. It has a slightly indented basal sag. The diameter of the body is 5.0 mm. larger than the diameter of the base at the highest measurable point, 37.0 mm. above the baseline. This difference is unlike the cylindrical forms and it therefore seems likely that this specimen was trapezoidal in vertical section, with shoulders of considerably larger diameter than the base. In its other traits it is like the bases with bell-shaped kickups. The surface is pebbly and the metal dark greenish yellow (7.5Y 6/7). The specimen is most similar to one illustrated by Noel Hume (1961: Fig. 4, No. 15) of the 1750-70 period.

Provenience:	2A6D2
Dimensions (in mm.):	
Exterior diameter, body:	100.0
Exterior diameter, body base:	95.0
Diameter of base:	79.1
Kickup height:	25.2
Pontil Mark ring height:	11.6

## Base, Cylindrical, Indented, Hemispherical Kickup (33)

Description: Bottle bases of this type are from cylindrical bottles (Fig. 108b). They sag, or are indented, just above the bottom. The kickup is a rounded dome form, nearly hemispherical in section. The top of the kickup has a roughened surface but lacks the characteristic form of the bell-shaped kickup, being more smoothly rounded. The angle between the interior of the wall and the kickup is a V shaped to rounded V form. The exterior surface of the metal is a pebbly texture. The metal is dark greenish yellow to light olive in colour. One specimen, 2A10H2, has a different colour in cross-section which appears to be laminated with a thin light blue surface layer and a dark blue layer.

This base form is similar to those illustrated by Noel Hume (1961: Fig. 5, No. 20) of 1750-70 and (1961: Fig. 5, No. 21) of about 1770-1800, but differ in having the V shaped interior base angle in contrast to the more open angle in Noel Hume's illustration.

Provenience:	2A3A1	2A6A1	2A10G7	2A10H2
Dimensions (in mm.):				
Base diametre, body:	110.0*	104.0*	90.0*	100.0*
Base diametre:	100.0*	85.0*	80.0*	82.0*
Kickup height:	?	23.5	20.0*	23.2
Colour:	7.5Y 6/7	10Y 5/5	7.5Y 6/7	10Y 5/5

\*Estimated ?=Indeterminate

Base, Cylindrical, Indented, Domed "Conical" Kickup (34)

Description: These base fragments are from bottles with cylindrical sections and indented (sagged) areas above the base (Fig. 108c,d,g). The kickup is domed and distinguished by being higher and somewhat more conical in form than the hemispherical examples described earlier. It lacks the characteristics of the bell-shape. The angle formed by the interior of the wall and the rising kickup is a V to rounded V shape. Pontil marks include roughened areas at the top of the kickup and one example which has an encircling line similar to the pontil mark ring of a bell-shaped kickup. One specimen has a small round indentation with a transverse slot located in the top of the kickup; this example (2A5C13) has the highest and most conical kickup. The metal has a slightly granular appearance and is mostly light olive in colour; one example is a brilliant green.

These specimens are most similar to one illustrated by Hume (1961: Fig. 4, No. 14 or 21) of the period 1740-60, except that the interior base angle is a sharper V form than in Noel Hume's illustration.

	Body	Base	Kickup	Colour
Provenience	Diam.	Diam.	Height	
2A6A9	110.0*	100.0*	33.4	10Y 5/5
2A6D4	110.0*	100.0*	28.9*	10Y 5/5



2A6D6	90.0*	75.0	15.2	10Y 5/5
2A6D12	90.0*	80.0	?	10Y 5/5
2A6D18	90.0*	80.0	26.9	5Y 5/6
2A5C13	96.0	78.0	43.3	5GY 8/8

Base, Cylindrical, Indented, Conical Domed Kickup, U  
Base Angle (35)

Description: These specimens are bases of cylindrical bottles with indented bases (Fig. 108 e,f). Only one example has a complete kickup intact. In this specimen (2A6D6) the kickup is a high conical form with a rounded top on the interior of the bottle. On the exterior side the kickup bears a circular pontil mark the same size as the top of the cone-like kickup. The interior base angle between the vessel wall and the slope of the rising kickup is distinctive; it forms a rounded groove which can be described as U shaped in contrast to the more common V shaped angle described earlier for other types. This specimen, the best example of the type, is listed first in the tabulation below. The remainder of the examples are fragments lacking the kickup and are difficult to classify since only a remnant of the interior base angle remains. These specimens have been included in this type because the remnant of the angle appears to be U shaped. The

exterior surfaces of the specimens have pebbly surfaces. The metal is light olive, with one example of strong yellow green. The closest parallel illustrated by Noel Hume (1961: Fig. 4, No. 14) is of about 1740-60 date.

Provenience	Base	Base	Kickup	Colour
	(Body)	Diam.	Height	
2A6D6	Diam.	Diam.	Height	
2A6D6	110.0	93.0	55.2	10Y 5/5
2A3B2	120.0*	110.0*	?	5Y 5/6
2A6D6	?	90.0*	?	7.5Y 5/5
2A7A4	130.0*	120.0*	?	7.5Y 5/5
2A7A8	100.0*	90.0*	?	2.5GY 6/8
2A10B1	100.0*	90.0*	?	10Y 7/9
2A10E20	?	?	?	7.5Y 5/5

All dimensions are in millimetres.

\*Estimate    ?=Indeterminate

### Miscellaneous Bottle Sherds

A large number of sherds from broken bottles are too small for typological classification. These specimens have been tabulated on the basis of the portion of the bottle represented and in terms of the colour of the metal.

#### Neck Sherds (36)

Sherds from the necks of bottles which lack remnants

of the string rim or rim have been placed in this category. A few of the specimens are large enough to determine the probable profile of the neck and have been classified as straight-concave or convex and tabulated separately. The remainder of the sherds are indeterminate.

Prov.	2.5GY 5/5	10Y 5/5	7.5Y 5/5	7.5Y 6/7	5Y 5/6	Remarks
2A6D6	1	1	1			St.-concave
2A6D7		1				St.-concave
2A6D10			1			St.-concave
2A6D11		1				St.-concave
2A9E13			1			St.-concave
2A5C13	1					Convex
2A6D6		1	3		1	Convex
2A6D12	1					Convex
2A6D13					1	Convex
2A6D20			1			Convex
2A8B1	1					Convex
2A10C9			1		2	Convex
2A10E16			1			Convex
2A10G2	1					Convex
2A3A4			1			Indeterminate
2A5C13		1				Indeterminate
2A6A9		1		1		Indeterminate
2A6C2			1			Indeterminate



## Shoulder Sherds (37)

These are curved sherds from the shoulders of bottles. They are tabulated in terms of the colour of the metal.

Provenience	2.5GY 5/5	10Y 5/5	7.5Y 5/5	5Y 5/6
2A1A7	1			
2A3C4			1	
2A4A2		1		
2A5C13	2			
2A6A6			1	
2A6A7	1			
2A6A9	1			
2A6D2		1	1	
2A6D3				1
2A6D5		1		
2A6D6	6	1	17	
2A6D7	1	3	2	
2A6D8	4		4	
2A6D10	1	1	5	
2A6D11			8	
2A6D12	2	1	3	
2A6D14	3		1	
2A6D18	1	1		
2A6D20	3	3	5	
2A6D21			1	

Provenience	2.5GY 5/5	10Y 5/5	7.5Y 5/5	5Y 5/6
2A6E6		1	2	
2A6E7		2	9	
2A7A2	1			
2A7A5		1		
2A7A6			1	
2A7A11			1	
2A9F5	1	1		
2A9E15			1	
2A9J5				1
2A9K12	1			
2A10A1			1	
2A10B7			1	
2A10B14			1	
2A10C5		1		
2A10D4	1			
2A10D10			1	
2A10D13			1	
2A10D14			1	
2A10E3			1	
2A10E10			2	
2A10E11			1	
2A10E12			1	
2A10E16			1	
2A10E18	1	1	1	
2A10E19			1	
2A10E21			1	

Provenience	2.5GY 5/5	10Y 5/5	7.5Y 5/5	5Y 5/6
2A10F7	1			
2A10F15			1	
2A10F31		1		
2A10F34			1	
2A10G4			1	1
2A10G5			1	
2A13A2			1	

## Body Sherds (38)

These sherds are from the wall of the bottles. In addition to the normal range of metal colours, there are several specimens which have a laminated light/dark blue colour in cross-section.

Provenience	2.5GY 5/5	10Y 5/5	7.5Y 5/5	5Y 5/6	2.5PB 3/6	7.5B 8/4
2A1A1			1			
2A1A5			1			
2A1A7	1					
2A1B2			1			
2A2C7			1			
2A3A2			1			
2A3A4	3					
2A3B2			3			
2A3C2	2					
2A3C3						1
2A5C3	1					

7.5B 8/4

Provenience	2.5GY 5/5	10Y 5/5	7.5Y 5/5	5Y 5/6	2.5PB 3/6
2A5C12			1		
2A5C13	2	6			
2A6A3	1				
2A6A7		3			
2A6A8				1	1
2A6A9		10			
2A6C2			1		
2A6D-	2		5		
2A6D1			3		
2A6D2		1	4		
2A6D3		1	2	1	
2A6D4		6	5		
2A6D6	19		96		1
2A6D7	38		18		
2A6D8	2		6		
2A6D10			43	1	
2A6D11			25		
2A6D12	3		28	2	
2A6D13			6		
2A6D14			14		
2A6D15			1		
2A6D18	5				
2A6D19	1				
2A6D20	9		7		
2A6D21			1		



7.5B 8/4

Provenience	2.5GY 5/5	10Y 5/5	7.5Y 5/5	5Y 5/6	2.5PB 3/6
2A6E4	4				
2A6E6			1		
2A6E7			22		
2A7A1				3	
2A7A2				1	
2A7A3			1		
2A7A5	1	1	1		
2A7A6			1		
2A8A2		1	1		
2A8B1			3		
2A9E1 2				1	
2A9F3		2			
2A9F5				1	
2A9F6				1	
2A9K14			1		
2A10A1		1	2		
2A10A2			4		
2A10A3			1		
2A10A8			1		
2A10B6			1		
2A10B10			3		
2A10B11			2		
2A10B12			2		
2A10B13			2		
2A10C1		1			

7.5B 8/4

Provenience	2.5GY 5/5	10Y 5/5	7.5Y 5/5	5Y 5/6	2.5PB 3/6
2A10C2	1				
2A10C4			1		
2A10C5				2	
2A10C6		1			
2A10C7				2	
2A10C9				3	
2A10C10		1	1		
2A10C15				2	
2A10C18		1	3		
2A10D1		1			
2A10D4				2	
2A10D7	1				
2A10D10				1	
2A10D12		1	2		
2A10D13				2	
2A10D15				2	
2A10D16		1			
2A10D17				3	
2A10D19				1	
2A10E2				2	
2A10E3				4	
2A10E4				2	
2A10E7				1	
2A10E10				1	

7.5B 8/4

Provenience	2.5GY 5/5	10Y 5/5	7.5Y 5/5	5Y 5/6	2.5PB 3/6
2A10E12			3		
2A10E13			1		
2A10E14		1			
2A10E16			1		
2A10E18		1	1		1
2A10E19			2		
2A10E20			2		
2A10E22		1	2		1
2A10F2			1		
2A10F3	1		3		
2A10F6			1	4	
2A10F7			3	1	
2A10F9			1		
2A10F12			2		
2A10F14			6		
2A10F15		1	1		
2A10F17		1	2	1	
2A10F22			1		
2A10F23		1	2		
2A10F24	1				
2A10F27			1		
2A10F30			1		
2A10F31			1		
2A10G4			1	1	

7.5B 8/4

Provenience	2.5GY 5/5	10Y 5/5	7.5Y 5/5	5Y 5/6	2.5PB 3/6
2A10G5			3		
2A10G6				1	
2A10G7			1		
2A10G8			1		
2A10H2	3		3		
2A10H3		1			
2A10H12	1	1			
2A10J2	2				
2A10J5		1			
2A12A2			1		
2A13A2		1			1

## Kickup Fragments (39)

These specimens are fragments of the kickups from bottle bases but are too small for accurate classification in any of the base type categories, and are therefore indeterminate.

Provenience	2.5GY 5/5	10Y 5/5	7.5Y 5/5	5Y 5/6
2A1A7		1		
2A2C4		1		
2A2C5		1		
2A4A2			1	
2A6A5			1	
2A6A9		1	1	
2A6C1		1		

Provenience	2.5GY 5/5	10Y 5/5	7.5Y 5/5	5Y 5/6
2A6D-			1	
2A6D3			1	
2A6D5			1	
2A6D6		1	2	
2A6D7		1	2	
2A6D10			1	
2A6D12	1		3	
2A6D13			2	
2A6D14		1		
2A6D20			1	
2A6E6			1	
2A6E7			1	
2A7A2			1	
2A7A3			1	
2A7A5			1	
2A8B1			1	
2A9E10			1	
2A9F14		1		1
2A10A1			1	
2A10B5		1		
2A10B7			1	
2A10B11			1	
2A10B27			1	
2A10C7			1	
2A10C10			1	

Provenience	2.5GY 5/5	10Y 5/5	7.5Y 5/5	5Y 5/6
2A10D9			1	
2A10E15			1	
2A10E18		1		
2A10F14			1	
2A10F15			1	
2A10G4			1	
2A10H2			1	
2A10J2		1		
2A12A3		1		

#### Indented Base Sherds (40)

These are sherds from the bottle wall, close to the base, but lacking sufficient amounts of base or kickup for classification. They exhibit the sagged or indented base profile and are from later bottle types.

Provenience	2.5GY 5/5	10Y 5/5	7.5Y 5/5
2A1A5			1
2A1A7			1
2A2A2			1
2A3B2			1
2A3A4			2
2A4A1		1	
2A6A9			2
2A6D3			2
2A6D4		1	1
2A6D6		2	16

Provenience	2.5GY 5/5	10Y 5/5	7.5Y 5/5
2A6D9			1
2A6D10			2
2A6D12			2
2A6D20	2	1	2
2A7A1			3
2A7A3			1
2A7A4			1
2A7A5			5
2A10A1			1
2A10A3			1
2A10A4		1	
2A10B4		1	
2A10B6			2
2A10B11			1
2A10B12			3
2A10B17		1	
2A10C2		1	
2A10C4			1
2A10C5		1	
2A10C6			3
2A10C10			2
2A10C15			1
2A10C18		2	
2A10D9			1
2A10D10	1		2

Provenience	2.5GY 5/5	10Y 5/5	7.5Y 5/5
2A10D13			2
2A10D16			1
2A10E3			1
2A10E4			1
2A10E5			1
2A10E7			1
2A10E10		1	2
2A10E15			2
2A10E18			2
2A10E22			1
2A10F2			1
2A10F13			1
2A10F14			1
2A10F15			1
2A10F17			1
2A10F28			1
2A10G1			1
2A10G4			1
2A10G5			1
2A10H2			1
2A10J2		2	

Applied Rim (41)

Description: This specimen consists of the rim, neck and a portion of the shoulder and side of a bottle



of the "gin" bottle form (Fig. 109a). The body is square-sectioned, a case bottle, with a profile which probably tapered from shoulder to the smaller base. The shoulder has a rounded corner and the top of the shoulder is at right angles to the vessel wall. The bottle has a short neck which tapers to become slightly narrower at the lip; there are diagonal twisted stress lines in the neck. The neck of the bottle forms a direct, untooled lip. Around the lip a thick applied rim has been added. One side of the applied rim is below the lip, the other rises above the lip. The applied rim is thicker at the top than at the bottom. The body of the bottle was probably similar to the ones illustrated by Noel Hume (1961: 106, Fig. 6) but the rim is a different form. The metal is light olive (7.5Y 5/5).

Provenience:	2A6D6
Dimensions (in mm.):	
Exterior diameter, rim:	35.0
Interior mouth diameter:	18.2
Height of applied rim:	12.0
Thickness of applied rim:	2.0-2.8
Neck diameter, below rim:	26.0
Neck diameter, shoulder:	36.0
Height, shoulder to top of rim:	30.0

## Wide Mouth, String Rim (42)

Description: These specimens are fragments of wide or large mouthed bottles with short necks (Fig. 109b). The mouth is slightly everted and the lip has been tooled, slightly thickened and beveled. Below the lip is a narrow string rim which has a convex top and a concave base, untooled, giving it a generally V shaped cross-section. The metal is light olive (7.5Y 5/5). Noel Hume discusses wide mouthed bottles (1961: 108-109) as mid to later 18th century types.

Provenience:	2A6D3	2A6D20
Dimensions (in mm.):		
Mouth diameter:	40.0*	40.0
Interior diameter, lip:	34.2*	33.0
Diameter, string rim:	47.6	42.0*
Neck length:	25.0	26.5
Top of string rim to lip:	4.5	5.4
Thickness, string rim:	7.8	4.9
Neck diameter, interior:	34.0*	26.0*

\*Estimated ?=Indeterminate

## Wide Mouth, Folded Rim (43)

Description: These rims are specimens from short necked wide mouthed bottles (Fig. 109c). The rim is formed by folding over the top of the neck. The fold

forms a thickened rim with a wedge shaped cross-section and a rounded lip. The mouth is slightly everted, especially on the interior. Most examples of the type are small fragments of the rim. One specimen, 2A10G5, retains a small remnant of a gently rounded shoulder. Another example, 2A6D12, fits a portion of a vessel body which is a flat sided, octagonal form. The fit is tentative since the joint is a very small segment, but is probably valid and associates the rim form with the octagonal body form. The metal is light olive (7.5Y 5/5).

These specimens are similar to ones described by Noel Hume (1961: 108-109) as mid to late 18th century forms possibly used for pickles or other solids.

Provenience:	2A5A1	2A6D6	2A6D6	2A6D12	2A6D20	2A10G5
Dimensions (in mm.):						
Exterior diam., mouth:	?	43.9	42.0*	42.0*	42.0*	48.4
Interior diam., mouth:	?	25.8	?	?	?	30.3
Neck length:	?	?	?	25.0	?	28.2
Neck diameter:	?	34.9	?	?	?	38.6
Rim fold height:	?	12.2	12.6	10.9	10.5	11.7

\*Estimated ?=Indeterminate

#### Bases, Octagonal (44)

Description: These bases are fragments of octagonal molded bottles (Fig. 109d). They have two large panels

on opposite sides and three narrow, angled panels at each end. The corners are rounded. The bases are flat and lack a kickup although they are slightly domed. The bases are marked by roughening in the form of concentric oval lines which are faint and irregular. The surfaces of the bottle walls are pebbly in texture. The metal is light olive in colour. This base form can be indirectly associated with only one rim form; on the basis of the probable association of an octagonal body sherd and a wide mouthed rim described above, these bottles may have been short necked and wide mouthed. However, McKearin and McKearin and Noel Hume illustrate octagonal bottles with long convex necks and it is likely that this form was also associated with this base type at Castle Hill. The bases are similar to the octagonal bottles illustrated by Noel Hume (1961: Fig. 4, Nos. 17 and 18) of 1769 and 1770. McKearin and McKearin (1941: Plate 222, 15a and 15b) illustrate similar bottles and suggest a date range of circa 1750-70.

Provenience	Length (in mm.)	Width (in mm.)	Colour
2A6D11	?	?	7.5Y 5/5-6/7
2A6D12	?	46.0*	7.5Y 5/5-6/7
2A6D13	72.0	47.0+*	7.5Y 5/5-6/7

Provenience	Length (in mm.)	Width (in mm.)	Colour
2A6D14	78.9	56.5	7.5Y 5/5-6/7
2A6D20	?	?	7.5Y 5/5-6/7
2A6D20	77.5	56.0	7.5Y 5/5-6/7
2A10C4	?	?	7.5Y 5/5-6/7
2A10C9	?	?	7.5Y 5/5-6/7
2A10C9-10C10	?	?	7.5Y 5/5-6/7
2A10G2	?	?	10Y 5/5
2A10G5	?	?	7.5Y 5/5

\*Estimated ?=Indeterminate

#### Body Sherds, Octagonal Bottles (45)

Description: These specimens are body sherds which can be determined to be from octagonally shaped bottles by the angles and combination of panels or their flat sides (Fig. 109e).

Provenience	2.5GY 5/5	10Y 5/5	7.5Y 5/5-6/7
2A6D1			2
2A6D2	1		4
2A6D3			3
2A6D4			1
2A6D6	1		4
2A6D12			4
2A6D13			4
2A6D14			3

Provenience	2.5GY 5/5	10Y 5/5	7.5Y 5/5-6/7
2A6D20		1	9
2A9F5	1		
2A9G5			1
2A9G7			1
2A9G10			2
2A9K14		1	
2A10C6	1		
2A10C9			1
2A10E3			3
2A10E10	1		2
2A10E13			1
2A10E18	1		
2A10F3			1
2A10G4		1	
2A10G5	3		
2A????			3

Base, Cylindrical Bottle, Truncated Conical Kickup with Nipple (46)

Description: This bottle base is cylindrical and has a tall conical kickup truncated by a flat top on the interior of the bottle (Fig. 109f). On the exterior the kickup has a hemispherical knob or nipple-like projection. The specimen is probably a French wine bottle of the late

19th or 20th century (Olive Jones: Pers. Comm.; cf. Putnam 1965: 137,153; Montagne 1961: 159). The specimen was probably made by the turn-mold technique (Toulouse 1969: 532) but lacks associated body sherds and cannot be positively identified. The metal is light olive (5Y 5/6). The specimen is composed of several cross-mended sherds from different stratigraphic contexts in the site. Three sherds were from the ditch fill and one from an occupational zone (10G4). The contexts of the four lots from which sherds were recovered were identified as English, probable English, probable French and indeterminate. The specimen is probably a late intrusive into the site, at least on typological grounds.

Provenience: 2A10G4-6D5-6D18-6A7 (crossmend)

Dimensions (in mm.):

Diameter of base: 80.0

Height of kickup: 57.0

(From base to top on interior of bottle)

Diameter, top of kickup: 34.0

(Interior)

Height of kickup: 52.0

Height of knob or nipple: 42.0

Bottle Seals (47)

Description: Two oval glass bottle seals were

recovered during the excavations (Fig. 105 b,c).

The first came from 2A10C2, an English level. It is oval, has a maximum diameter of 41.0 mm. In its centre the metal is thinner, forming a depressed area 26.0 mm. in diameter. The letters AIR No I are stamped in the centre of the seal.

The second specimen is from 2A10E18, also an English level. It is an irregular oval seal 43.0 mm. in diameter. It bears a name and date: W. Saunder 1777 in molded raised letters. The date is consistent with the English occupation of the Castle.

### Interpretations

Marwitt has described two groups of bottles from Louisbourg. Group I, presumably English, was described as "usually Y hue; a few are GY." In contrast, group II specimens, presumably French, exhibit metal colours which are "usually GY or G hue; a few are Y hue" (Marwitt 1966: 26-28). Thus French glass appears to be greener in colour than English glass although the ranges overlap.

An analysis of the glass fragments from Castle Hill confirms Marwitt's observations. A tabulation of glass hues from stratigraphic and culturally identified contexts at Castle Hill indicates that green hues are



more frequent in glass fragments from French occupational levels and the yellow hues are more frequent in English debris.

One important source of data is the strata block excavated in the fortification ditch. Well defined stratigraphic levels were observed and excavated and despite evidence of post-deposition mixture within the fill one strata block was found to be a reasonably reliable unit of study within the ditch fill deposits. Table 85 shows the distribution of glass colour hues for bottle sherds recovered in the strata block.

The upper and lower stratigraphic lots in the block may be eliminated from consideration because the sample of bottle sherds recovered is too small for study. The other layers exhibit a clear series of trends with a reduction of relative frequency of BG, G and GY hued glass in the 2A6D6 level and a corresponding increase in the relative percentage of Y hue sherds. The lots 2A6D7 and 2A6D8 are primarily of French origin while 2A6D6 is mixed but presumably contains a large proportion of English refuse. These data thus suggest an increase in Y hue glass during the English period at the site despite the disturbed and mixed nature of the ditch fill.

Another approach to determining relative frequency

of glass hues is to examine the colour of bottle sherds from a culturally identified stratigraphic unit not subject to potential mixture of specimens found in the ditch fill refuse deposits. All of the strata in sub-operation 9E are of French origin with the exception of two intrusive English deposits which did not produce glass sherds. Taking the bottle sherds from these levels as a single "French" sample, the tabulation of sherd hues was obtained (See Table 86).

Thus, in a sample of glass certainly of French origin on stratigraphic grounds, a total of 31.8 per cent Y hue sherds were identified in contrast to 68.2 per cent which had G, GY or BG hued metal. These data are consistent with Marwitt's conclusions.

A summary of the glass colour hue data for the three major stratified occupational zones in sub-operation 9E also produced some interesting results, tabulated in Table 87.

Strata/lot 2A9E2 is the most recent of the three sequential zones of heavy occupational debris within the series of strata in the primary bastion fill; 2A9E15 is the earliest. These data suggest that there may have been an increase in the relative frequency of Y hued glass and a corresponding decrease of the G hues during the period of the French occupation at Castle Hill. However, the

sample is small and the time span represented by rampart fill is short; such a conclusion is tentative at best.

None of the English stratigraphic units at the site provide a sample of data adequate for comparison with these from sub-operation 2A9E. It is possible, however, to compare the relative frequency of glass hues from the French and English occupations as a total unit, basing the tabulations on the overall cultural identification of excavated lots. These data are presented in Table 88. Only a small number of excavation units could be identified as unquestionably English and ones with little or no possibility of intrusion or mixture; a larger number of levels and lots could be identified as "probably" English although the possibility of some mixture in such levels must be remembered. Similarly, a number of levels could be readily identified as undisturbed French deposits while additional levels were "probably" French but could contain some intrusive material. Still other excavation units could not be accurately classified as either French or English due to obvious disturbance, sources of mixture, and so on. In Table 88 the glass bottle sherd hue frequencies are tabulated in terms of the cultural identification of lots, English including both "English" and "Probably English" units and French including both "French" and "Probably French" units. Relative frequencies are

also included for the unclassifiable lots and for the site total. The tabulation does not include specimens which were indeterminate in colour.

Table 88 shows clearly that BG, G and most GY hued specimens come from French levels in the site and that Y hued glass, although present in the French sample, is most common in English levels.

The data is further summarized in Table 89.

On the basis of the Castle Hill data, Marwitt's observations of the differences in French and English glass hues at Louisbourg can be confirmed. It is quite clear that greener hues are more common in French glass and yellow hues more common in English material. It is equally clear that colour alone cannot be used to make accurate cultural identifications. Other factors, such as stratigraphic association, ceramic content and pipe stem dating have been used to identify lots. These identifications have been used in turn to examine the cultural distribution of bottle sherds. The differences in distribution of bottle sherds tends to confirm the cultural identifications made on typological grounds, but also shows that all colours are represented in both occupations. The colour of glass might then be a significant clue but would be insufficient evidence for the cultural classification of an unknown lot or site.

The association of the various bottle finish, base and body sherd type categories with the French and English occupations at Castle Hill was investigated through stratigraphic and other data. The sealed French bastion fill deposits excavated in sub-operation 9E were useful in this analysis although not all types are represented in the small sample of specimens from this stratigraphic sequence. The data are summarized in Table 90.

Due to the sealed nature of the 9E bastion fill deposits there is little question about the association of the types listed in Table 90 with the French occupation at Castle Hill.

The stratigraphic data from the best strata block in the fortification ditch fill can also be used to determine the relative frequency of these types. Table 91 presents this data.

In the strata block the sample from the uppermost and lowest levels, 2A6D5 and 2A6D9, respectively, are too small to be very significant. Lot 2A6D5 is a badly mixed level; 2A6D9 is probably a French refuse deposit. Both 2A6D7 and 2A6D8 are probably French deposits though surely with some intrusive materials. Lot 2A6D6 is too badly mixed to classify positively though it probably has a large proportion of English remains. Despite the

mixture the stratigraphic sequence is usable. The results with respect to the glass bottle sherd types are less clear cut than the data from sub-operation 9E; however, types 5, 6, 8, 11, 16 and 17 are associated with the French levels only and type 13 shows a strong association with the French refuse levels in relative terms. Types 19 and 20 are similarly found in both French and the mixed levels but strongly associated with the French levels. Types 36, 37, 38 and 39 are various body sherds and it is not surprising to find them the largest category and present throughout the sequence.

Types 3, 4, 8 and 12, though in the upper deposits in the ditch fill, are probably French types on grounds other than their stratigraphic position in the ditch. However, they could be from the late occupation. Other types, 18, 23, 25, 26, 30, 31, 34, 35, 41, 43, 54 and 46 are represented only in the late levels of the ditch fill. Such a stratigraphic position is consistent with the typological evaluation of these specimens.

Thus the relative frequency of the various bottle sherd types in the ditch fill strata block corresponds reasonably well with the typological classification of the specimens. However, due to the uncertainties concerning the mixed level 2A6D6, the strata block analysis

is inadequate for demonstrating the association of the bottle types with culture periods at the site.

Another approach to this problem can be made through the tabulation of specimens associated with all lots which can be culturally assigned. As explained earlier, the cultural identification of lots varies in reliability and the tabulations are based on groupings as follows: English, Probably English, French, Probably French, Unclassified. Table 92 also includes data on the site total for each type and for the combined cultural identifications.

An examination of the relative frequencies in Table 92 indicates that some bottle sherd types are associated with the French occupation, some are associated with the English period and a number are found in both occupations. A few types are indeterminate since they are not found in culturally identifiable levels; these can, however, be classified on the basis of form. Unfortunately, the sample from definite French and English levels is quite small, few types are represented, and these data are only suggestive at best. Bottle type 1, rim types 7, 14, base types 18, 19 and body types 11, 13 and 36 are found in French contexts. Rim types 22 and 43, base types 33, 40 and 44 and body types 45 and 47 are found in English contexts. Base types 9, 20, 31 and 39 and body types

6, 37 and 38 appear in both French and English contexts. This association data is suggestive, but incomplete due to the small sample of material from these best identified levels.

A more meaningful evaluation of the association of bottle sherd types with occupational periods at Castle Hill can be derived from an inspection of that part of Table 92 in which the Total French and Total English samples are reported. This category combines the material found in English and Probably English levels and similarly combines the specimens from French and Probably French levels. The data provide some clear cut associations of bottle rim types with the two occupations.

Bottle type 1 and finish types 2, 3, 7, 14, 15, 16 and 17 show an exclusive association with deposits identified as French. Rim types 22, 24, 25, 26, 28, 42 and 43 are associated exclusively with deposits identified as English. Rim type 23 is found in both occupations, but may be intrusive in the French level in which it was found; typologically it appears to be a late form. Rim type 21 is from a talus level outside the wall which may be mixed and is hence not classifiable; however it includes French ceramics and has an early mean pipe stem date. Rim type 21 is possibly of the French period. Rim types 27, 29, 30 and 41 are likewise from mixed, culturally



indeterminate, levels. Several of these specimens are from the upper level of the ditch and are presumably late although the level is mixed. Typologically these are all rims of forms to be expected in the English period. In general the stratigraphic and cultural associations of the rim types correspond with the typological classification dating of the specimens which was done prior to context analysis.

The associations of bottle bases is less clear cut, but still in general agreement with the typology. Base types 1 and 5 are found only in French levels. Base types 33, 44 and 46 are found only in English levels. These associations are in agreement with the evaluation of these specimens based on their form and material. Base type 4 is also found in English levels, but appears to be a French type on the basis of form. Two specimens are from indeterminate levels within the ditch fill and the two which are "English" are from deeper ditch fill levels classified as "probably English". The specimens could be French intrusives or they could have been used during the English period.

The remainder of the bottle base types are found in both French and English contexts. However, on typological grounds and on the basis of relative frequencies some of these are more likely French than English and

vice versa. Base type 9 is associated strongly with sealed French refuse and also with possibly English but mixed debris. Base types 18, 19 and 20 are found in both periods but more frequently in the French. This is exactly what would be expected of specimens of this form; they probably were used in both occupations. Base types 31, 34 and 40 are present in both contexts, but are base forms of types too late for the French occupation. The few specimens found in French levels are probably intrusives. Base types 33, 35, 44 and 46 are associated with English levels.

Among the body sherds, types 6, 11, 12 and 13 are mainly from French levels from which some 83 examples are found. The four sherds from English levels are probably due to subsequent mixing of refuse during the English occupation. Body sherd type 45, from octagonal bottles, is probably English with the specimens in French contexts being intrusives. Body sherd types 36, 37, 38 and 39 are found in both French and English contexts. They are too small for classification and could be from bottles of any form.

The analysis in Table 92 included body sherds, but since many of these could come from single bottles another approach might also be useful. In Table 93 all body sherds are omitted. The table also omits any rim

and base types not represented in culturally identifiable lots within the site. This approach provides a comparison which is close to being representative of vessel rather than sherd counts. It does not change the basic association of types with cultures at the site, but may provide a clearer reflection of the relative frequency of different bottle types, as vessel units, at the site.

Although many of the bottle rims cannot be associated with base and/or body sherd types on the basis of fitting sherds, it is possible to group the bottle sherd descriptive types into generalized bottle type categories. Such a grouping is shown in Table 95.

A relative frequency tabulation of these bottle type groups with respect to culturally identified lots is presented in Table 96.

Bottle Groups A, B, C, D, E, F and G are typical of the French period at Castle Hill. Bottle Groups G, H, I, K and L are typical of the English period at the site. Some of the groups are found in both occupations, notably G and the miscellaneous body sherds of M. Groups C and D may have been used by the English but are more likely intrusives due to mixture; Group E is certainly of the French period with a few intrusive sherds in English deposits. Group F was present in both occupations. Group

G was more common in the French period but was probably represented in the bottles used by the English. Groups H, I and K are probably of exclusively English origin with the examples found in French deposits being interpreted as intrusive sherds. The miscellaneous body sherds of Group M undoubtedly include sherds from both periods at the site but are largely fragments of bottles of the 18th century. Group J is only represented in mixed contexts but is probably English.

Thus it can be said that during the French period at Castle Hill there were occasional miniature and tubular necked bottles and small cylindrical bottles with flanged and everted rims in use. The most common bottle was probably a square based form of green hued metal, followed in popularity by the oval bodied, short necked wine bottle. During the English period the oval bodied wine bottle was present but the most popular bottle type was the cylindrical wine bottle. A number of octagonal bottles were also in use during this period, some of them with wide mouths. Bottles were probably somewhat more numerous at the site during the English period than they were during the French occupation. Green hues in glass metal are more common in the French period and yellow hues more characteristic of the English period, the relative frequency shifting

from green to yellow hues during the occupation of the site.

### Window Glass

A large number of fragments of flat glass came from the interior of the redoubt, the area in which several structures had been located. A smaller number of specimens were found in other areas of the site. Most of the fragments are quite small and the 556 specimens probably do not represent a great quantity of glass.

The specimens range from 0.5 mm. to 3.5 mm. in thickness and thickness is uniform throughout the individual sherds. Nearly all of the specimens are covered with an irridescent patina. Most are a light yellowish green to bluish-green in colour, but there are a few examples which are greyish and some which are greener metal. All are clear and include tiny bubbles in their structure. The bubbles appear to have random rather than regular distribution in the metal. Most of the sherds are irregular fragments but a few examples have a straight side.

Although some of these specimens might have some unrecognized function the bulk appear to have been fragments of window panes. Some structures, operation 7 for example, are notable for the lack of window glass sherds, suggesting that they lacked such lights.

The distribution of pane glass sherds in the interior of the redoubt, operation 10, was plotted in an effort to discover significant concentrations which might suggest possible window locations in redoubt structures. It was found that these flat glass sherds were distributed over the entire area, with a few concentrations. They appear to be somewhat less frequent in N980-990/E1010-1020; this is within the foundation area of the English blockhouse. There is also a slightly higher frequency of pane glass sherds in the east central area of the redoubt in grid area N970-990/E1020-1040. This area is between the east side of the blockhouse and the west side of the English storehouse. Some 35 per cent of the total within the redoubt was found in this area and it suggests that one or both of these structures may have had windows facing this area. There is relatively little pane glass in the eastern end of the redoubt in sub-operations 10G and 10H. Sub-operation 10G is mainly within the foundation area of the storeroom while 10H is near the entrance area. Another slight concentration of pane glass was in the northwestern corner of the redoubt interior adjacent to the brick fireplace at the north end of the French barracks foundation. Creamware sherds were also found here and

it seems likely that this concentration represents a trash deposit rather than English reconstruction of this French structure.

The distributional study of glass sherds exhibits some weak correlations with historically known structures in the redoubt but does not provide a positive record of window locations. Probable window locations are indicated on some historical plans.

Table 97 is a tabulation of pane glass sherds by thickness and excavation lot. Table 98 is a summary of the cultural association of these sherds.

It is quite clear that there is an association of this material with the English occupation of the site. There are 503 sherds in English contexts as opposed to only 41 in French associations. Of the latter, many come from "probably" French levels in the ditch fill where such specimens could be later intrusives. No more than nine pane glass sherds were recovered from sealed French fills of a high degree of stratigraphic reliability. It appears to be most unlikely that the pane glass from the site is a significant component of the French artifact inventory.

There is a wide range of thickness represented in the collection but the bulk of the specimens fall into the 1.5 mm. to 2.0 mm. categories; over 79 per cent of the sherds.

Wine Glass Stemware Fragments

Nine small fragments of stemware were recovered (Fig. 110). Each specimen is described below.

Provenience: 2A10F24

A fragment of a plain conical foot (Haynes 1948: 199) of a piece of clear glass stemware was found (Fig. 110g). The estimated diameter of the base is 60.0 mm. and the thickness of the glass at the edge is 2.0 mm. Near the centre the thickness is 7.0 mm. The stem is missing. The specimen is from "probably" English occupational debris in the interior of the redoubt.

Provenience: 2A3C4

A fragment of a plain conical foot (Haynes 1948: 199) of clear glass was also recovered from a mixed rubble level (Fig. 110h). The metal is clear and faintly greenish. The estimated diameter of the foot was 70.0 mm. Glass thickness of the fragment ranges from 1.0 mm. to 1.3 mm.

Provenience: 2A2C8 and 2A2C9

Several very thin fragments of glass 1.0 mm. in thickness were found in French floor deposits in the magazine. One is a rim sherd of a wine glass bowl?, the others indeterminate but probably from the same specimen. The colour of the metal is very pale greenish and irridescent.



Provenience: 2A3A1

A stem fragment lacking the bowl was found in a mixed rubble level. The stem is of the hollow inverted baluster form (Haynes 1948: 202). A trace of the hollow conical foot remains intact (Fig. 110e). The specimen is probably of the 1750-60 period (Haynes 1948: 262). Although the specimen is from a culturally unidentifiable context it is probably of the English period.

Provenience: 2A10D4

A stem fragment of a glass of rather thick clear metal is lacking the foot and retains only a portion of the bowl which may have been of the solid base bell type (Haynes 1948: 194). The bowl is welded to a stem which has an inverted tear drop hollow in its core (Fig. 110f). The stem is 15.0 mm. in diameter at the foot end. It is 14.0 mm. in diameter at the centre and gently flares to 25.0 mm. diameter at the top where it forms a shoulder knob (Haynes 1948: 203). It falls into the plain straight stem class and would date between 1740 and 1775 (Haynes 1948: 245). It was recovered from a "probably" English context in the interior of the redoubt.

Provenience: 2A6D6

This specimen is a fragment of a stem of the opaque

white twist variety (Fig. 110c). The stem metal is clear glass. It has a central white twist formed by a pair of strands spiraling around one another. The outer twist pattern consists of 10 parallel white strands which spiral around the stem. The fragment is 39.0 mm. in length and 14.0 mm. in diameter. It is probably of the 1755-80 period (Haynes 1948: 267) (See also Noel Hume 1970: Fig. 64 XXII). Lot 2A6D6 is "probably" English refuse in the ditch, a context which would agree with the typological date.

Provenience: 2A6D10

This specimen, in a faintly greyish-greenish clear metal, had a hollow plain conical foot; the bowl form is indeterminate (Fig. 110d). The foot is also fragmentary but the stem is complete. It is a balustroid stem (Haynes 1948: 222) of circa 1725-60, a date range consistent with the "probably" English context in the site. The stem is hollow. It has knops which are not pronounced. The overall length of the specimen is 62.0 mm. The diameter of the stem is 8.0 mm.

Provenience: 2A9E7

This fragmentary wine glass stem is made of a bluish green metal (Fig. 110a). The bowl is fragmentary but was probably a trumpet bowl form (Haynes 1948: 195) with a collar at the base. It has an irregular ball knop on the hollow stem. The foot is

missing. The length of the fragment is 42.0 mm., the diameter of the stem is 9.0 mm., diameter of the knob is 14.0 mm. This specimen is from a level in the sealed French rampart fill and certainly belongs to the early period of the occupation of Castle Hill.

Provenience: 2A9E11

Another fragmentary stem section is also from the French rampart fill stratigraphy (Fig. 110b). A small trace of the bowl remains but is of indeterminate form. The metal is clear and faintly bluish green. There is a bladed knob or collar around the stem. The stem is hollow. The fragment is 21.0 mm. long and the annular knob is 20.0 mm. in diameter.

#### Stemware Bowl Fragment

Provenience: 2A9E15

Thickness: 0.5 mm.

Provenience: 2A2C8

Thickness: 0.5 mm.

Remarks: Tiny fragments, possibly part of specimen below.

Provenience: 2A2C9

Thickness: 0.5 mm.

Remarks: Several fragments of curved stemware bowl. Irridescent.

## Summary

Both the French and English can be shown to have used wine glasses at the site. The typological characteristics of the English specimens are consistent with their dating at the site.

## Miscellaneous Glass Artifacts

In addition to the stemware already described, there are a few miscellaneous glass artifacts.

### Cut Glass

A small jewel-like conical disc of faceted cut glass was recovered from an English context (Fig. 110k). It was probably inset into something else, such as a shoe buckle.

Provenience:	2A10F22
Diametre:	11.0 mm.
Thickness:	6.0 mm.

### Plate Glass

A fragment of thick plate glass was recovered from an English rubble zone (Fig. 110j). It is flat and is an irregular fragment. It is decorated with an inlaid wire floral design.

Provenience: 2A10F3  
Thickness: 6.0 mm.

## Bead

An opaque, round, dark green glass bead was recovered from the basal rubble fill of the ditch, a probably French context (Fig. 110i). It has a central hole for stringing. It is probably a type IIa drawn bead of dark palm green colour (Kidd 1970: IIa28 Colour Plate ii, Table 2). It is of large size.

Provenience: 2A6D4  
Diameter: 8.0 mm.  
Hole diameter: 1.5 mm.

## ORDNANCE SUPPLIES AND EQUIPMENT

This chapter is concerned with the description and identification of military equipment and supplies such as cannon balls, cannon carriage parts, musket fragments, lead shot, gunflints and edged weapons.

A good sample of ordnance supplies consisting of grapeshot and cannonballs was recovered from Castle Hill. Although there are some interpretive problems, it is possible to use these data to reach conclusions about the nature of the guns mounted at the redoubt by the French and English during their respective occupations.

Grapeshot

Grapeshot (Fig. 111 b,c) was found in abundance, particularly in operation 1 where 3643 of the total 3987 specimens were recovered. Nearly all of these are from English floor levels in the structure.

The grapeshot specimens are of cast iron, often with a mold seam visible and a slightly irregular diameter. The specimens can be grouped into two major size ranges,

large and small. The specimens in the small size category range in diameter from 20.0 mm. to 25.0 mm. The average diameter is 21.2 mm. and the average weight is 1.34 ounces each. The larger specimens range in size from 29.0 mm. to 32.0 mm. in diameter, averaging 31.1 mm. The average weight is 4.07 ounces. There are but 30 specimens in this size range, and all are from English contexts. The larger sized "grapeshot" could have been fired from a small swivel gun (Chapelle 1949: 92); such armament could have been mounted in the English blockhouse.

Only one specimen of small grapeshot came from an indisputably French context; it was found in the sub-floor bedrock fill of the powder magazine. This specimen had a diameter of 22.0 mm. Twenty-three other grapeshot specimens came from probable French contexts such as predominantly French refuse levels in the ditch. Such proveniences are subject to some potential intrusion, especially by small round objects. In any event, not more than 0.6 per cent of the grapeshot are from possible French levels while 90 per cent are from English contexts and the unclassifiable proveniences contain about 9.4 per cent of the specimens. There seems little doubt that the grapeshot can be identified as ammunition of the English period of occupation.

Nearly all of the grapeshot was found in five excavation lots in operation 1, all locations on the English floor level of the structure which served as the entrance to the magazine. Clay pipe stems from the levels produce a mean date of 1767. Within operation 1 the bedrock slopes downward to the north and it was at this end of the operation that the bulk of the grapeshot was recovered. This location is where dropped specimens would have come to rest. Additional specimens came from the interior of the redoubt. In that location they are scattered except for a minor concentration in the operation 8 area adjacent to operation 1.

The locations from which grapeshot was recovered suggest that these specimens were probably dropped accidentally.

The grapeshot specimens are tabulated in Table 99.

Cannonballs recovered in the excavations include solid shot, bar shot and hollow shells. Fragments of some very large mortar shells were also found. The identification and association of these specimens with the French and English periods of occupation of Castle Hill sheds some light on the armament mounted at the fort. Such a classification is attempted but is subject



to error and is not completely reliable. This problem will be discussed in the analysis following the description of the cannonballs.

### Solid Shot

The solid shot are made of cast iron. Hemispherical mold marks are visible in at least two specimens. Three examples have the British ordnance broad arrow indented on the surface (Fig. 111h). These markings consist of three linear indentations arranged to form an arrow. The lines are all one-eighth in. wide and V shaped in cross-section. The dimensions of the markings are shown in Figure 111e. Several different sizes of cannonballs are present, ranging from 50.0 mm. to 112.0 mm. in diameter. This size range is indicative of cannon of from 1- to 12-pounder calibre.

Diameters were measured or estimated (for fragments) and are recorded in Table 100, which also includes the weight of the specimens. It should be noted that there is considerable variation in the weight of cannonballs of the same diameter. The weight range for specimens 90.0 mm. in diameter is 5 pounds 14 ounces to 7 pounds 8 ounces. This variation is caused by casting faults which can be observed on both whole and fragmentary specimens. The surface of a whole shot may have a small

hole or two which are connected to a larger air chamber inside. In broken shot this casting void and surface vent may be observed directly (Fig. 111g). Casting faults and slight variations in diameter from place to place on a single specimen can account for the weight variations. The observed weight of a shot is thus less reliable as an indicator of its calibre than is its diameter.

### Hollow Shells

The hollow shells are also made of cast iron and sometimes exhibit the hemispherical mold seam (Fig. 111d). One specimen has a truncated casting spur on one side. The diameters and weights of hollow shells are recorded in Table 101 which also includes measurements on the thickness of walls. This dimension is variable. Manucy reports that during the 18th century such shells were cast thicker at the base than at the fuze hole (Manucy 1949: 66). All of the specimens from Castle Hill have a simple fuze hole where this part of the shell is preserved. No evidence of the projecting collar is present (Manucy 1949: 66). Fuze holes range from 12.5 mm. to 18.0 mm. in diameter with a mean value of 15.6 mm. diameter. The shell walls range from 5.0 mm. to 18.1 mm. in thickness, the average shell being 8.3 mm. to 12.8

mm. in wall thickness. For hollow shells it is obvious that diameter rather than weight is the key to calibre identification. Hollow shells range from 80.0 mm. to 100.0 mm. in diameter, representing 4- to 9-pounder cannon.

### Bar Shot

A few examples of bar shot (Manucy 1949: Fig. 41) are present in the collection (Fig. 111 a,f). These consist of a hemispherical ball (or fragment) with a rectangular socket in the flat surface. Ball dimensions and socket dimensions are listed in Table 102. Bar shot ranges in diameter from 89.0 mm. to 140.0 mm., indicating cannon of from 6- to 24-pounder calibres. It is notable that the bar shot is mainly in larger calibre than either solid shot or hollow shell.

Two unusual examples of bar shot have a different structure. The most common bar shot form is a simple hemisphere with a smooth flat surface. In the unusual specimens there is apparently a separate disc or plate, also with a smooth surface (Fig. 111a). These are firmly rusted in place so that the specimens now appear to have a stepped surface but this is merely a difference in thickness where the thin plate has partly broken away. Where the plate or disc remains intact there is

an encircling groove around the exterior of the shot marking the point of separation between the half ball and the disc. The discs are about one-half in. thick.

### Mortar Shells

In addition to the cannonballs described above, fragments of larger mortar shells or bombs were also present. These are made of cast iron and were of large diameter and very thick walled. Some of the fragments are heavier than complete cannonballs. The shell wall varies or tapers in thickness. One example has a step-like cross-section and may be a section through a fuze-hole collar. No complete examples of mortar bombs were found. All of the mortar shell fragments were recovered from French rampart fills in the west gun platform (operation 9) and are entirely associated with the French occupation, confirming historical references to this effect. Based on the estimated shell diameters these were probably for a 10-inch mortar. The estimated calibre is 10.23 inches which would convert to approximately 9 pouce 7 lignes in French measure. French mortars with a bore diameter of 10 pouce are included in a list of such ordnance by St. Remy (1745: Vol. 2, p.4). A diameter of 10 pouce is approximately 10.65 inches, slightly larger than

the estimated shell diameter of 10.23 inches, the difference being accountable as windage. Hence the shell diameter strongly suggests a French 10-inch mortar is represented by these shell fragments.

#### Bar Shot Bars?

Two iron bars have been identified as possible bars from bar shot (Fig. 111a). There is no direct evidence for this identification since the bars were not found in association with the bar shot hemispheres. However, the cross-section dimensions of these bars are of a size to fit the sockets in the hemispherical shot.

These bars appear to be somewhat shorter relative to the shot diameters in specimens illustrated by Manucy (1949: Fig. 41-2) and St. Remy (1745: Vol. 1, Plate 14, E and F). Peterson (1969: 26) illustrates a cross bar shot with a bar of relative length similar to the Castle Hill specimens, but with round rather than hemispherical balls at each end. A similar form of bar shot is also illustrated by Hogg (1970: Fig. 17); here too the bar is longer relative to ball diameter. A civil war period example is illustrated by Ripley (1970: Fig. XII-31). Peterson figures an expanding bar shot which has hemispherical ends and a linked sliding bar (Peterson 1969: 26). Thus it is not possible to demonstrate that these bars from Castle Hill are parts of bar shot on the basis

of exact comparative specimens. However, the tentative identification may be advanced. Other possible shot bars may be found listed with the miscellaneous iron bars, but those specimens do not match the required cross-section dimensions as well as is the case with the specimens described here. It is notable that both these specimens are from French contexts in the site as are most of the examples of bar shot.

Bar Shot Bars:

Provenience	Length (in mm.)	Cross-section (in mm.)
2A9E2	200.0	22.0 x 23.6
2A6D19	193.0	23.3 x 23.5

Analysis of Cannonballs

If the cannonballs can be associated with the two occupations at Castle Hill they can be used to determine what sizes of cannon were mounted at the fort by the French and English.

One problem which affects these as well as other specimens in such an interpretation is that of the accurate identification of excavation lots, a factor subject to some variation. As discussed at length earlier, some lots are clearly French or English, others are probably French or English while still others are

culturally unidentifiable. This factor is controlled by the above classification of lot identifications.

Another problem is that of the intrusive specimens, particularly in those lots classified as probably French or English. These are contexts in rubble or refuse where objects like cannonballs are probably more subject to post-deposition displacement than are less mobile specimens of irregular shape. The possibility of English cannonballs having been fired into the site during the French occupation appears historically unlikely but cannot be totally discounted. The battered condition of one or two of the specimens suggests such a possibility. Other sources of confusion are also present. The French are known to have used English cannon captured at St. John's at Castle Hill (Proulx 1969: 157) and it is likely that they also captured English cannonballs at the same time.

Another problem is the difficulty in identifying French and English specimens. Unlike pottery, cannonballs appear to have few reliable culturally identifiable characteristics although there are some traits which could theoretically be used for this purpose. The best example of a reliable identifying trait is seen on three specimens marked with the broad arrow of British ordnance. Unfortunately the cultural contexts of these three

specimens does little to clarify the point. One specimen is from culturally indeterminate rubble; the other two are from probable French contexts. These specimens could have been later intrusives into these levels or could have been shot captured by the French as outlined above.

Other formal characteristics which are potential means of identifying cannonballs are the size and weight of the specimens. Weight would seem at first hand to be particularly useful especially in determining the popular calibre of cannon used at the site. However, due to minor size differences and casting voids there is such a weight range represented for particular diametres of shot that weight appears to be very unreliable, even for calibre identification. The weight variations for shot of identical diametre may be seen in Table 100. The weights of 90.0 mm. shot, 6-pounders, vary from 5 lbs. 14 ounces to 7 lbs. 8 ounces, although many shot weight tables imply potential precision (Hogg 1970: 274,265). Weight appears to be a poor indicator of calibre.

The diametre of the shot or shell is potentially the most accurate means of identifying the calibre of cannon implied by the shot, since the



bore diameter had to be uniform regardless of the weight of the cannonballs.

Variations in diameter are also a potential means of identifying the cultural origin of cannonballs. This is because the English windage allowance was 20 per cent greater than in French cannon (Manucy 1949: 44) and because of differences in the English and French systems of measurement of the period. Manucy bases his description on Muller (Manucy 1949: 44), and indicates that an English 9-pounder ball was 4.00 in. in diameter and the calibre of the cannon bore was 4.20 in. A French 9-pounder ball measured 4.18 in. in diameter and the cannon bore 4.34 in. (Manucy 1949: 44; Muller 1965: 6,10). As indicated by these diameters, French shot should be larger and heavier than comparable English shot. In English weight the French 9-pounder ball would weight about 9 lbs. 4 ounces. It has already been demonstrated that the weight ranges in the specimen collections vary so much that weight of shot is unreliable despite the theoretical difference noted above, but the diameter factor remains a potential source of identification.

Muller provides tables for the comparison of the diameters of shot and calibres of English cannon

(Muller 1965: 6) with similar dimensions for French cannon expressed in English inches (Muller 1965: 10). In theory one would therefore expect to be able to measure cannonballs and determine their cultural origin by reference to Muller's tables of diameter or calibre. Although this hypothesis appears sound, the actual diameters of shot found at Castle Hill prove to be highly variable and few of the measured dimensions match those listed by Muller or other authorities. Furthermore, there are variations in diameter found on a single cannonball (See Tables 100, 101). Diameters varying from 0.2 mm. to 4.5 mm. can be found on a single shot; a range of 0.019 in. to 0.177 in. calibre difference. This factor must be kept in mind since the diameter difference between English and French 9-pounder balls would be 0.188 in. using Manucy's factor. It should also be noted that there are similar variations in the diameter ascribed to a particular calibre shot by different authorities (See Table 104).

A comparison of diameters of Castle Hill specimens with the closest dimension in Muller and other authorities is presented in Table 104. Muller's data are taken from the 1965 reprint of the 1780 edition (Muller 1965). Hogg presents several tabulations,

some of them apparently based on Muller (Hogg 1970). Peterson records data for English ordnance of 1764 (Peterson 1969). Diderot's Encyclopedia lists shot diametres as of the order of 7 October 1732 (Vol. 2: 608) and also a listing of cannon calibres (Vol. 2: 557-558). These dimensions are in pouces, lignes and fractions which can be converted to inches according to the formula in Berriman (1953: 136-7). In Table 104 the cannon calibre calculated from Diderot's table has been converted to estimated shot diametre by using the proportion for windage in Manucy (1949: 44). The resulting figures are not identical to those in Muller (1965: 10) for French shot diametres. Another source used for French shot diametres is St. Remy (1745) who tabulates the shot diametres for various French calibres. These are shown in Table 104 converted to inches. Table 104 does not list all of the shot diametres reported in the sources used; it omits shot of diametre larger than the specimens from Castle Hill and omits some intermediate sizes not represented in the Castle Hill collection. Descriptions of British naval guns of the American Revolutionary period are available (Chapelle 1949: 89, Fig. 10). Calculations based on the ratios in this source indicate the following calibres: 140 mm. shot, 24-pdr.; 110 mm. shot, 12-pdr.;

100 mm. shot, 9-pdr.; 90 mm. shot, 6-pdr.; 70 mm. shot, 4-pdr.; 50 mm. shot and larger grapeshot 29 mm. to 32 mm. swivel guns. Variations in the diameter and weight of shot are to be expected (Chapelle 1949: 92). Calibre estimates based on Chapelle are also included in Table 104.

On the basis of the size and weight of shot in Table 104 from various authorities and the Castle Hill collection it is concluded that shot diameters and popular calibres can be correlated as follows:

Castle Hill Specimens

Range of diameters

(in in.)	Popular Calibre
1.96	1-pounder
2.75 - 2.95	3-pounder
3.11 - 3.22	4-pounder
3.25 - 3.42	5-pounder
3.46 - 3.74	6-pounder
3.86	8-pounder
3.94 - 4.17	9-pounder
4.33	10-pounder
4.40	12-pounder
5.11	16-pounder
5.51	24-pounder

It may also be concluded that while shot diameter can be utilized to determine the probable calibre of the implied cannon, this measurement is too variable in reality to achieve the cultural identification of the shot implied by the theoretical differences between English and French cannonball diameters. The data may be used to make some informed guesses but are unreliable for greater precision.

We may, however, fall back on archaeological data and associate shot diameters and stratigraphic position in the site. These data are presented in Table 105, and some conclusions concerning the English and French armament at Castle Hill may be advanced. It must be remembered that these conclusions are subject to some unavoidable errors which have been discussed at length.

It may be suggested that the French probably had 1-, 3-, 4-, 5-, 6-, 7-, 8-, 9-, 10- and 16-pounder cannon at the site. In addition there was probably a 10 inch mortar. Some of the French cannon were probably English pieces particularly the 5- and 6-pounder sizes.

The English mounted swivel guns and cannon of 3-, 5-, 6-, 9-, 12- and 24-pounder calibre. The basic English armament consisted of 6- and 9-pounders while the French depended mostly on 5- and 6-pounders but had a larger variety of guns.

The ammunition used during the two periods also varied in the relative frequency of different types of shot as indicated in Table 106.

Grapeshot was rare in French contexts and common in English deposits. Both French and English employed solid shot and hollow shell, but in reversed proportions, shell being more frequent in the English period. Bar shot was relatively more common in French contexts and mortar bombs were only associated with this period.

Historical records afford some additional clues to the cannon mounted at the site. The first cannon mounted at the fort were placed on the platform constructed in 1693. These were a 10-pounder culverine, a 10-pounder cannon, an 8-pounder cannon and two 2-pounders (Proulx 1969: 68). In 1695 the French had 12 cannon of unspecified calibre at the redoubt. These were included among the 34 guns at Plaisance with reported calibres of 35-, 24-, 18-, 12-, 10-, 8-, 4- and 2-pounders and one mortar (Proulx 1969: 90). In 1700 the plan was to mount eight 18-pounders on the gun platform (Proulx 1969: 96-7). Artillery mounted in 1701 was listed as eight cannon and two mortars but calibres are not reported (Proulx 1969: 101). In 1702 there were three mortars and 48 cannon in town, ten of which were at the Castle, but no sizes are recorded

(Proulx 1969: 127). An English prisoner in 1703 reported 10 cannon at Fort Royal (the Castle), seven pointed toward the sea and three toward the port. There were two mortars at the site (Proulx 1969: 129). Another English account in 1709 reported 14 guns and two mortars (Proulx 1969: 153), and a second account in the same year reports 10 cannon and two mortars at the site (Proulx 1969: 156), including "The six best guns from St. John's are mounted here, and all the choicest of their cannon...." (Proulx 1969: 157). Another 1709 account of the French armament reports 16 guns, 10 of iron and six of brass. The iron guns were estimated as of about 12-pounder size while the calibre of the brass cannon was uncertain (Proulx 1969: 160).

Historical records of the cannon at the Castle during the English period include a 1757 proposal to rebuild the redoubt and mount a battery of six cannon of either 6-or 9-pounder calibre (Ingram 1964: 5). Five years later the work had not been completed nor had the cannon been mounted but the six guns sent for the purpose were "ordered up" (Ingram 1964: 5). In 1795 it was feared that firing the two cannon of unspecified size at the Castle would collapse its walls (Ingram 1964: 7) and in 1811 all servicable ordnance

ammunition was removed from the site (Ingram 1964: 7).

A number of specimens classified as parts of cannon carriages or as artillerists tools are described in the section below.

### Iron Eye

This specimen is a heavy iron eye with a square base plate. It was formed by bending an iron rod to form an eye (Fig. 112d). The specimen may be a side loop from a cannon carriage. Side loops with riveted plates are shown in a detail drawing of cannon carriages used on HMS Victory (Bugler 1966: 57, Drawing XIII, No. 19). The specimen is from an English context at Castle Hill.

Provenience:	2A10C18
Dimensions (in mm.):	
Length overall:	175.0
Exterior diametre of ring:	101.0
Interior diametre of ring:	53.0
Diametre of shank:	25.0
Length of shank from interior base of ring to top of base plate:	75.0
Base plate dimensions:	55.0 x 60.0
Base plate thickness:	10.0



Wormer

The wormer was a corkscrew-like device used for cleaning a cannon bore (Manucy 1949: 73; Hogg 1970: 236), usually a double spiral (Fig. 112 b,c). Two specimens interpreted as wormer fragments were found at Castle Hill.

## Spiral Spring

An iron spiral spring-like device, tapering to a point at one end was found in 2A10G5, an English floor level, near a spot where several cannon balls were recovered.

Provenience:	2A10G5
Dimensions (in mm.):	
Length:	83.0
Diametre:(across the sprial)	65.0
Diametre of rod:	11.0 to 4.0

## Socket and shaft

An iron specimen consisting of a hafting socket and a twisted rod-like shaft is also identified as a wormer fragment. This specimen is from a probably French refuse level. Like the spiral fragment, this example appears to be a single spiral form similar to that illustrated by Peterson (1969: 29).

Provenience:	2A6D7
Dimensions (in mm.):	
Overall length (incomplete):	205.0
Shank diameter (tapered):	13.0 to 17.0
Socket length:	56.0
Socket diameter (exterior):	34.0
Socket diameter (interior):	25.0

#### Side Hook with Eye

An iron hook with an eye at one end was recovered from a probable French level (Fig. 113a). The specimen is made of an iron bar, rectangular in cross-section, which has been bent around and forge welded to itself to form an eye at one end. The opposite end is bent in a U shape to form a hook. The hook is tapered to a point. The plane of the hook is at right angles to the plane of the eye. A specimen of similar shape is shown on the end of the axle of an English howitzer carriage (Peterson 1969: 43). A hook on a plate rather than an eye is illustrated on the side of a French naval type garrison carriage (Peterson 1969: 49). The illustrated specimen also differs from the Castle Hill example in having the end bent over to blunt the point; other side hooks have blunt bulbous ends. This Castle Hill

specimen cannot be positively identified as cannon carriage hardware and other functions, such as part of a block and tackle, could be suggested.

Provenience:	2A11A1
Dimensions (in mm.):	
Length:	125.0
Eye diameter:	50.0
Hole diameter:	27.0
Hook length:	75.0

#### Side Hook with Plate

Another example of the side hook (Fig. 114b) with a typical bulbous blunt end was recovered from the surface of operation 9D. It is an iron rod, round in cross-section, bent to form a U shaped hook. The terminal end of the hook is a rounded knob. The opposite end was flattened into a strap for mounting but has been broken off. Such a hook on a strap is illustrated on a French carriage by Peterson (1969: 49) and St. Remy (1745: Plate 34,G).

Provenience:	2A9D Surface
Dimensions (in mm.):	
Length overall:	75.0 inc.
Strap width:	28.0
Strap thickness:	7.0

Hook width:	38.0
Hook shaft diameter:	8.7
Hook end:	8.0 high
Hook end diameter:	17.0

### Eye with Slotted Shank

Large wrought iron eyes with a long shank (Fig. 112a) are similar to the one with the base plate described above but differ in lacking a base plate. Instead, the end of the shank is slotted for the insertion of a cotter key. These specimens were found on the French floor of the magazine and were initially thought to have been incorporated into the fallen roof structure as a hinging eyebolt. It seems more likely that they may have been side loops for a cannon carriage.

Provenience:	2A2C7
Dimensions (in mm.):	
Length overall:	244.4
Shank length:	149.2
Eye diameter:	59.0
Eye thickness:	28.6
Shank diameter, top:	35.0
Shank diameter, bottom:	19.0
Slot dimensions:	6.0 x 30.0

Provenience:	2A2C7
Dimensions (in mm.):	
Length:	200.0
Shank diameter:	25.0
Exterior eye diameter:	115.0
Interior eye diameter:	65.0

### Linch Pins

These specimens consist of tapered iron rods (Fig. 113 c,d). At one end they taper to a blunt point. At the opposite end a section has been hammered flat and its end bent up at right angles to the shaft. Such pins were driven through cannon axles to hold the wheels in place (Peterson 1969: 39,46,49; Bugler 1966: 57, Drawing XIII, 28). Such specimens could also have been used in other wheeled vehicles such as carts, but cannon carriage hardware seems the most likely hypothesis for these specimens at Castle Hill.

The specimens and their dimensions are tabulated in Table 107.

### Friction Primer

This specimen is a rolled copper tube 80.0 mm. in length and 5.0 mm. in diameter (Fig. 113b). A joint

seam runs along one side of the tube. The tube is open at both ends. At a point 2.0 mm. from one end another short rolled open tube or spur has been joined to the longer tube by means of wrapping copper wire around a yoke extension of the short tube. The short tube was 5.0 mm. in diameter but has been flattened and split. It is 12.0 mm. in length. The short tube opens into a hole in the side of the long one to which it is affixed.

Provenience:

2A9C2

The specimen is similar to the friction primer as described by Manucy (1949: 26-27; Fig. 19). The friction primer did not come into use until 1800 (Manucy 1949: 26), a date probably too late for use at Castle Hill although it was not until 1811 that all British ordnance supplies were removed. Hogg dates the introduction of the quick-match tube at 1765 and notes that both copper and quill were used by the British about 1778 (Hogg 1970: 148), dates which encompass the active English occupation of the Castle. The specimen is from a lot within the French rampart fill, but could be intrusive in this now eroded location.

#### Trunnion Cap Square Cotter

Small iron wedges or cotters attached to short

lengths of chain have been identified as keys for locking trunnion caps or covers on cannon carriages (Fig. 114c). These specimens could have been used for latching doors or trunks but in size and shape are most like cannon furniture.

The specimens consist of thin iron rectangles with a protruding stop at one end. In the corner opposite the stop is a perforation through which a short light chain is affixed.

Bugler (1966: 57, XIII, 2,3,5) illustrates the parts of a cannon carriage pertinent to this artifact. The trunnion box is covered with a curved iron strap, the cap square, which is slotted to pass over a slot at the end of an eyebolt. The cap was secured by the type of artifact described above. The chain was affixed to the side of the carriage. Illustrations of the chain and key in place on the carriage and locking the trunnion cap may be seen in Peterson (1969: 37,45,46,52) on both French and English carriages.

One Castle Hill specimen is from a probable French context; the remainder are from probable English refuse levels. The specimens are listed in Table 108.

#### Chain Links

Several links of chain of size and shape similar

to those attached to the keys were also found in English contexts in the site and are listed in Table 109. They probably came from similar artifacts.

### Trunnion Cap

One example of a trunnion cap or cover was recovered from a French context in the site (Fig. 114). It is made of wrought iron and consists of an iron strap with the centre bent upward to go over the trunnion. The proximal end has been slightly tapered or rounded by having the corners bent over. A circular hole in the centre of this end served to attach the cover to the carriage by means of a bolt. A rectangular hole at the opposite end passed over the eyebolt and would have been locked in place by a key. Bugler refers to this furniture as a cap square (Bugler 1966: 57, Drawing XIII, No. 3).

Provenience:	2A9F8
Dimensions (in mm.):	
Length:	184.15
Width:	54.0
Thickness:	6.4
Pivot hole diameter:	12.7
Rectangular hole dimensions:	22.2 x 28.5



Iron Tire or Axle Band?

These specimens are made of iron and have a collar-like form (Fig. 115). The nearly complete example has three holes, two with rose headed nails in situ. These specimens may be iron tires from cannon carriage wheels as illustrated by Peterson (1969: 25). However, such tires have more fastenings, and iron tires were not used on naval carriages to reduce deck wear (Bugler 1966: 58). It is not known what type of carriage was used at the Castle and these specimens could have served some other banding function. The specimens are from mixed and probable French contexts. They could also be Nave (hub) hoops.

Provenience	Metal		
	Thickness	Diameter	Width
	(in mm.)	(in mm.)	(in mm.)
2A10G1	4.0	145.0	45.0
2A11A1	3.0	-	43.0
2A11A1	3.0	-	45.0
2A11A1	3.0	-	42.0

Lead Shot

A sample of 101 lead shot was recovered. The specimens range from a single example of bird shot (3.0 mm. in diameter) to one of 18.5 mm. diameter. Some of

the specimens exhibit remnant mold marks (2A6D6, 2A9E10) and one has a raised oval mold plug intact (2A9G6). The mold plug measures 5.0 mm. x 7.0 mm. and is 2.0 mm. thick. Some specimens are pitted, nicked or have flat spots (2A6D6, 2A6D7, 2A6D12, 2A9E15, 2A9G7). The specimens and their dimensions are listed in Table 110. The table indicates size in millimetres and in inches. The table also includes a summary tabulation by cultural context.

It is clear that the bulk of the sample is from English contexts. Seventy-five specimens were from English floor deposits in the powder magazine (operation 2). The remainder of the English specimens come, for the most part, from occupational debris in the northeast quadrant of the redoubt interior. This area is adjacent to two English structures and the entrance passage to the powder magazine just inside the entrance to the Castle. This is an area which must have had heavy traffic and is thus a likely place for the accidental loss of such items.

The calibre of specimens from English contexts varies widely but calibres .67, .69 and .71 are the most common specimens. These dimensions refer to the size of the shot as measured, and an allowance for windage must be made to determine the calibre of the

musket represented. The English musket of the period was the "Brown Bess" in one or another of several models, all of which were .75-calibre weapons (Peterson 1968: 27-29).

Four specimens came from French floor levels in the magazine; the remainder of the French specimens came primarily from rampart fill deposits. It does not appear to be possible to distinguish the French from the English musket balls on the basis of size in this collection. A similar overlap in size range was noted at Fort Michilimackinac. However, at that site the largest number of musket balls was in the .54 to .59 calibre range (Maxwell and Binford 1961: 106-7) which does suggest that the predominant musket at Castle Hill was of a larger size.

#### Lead Scraps

Lead scraps are included in this section because some of these specimens are sprue strips from a small mold, presumably a bullet mold (Noel Hume 1970: 222). These fragments come from within the powder magazine, from the interior of the redoubt, from ditch fill refuse and from rampart construction fills and are thus associated with both French and English occupations of the site.

One sprue strip is from a French rampart fill level. It consists of a short segment of lead, nearly rectangular in cross-section and with four stumps projecting from one side. Other mold trimmings are oblong to irregular in shape. Stock material may be represented by an irregular slab (2A5C13) and by a thin lead rod or wire with an octagonal cross-section (2A6D7).

The lead scraps are tabulated below.

Provenience	Number of Specimens	Remarks or Dimensions (in mm.)
2A2C4	2	
2A2C7	2	
2A5C13	1	Slab of stock lead, 9 ounces. 63 x 58 x 12
2A6D2	1	
2A6D4	1	
2A6D7	1	Octagonal sectioned stock rod or wire. 20.0 cm. long, 4.0 mm. diameter.
2A6D11	1	Oblong sprue? 53 x 13 x 4
2A6D12	1	Thin angular knife cut trimming strip. 56 x 5 x 2
2A9C1	3	
2A9E15	1	Sprue with four stumps 36 x 6 x 4

Provenience	Number of Specimens	Remarks or Dimensions (in mm.)
2A9E11	1	Flat irregular sprue 38 x 6 x 2
2A10B10	1	
2A10E3	1	
2A10G10	1	
Dirt pile	1	Rectangular section rod. 18 cm. long 3 mm. diameter

It seems likely that moulding of musket balls was done at the site.

A few fragments of firearms were found and are described below.

#### Side Plate

A fragment of a side plate with a rounded end was found in an English context (Fig. 116a). The specimen is made of brass.

Provenience:	2A7A6
Dimensions (in mm.):	
Length:	46.0 (incomplete)
Thickness:	3.0
Width:	17.0
Hole diameter:	8.0

#### Cap Screw

A cap screw was recovered from an English level

(Fig. 116b). It has a rounded head, with flat sides, and is perforated.

Provenience:	2A8B1
Dimensions (in mm.):	
Length:	45.0
Shaft diameter:	7.0
Head dimensions:	10.0 thick
	15.0 diameter
Diameter of hole:	6.0

### Cock

An iron flintlock cock (Fig. 116d) was recovered from a probable French refuse level in the ditch. The specimen is not British military in form (Carlyle Smith: pers. comm.). It has an oval lower flint vise jaw, and a goose necked profile. The hole for attachment of the cock to the lock is rectangular. The specimen is similar to one illustrated by St. Remy (1745: Vol. 2, Pl. 42) which could support a French identification for the specimen.

Provenience:	2A6D7
Dimensions (in mm.):	
Overall length:	79.4
Vise jaw: length:	25.0
width:	18.0
thickness:	5.0
hole diameter:	5.0



Provenience:	2A9J5
Dimensions (in mm.):	
Length:	56.0
Diametre of wire:	3.0
Diametre of spring (but distorted):	11.0

### Gunflints

Twenty-five gunflints, one strike-a-light and eight irregular flint flakes were found. Gunflints associated with the French occupation are listed in Table 111 while those from English associations are listed in Table 112. Table 113 lists the strike-a-light and miscellaneous flakes.

The gunflints (Figs. 117, 118, 119) may be divided into two basic types, the blade gunflint and the spall gunflint. The spall gunflint is the most common and is termed the gunspall (Hamilton 1964), Clactonian (Witthoft 1966) or spall gunflint (Stone 1970). The blade gunflint (Stone 1970) is termed the gunflint by Hamilton (1964) and the blade type (Witthoft 1966).

The spall gunflint retains the unretouched bulb of percussion on the face or top surface near the heel or back of the flint. In the collection from Castle Hill the spall gunflints from English contexts exhibit a more pronounced bulb of percussion than is present on French



specimens. The thick heel of the spall gunflint type has been beveled and rounded by the removal of small flakes, and such trimming usually extends around the sides of the specimen. The flint is plano-convex or wedge shaped in cross-section. The striking edge is straight to irregular and most specimens exhibit small flake scars on both face and bed surfaces, probably resulting from use. A number of the specimens are fragmentary and are missing either the heel or striking edge or are broken in half. The fragments are sufficiently complete that they can be classified. The rounded heel is present on all but a few examples. Exceptions include one specimen from 2A10C2 which has a straight heel and one from 2A6D7 which has a slightly concave heel. The latter example is also narrower in the blade than at the heel in contrast to the usual widening of the blade toward the striking edge. This specimen is also unusual in that its striking edge is diagonal. This can be interpreted as a flint which was extensively worn and retouched, possibly from use in a strike-a-light. It is described with the gunflints, however, since it differs from the strike-a-light identified as such in the site. A third unusual example of the spall gunflint type is a rather large specimen made from a creamy white chalky chert. It is missing the heel.

The prismatic or blade gunflint was made from a section of a parallel sided blade and is characterized by a flattened top resulting from a transverse flake scar. The top of the flint and the bed or bottom are parallel. They are trapezoidal in cross-section. The Castle Hill specimens have rounded heels and the sides have been retouched and beveled. The striking edge is formed by the side of the blade of manufacture and is steeply beveled. The striking edge also has small flake scars from use on the top and somewhat larger flake scars on the bed surface. Stone distinguishes between specimens with two and three transverse flake scars on the top. In these terms two of the Castle Hill specimens belong in his Series A, Type 2 (Stone 1970: 12-13). One is of blond flint and thus belongs to the same variety but the other is reddish grey chert and hence would be placed in a different variety (Stone 1970:11). The third Series A blade gunflint would be classed as Stone's Type 1 (Stone 1970: 11) but is a different colour and thus a different variety.

The shape of gunflints, spall or blade type, is an approximate chronological marker (Witthoft 1966: 28). Another important characteristic is the material of manufacture. Most of the Castle Hill specimens are made of the dark grey-black flint sometimes thought of

as English (Peterson 1956: 229). Others are made of tan or blond flint, once thought to be indicative of French origin (Smith 1961: 422). Some light grey examples are also present as are specimens which are white and red grey cherts.

In the Castle Hill sample the main correlation of shape and colour is that none of the blade type flints were made of the dark grey-black material. Spall types were made in both the dark grey-black and in light grey to blond flint, but those made in the dark material have a much more pronounced bulb of percussion and striking point and also tend to be larger in size.

Comparison of the data in Tables 111 and 112 indicates some possible cultural differences in the gunflint associations at Castle Hill. Both the blade and spall types are present in French contexts but only the spall form is found in English contexts. This suggests strongly that the blade type is associated only with the French occupation. Two of the three blade type gunflints come from lots 2A9E2 and 2A10G10 both of which are stratigraphically sealed French deposits. The third specimen is from lot 2A6A9 which is probably French. All of these specimens are blond or light coloured, rather than the dark material.

Three of the spall type gunflints were also found in sealed French levels in lots 2A9E2, 2A9E11 and 2A9E15 while another example from lot 2A6D7 was from a probable French level in the ditch. All of these specimens from French contexts are either blond or grey in colour.

Three additional spall gunflints came from lots 2A6D7 (two specimens) and 2A5C8, all probable French levels. These three specimens are, however, made of the dark grey-black material and are larger in size. Two of the specimens are stylistically like the spall gunflints from English contexts while the third is a fragment. Thus on the basis of both colour and form these three specimens appear to be different from the other spall gunflints from French contexts. None of the spall flints made of the dark material were found in stratigraphically sealed French levels; only in probably French ditch refuse which is subject to possible mixture. These three specimens therefore may be intrusive English flints and have been so designated in Table 111.

The gunflints found in probable English contexts (Table 112) are all of the spall type and are mostly made of the dark grey-black flint. All but one have rounded heels and a prominent bulb of percussion if

that portion is preserved. One specimen from the surface appears to fit this category and the possible intrusion of this type in French associations has already been discussed.

Both black and tan gunflints are present at the French and English Fort Michilimackinac (Maxwell and Binford 1961: 99-100). Stone notes that the series C or spall type gunflint is present in both occupations but is not common in the French period while it was in common usage in the English occupation (Stone 1970: 20). This distribution parallels that at Castle Hill and may be more due to cultural factors than to chronological ones.

Witthoft has discussed the complexities of flint colour and cultural identification (1966: 30). It has been suggested that black flints with rounded backs are French while square backed flints of black material may be either French or English (Smith 1961: 422; Hamilton 1964: 53). However, Witthoft states that English knappers used a glassy black flint (Witthoft 1966: 36). Most of the gunspall flints from English contexts at Castle Hill are dark grey-black and smooth and shiny. Hamilton also described French flints as having a rounded heel and being honey-coloured chalcenony and asserts that gunspalls

with rounded heels and secondary chipping are a French product (Hamilton 1964: 53). There was little development of the English flint industry until 1780 (Witthoft 1966: 36) toward the end of the English occupation at Castle Hill. The bulk of these data suggest that the dark spall type gunflints from Castle Hill are of French manufacture. Regardless of manufacture, there is no question about their primary association with the English occupation of the site.

It is also interesting to note that the blade gunflint appears only in French contexts (pre-1714). Witthoft felt that this type may have appeared as early as 1675 but did not become common until 1740; it became the only type made by 1775 (Witthoft 1966: 28). Hamilton has concluded that this type was introduced to North America about 1680 (1964: 55). The presence of two specimens of this type in sealed French levels at Castle Hill certainly supports a pre-1714 dating. At the other end of the occupation of the site the characteristic flint of the English period was the spall form. This indicates that this type must have continued in use, at least at this site, until the 1780's. Witthoft concluded that the wedge shaped type had a time span of circa 1650 to 1770 (Witthoft 1966: 25).

Strike-a-light and Miscellaneous Flakes

These specimens are listed in Table 113. The group includes eight small fragments or flakes which could be tiny parts of broken gunflints or simply waste flakes (Fig. 120). Two of these are dark grey-black material. Three are light grey and three are tan. Two of the tan specimens are from French rampart fills, one is from a probable English context. The three light grey fragments are from French levels.

Three additional specimens made of dark grey-black flint are all from English contexts. These include one large thin flake which is unworked, and a small section of a core with some of the exterior cortex of the stone intact. The third is larger and an irregular truncated conical form with two circular flat ends. Around the perimeter of the ends the edge of the specimen is covered with small pits and flake scars, having been repeatedly struck against something. Although the usual strike-a-light was indistinguishable from the gunflint in shape (Witthoft 1966: 30), this core seems to have been used as a strike-a-light.

A final specimen in this group is a large bifacially worked core tool made of a creamy white chalky chert. It is from lot 2A9J5, a French rampart fill level. The specimen is faceted from the removal of parallel sided

blade type flakes, and it is incomplete. Its function is unknown but it could have been a strike-a-light.

### Sword or Bayonet Blade

A fragment of a sword blade (Fig. 121d) was recovered from a mixed level in the powder magazine. The blade fragment is triangular with concave sides in cross-section. There are no identifying marks.

Provenience	2A2B1
Dimensions (in mm.):	
Length:	130.0 (incomplete)
Width:	15.0
Thickness:	6.0

### Sword Guards

Several fragments of sword guards were recovered. All are made of brass.

### Knuckle Bow

This specimen is broken off at one end (Fig. 121e). There is a pommel tang at the intact end. At the centre of the bow a bulbous segment is pinched inward by an encircling cordon. The specimen is from an indeterminate context which contained English ceramics. The shape of the specimen resembles a later French type illustrated by Peterson (1968: 88) but is not identical.



Provenience:	2A3A1
Dimensions (in mm.):	
Length:	115.0 (incomplete)
Diametre:	5.0 to 11.0

### Shell Counterguards

Two fragments of cast brass shell counterguards (Peterson 1956: 253-4) were found (Fig. 121 f,g). Both are from probable French contexts. The specimen from lot 2A3A2 was found stratigraphically below but near the knuckle bow described above and could be part of the same hilt. A similar specimen is illustrated by St. Remy (1745: Vol. 2, Pl. 47e).

Provenience:	2A3A2
Dimensions (in mm.):	
Length:	65.0
Width:	28.0 (incomplete)
Thickness at edge:	5.0
Thickness of plate:	1.0

Provenience:	2A6D7
Dimensions (in mm.):	
Length:	46.0 (incomplete)
Width:	33.0 (incomplete)
Thickness at edge:	4.0
Thickness of plate:	1.0

Scabbard Clip

Three nearly identical brass sword frog parts (Fig. 121 a,b,c) were recovered. One is from 2A10F33, a culturally unidentifiable lot. The others are both from English contexts. They have rivets on the base plate for attachment to the belt and one specimen retains intact the plate to which the rivets were affixed on the back side of the belt. The gap between the clip and the back plate indicates a belt thickness of 2.0 mm. Overall length of the specimens is 54.0 mm. These specimens are almost identical to the uppermost frog illustrated by Maxwell and Binford from Fort Michilimackinac (1961: 129, Pl. XIII). The plate does not make clear which three of the five specimens illustrated came from French contexts as mentioned in the text (Maxwell and Binford 1969: 110). The Castle Hill examples are probably English specimens.

Provenience:	2A10D20
	2A10E19
	2A10F33

Five specimens can be identified as possible pole arm blades. One is possibly the hook from a bill and the remaining four are pikes.

Bill

This specimen consists of a curved blade with a cutting edge on the inside curve (Fig. 122a). The specimen tapers to a point at the end of the curve. The outside edge is blunt. It is a fragment and cannot be positively identified as a bill blade; it could also be interpreted as a scythe or sickle. However in shape it is very similar to the hook on a bill blade (Peterson 1956: 96,97). Peterson illustrates English examples; the Castle Hill specimen is from a French context.

Provenience:	2A9G10
Dimensions (in mm.):	
Length:	180.0
Width:	46.0
Thickness:	9.0

Pikes

Four specimens interpreted as pike blades are described below (Figs. 122b, 123). A fifth possible example has already been described as a possible cannon wormer because of its spiral twist. All four of these specimens have the attenuated awl-like head rather than the more common diamond or leaf shapes (Peterson 1956: 98). One specimen is very similar

to an example from Fort Washington (Peterson 1968: 101).

Provenience:	2A3A4
Dimensions (in mm.):	
Length:	215.0
Shaft dimensions:	7.0 x 7.0 to 15.0 x 16.0 tapered
Socket length:	53.0
Socket diameter:	29.0 Exterior
Socket diameter:	24.0 Interior

Description: This specimen has a blade with a rectangular cross-section. It tapers to a blunt point (Fig. 123b). The socket for hafting at the proximal end is conical in form and was made by flattening part of the shaft and rolling it to form a socket. Two rectangular holes for fastening are present. The specimen is from a probably French context.

Provenience:	2A9F3
Dimensions (in mm.):	
Length:	246.0
Shaft Dimensions:	9.0 x 11.0 to 14.0 x 16.0
Socket length:	62.0
Socket diameter:	28.0 Exterior
Socket diameter:	21.0 Interior

Description: This specimen is similar to the one from 2A3A4 described above and has a rectangular tapered blade (Fig. 123a). The socket lacks holes. The specimen is from a French context.

Provenience:	2A10F31
Dimensions (in mm.):	
Length:	310.0
Blade width:	18.0
Socket diameter:	28.0 Exterior
Socket diameter:	22.0 Interior
Hafting straps:	76.0 long
	6.0 wide
	3.0 thick

Description: This specimen has a long tapered blade which is triangular in cross-section (Fig. 123c). The blade terminates in a cordon at the base. Extending toward the proximal end from the cordon is a tapered cylindrical socket which would have held a pole seven-eighths inch in diameter. On opposite sides of the base of the socket are two long narrow straps for hafting. The specimen is very similar to an American pike illustrated by Peterson (1956: 299, Pl. 304). Although Peterson asserts that the English ceased using the pike in England about 1700 (Peterson 1956: 99), this specimen is from an English context at Castle Hill.

Provenience:	2A10F34
Dimensions (in mm.):	
Length:	350.0
Blade diametre:	16.0
Cordon base dimensions:	29.0 Diametre 1.0 Thickness
Tang length:	95.0
Tang dimensions:	13.0 Thickness

Description: This specimen has a long tapered blade which is round in cross-section. A disc-like cordon marks the base of the blade. A rectangular cross-sectioned tang is present; it tapers to a point. This specimen is from a culturally unidentified lot. The blade has been twisted into a circular shape.

## TOOLS AND UTENSILS

A good sample of masons and carpenters tools was recovered and is reflective of the different modes of construction at the site during its two periods of occupation. The heavy stoneworking tools tend to be from French contexts while woodworking and excavating implements are primarily English.

Sledge Hammer

Half of a large iron sledge hammer was recovered from a level within the French rampart fill deposits (Fig. 124b). The heavily battered face of the sledge indicates that it was probably used in stone quarrying. Other evidence demonstrates that the French carried out extensive quarrying operations during the construction of the site and this specimen was undoubtedly broken at that time and discarded in the rampart fill. A similar sledge is illustrated by St. Remy (1745: Vol. III, Pl. 2,1,k).

The specimen is square in cross-section, and is

broken in half across the eye. The working end was battered and expanded in size.

Provenience:	2A9C2
Dimensions (in mm.):	
Length:	100.0 (incomplete)
Thickness:	65.0 x 65.0
Working end:	80.0 x 80.0
Shaft hole diametre:	26.0

#### Chisels and Quarry Wedges

Five iron chisels were found in French contexts (Figs. 124,125). One specimen is the top portion of a chisel with a D shaped cross-section. The top has been mushroomed by pounding.

Provenience:	2A9E15
Dimensions (in mm.):	
Length:	64.0
Shaft:	23.0 x 43.0

Four iron chisels, square in cross-section and tapering to blunt edges were found on the French floor and sub-floor of the magazine. The floor had been quarried out of bedrock and these tools were apparently discarded at that time. The heads are mushroomed from pounding. Some similar but not identical specimens are illustrated by St. Remy as miners'



tools (St. Remy 1745: Vol. III, Pl. 2, t,x,v).

Provenience	Dimensions	
	Length (in mm.)	Width (in mm.)
2A2A11	170.0	19.0
2A2A11	170.0	19.0
2A2A14	150.0	20.0
2A2A15	210.0	32.0

One specimen of a large heavy wedge was found in an English context. It is rectangular in cross-section and tapers to a point. Its head is mushroomed from pounding. In size and shape it is very similar to the largest French specimen described above.

Provenience:	2A10J2
Dimensions (in mm.):	
Length:	168.4
Maximum width:	50.8
Minimum width:	41.0
Maximum thickness:	38.0
Minimum thickness:	3.0 (at blade edge)
Mushroomed head size:	62.0 x 85.7

#### Hammered Rod

One heavy iron rod, round in cross-section, has been battered at one end by hammering. The opposite end has

been broken off but it is possible that the specimen was used as a chisel-like quarry tool although other functions could be suggested. It was recovered from an English floor level in the magazine.

Provenience:	2A2A10
Dimensions (in mm.):	
Length:	350.0
Diameter:	30.0

#### Wood Splitting Wedge

One iron axe-like wedge has been interpreted as a wood splitting wedge (Fig. 125b). It has a rectangular top. The sides expand to a curved cutting edge. Below the battered top a shallow channel encircles the specimen. The specimen is from a probable English context.

Provenience:	2A6B1
Dimensions (in mm.):	
Length:	145.0
Thickness, top:	33.0
Thickness, below channel:	30.0
Thickness, at blade edge:	7.0

There is a distinct difference between axes from French and English contexts in the site. The French type is a hatchet or belt axe of the half-axe variety

in which the blade flares toward the handle side only (Peterson 1965: 6). The English specimens flare symmetrically and are hewing axes.

### Hatchets

Two nearly complete specimens of this type of axe were recovered, both from French contexts (Fig. 126 a, b). An eye fragment (Fig. 126c) from a probable French level is not sufficiently complete to classify but may belong to the same general type.

The specimens have a rounded oval to tear drop shaped eye formed by bending the iron around upon itself (Peterson 1965: Fig. 17).

The two nearly complete specimens are not identical. In one the poll-less (rounded) top has been bent and distorted. Such a rounded top may be termed poll-less (Peterson 1968: 104) or as a poll (Peterson 1965: 6). The poll-less top has been bent and distorted in one example. Below the eye the hatchet narrows, then expands toward the blade edge. The flare is greater at the heel, on the side toward the haft, giving the specimen the half-axe shape. Eye and bit were made of a single piece of folded iron with a central piece added partly for blade thickness. In the second specimen the eye is more elongated but has been distorted by being broken open on

one side. Below the eye the blade has a marked notch beneath which the blade flares markedly toward the haft. Beneath the fore end the blade curves back toward the haft so that the leading edge is not in the same line as the fore end of the eye.

Both specimens are similar to the poll-less belt axes or tomahawks illustrated by Peterson (1968: 104), or simple hatchets and belt axes (Peterson 1965: Photograph 25).

Provenience: 2A6A9 (Fragment; eye)

Dimensions (in mm.):

Length: 88.0 (incomplete)

Width at top: 56.0

Width below eye: 45.0

Thickness of metal: 7.5

Eye size: 36.0 x 50.0

Provenience: 2A9E10

Dimensions (in mm.):

Length: 186.8

Eye height: 47.6 (distorted)

Eye width at top: 47.6 (distorted  
diameter)

Eye width at bottom: 12.8

Blade length: 149.0

Blade width at top: 49.4

Blade width at bottom:	95.0 (bit)
Blade thickness at top:	28.7
Blade thickness at bit:	1.5
Metal thickness, poll:	6.4
Provenience:	2A9E4
Dimensions (in mm.):	
Length:	222.2 (elongated by distortion )
Eye diameter:	Indeterminate; opened
Metal thickness, poll:	4.9
Blade length:	114.3
Blade width at top:	63.6
Blade width at bottom:	101.6 (bit)
Blade thickness at top:	19.0
Blade thickness at bit:	1.5

### Hewing Axes

These specimens are also made by folding over a single sheet of iron and forge welding it to itself above the bit to form an open eye and a solid blade (Fig. 127). These specimens all have a thickened flat poll. The top of the axe when viewed from the side is narrow; the sides of the eye are strengthened by extensions below the poll called ears (Peterson 1965: 7,

Fig. 1). The head incurves beneath the ears forming a pinched waist. Below this point the head flares symmetrically toward the heel and leading edge corners of the blade. In one specimen there is only one ear, probably the side toward the haft, but the others have two. The eye is a flat topped, elongated oval or tear drop shape. These traits are best seen on the complete specimen (Fig. 127). Several eye fragments were also recovered. All five examples are from English contexts in the site. They are similar in form to the carpenters broad axe illustrated by Welsh (1966: 188, Fig. 8). A similar specimen is illustrated and identified as a carpenters hewing hatchet by Mercer (1960: Fig. 83) while the same general head form is also identified as a British felling axe (Mercer 1960: Fig. 4).

Provenience:	2A10C5
Dimensions (in mm.):	
Length:	203.0
Poll length:	50.0
Poll width:	39.0
Width across ears:	86.0
Blade top (below ears) width:	60.0
Blade length:	120.0
Blade width at edge:	175.0
Blade thickness, top:	24.0

Blade thickness, bit:	4.0
Eye dimensions, top:	25.0 wide
Eye dimensions, middle:	28.0 wide; tapers to a point
Provenience:	2A10B13
Dimensions (in mm.):	
Poll width:	36.0
Poll metal thickness:	12.0
Width at side of eye:	65.0
Width at base of eye:	55.0
Provenience:	2A10C7
Dimensions (in mm.):	
Width at eye:	70.0
Width at base of eye:	48.0
Provenience:	2A6D12
Dimensions (in mm.):	
Poll length:	48.0
Poll width:	24.0
Poll metal thickness:	12.0
Length:	120.0 (eye length only)
Width of eye:	63.0
Width at base of eye:	48.0
Blade thickness, top:	7.0 (metal sheet thick- ness, not blade)

Provenience:	2A6D6 (Poll Fragment)
Dimensions (in mm.):	
Length:	48.0
Width:	37.0
Thickness of metal:	11.5

### Adz, Hoe or Mattock Eye

One specimen of an eye has been interpreted as the top of a mattock, adz or hoe (Fig. 126d). The eye is formed by bending an iron sheet back against itself. The blade is missing but from the fracture scar it is evident that the blade was oriented at right angles to the axis of the haft rather than parallel to it as in an axe head. Hence the specimen appears to be the eye of an implement such as an adz, hoe or mattock. It is from an English context. Since much of their construction was in timber the use of the adz may be most likely.

Provenience:	2A6D12
Dimensions (in mm.):	
Top, length:	55.0
Diameter of eye:	43.0
Thickness of metal:	8.0 to 11.0

### Pick

The broken point of a heavy iron pick-axe was



recovered from an English context in the site (Fig. 128a). It was found in the rubble zone of the interior of the redoubt.

The blade is rectangular in cross-section, is slightly curved, and tapers to a blunt point at one end. The opposite end is broken.

Provenience:	2A10A1
Dimensions (in mm.):	
Length:	235.0 (incomplete)
Width:	36.0
Thickness:	31.0

#### Pick

Another example of a pick blade or tine is also rectangular in cross-section, curved and tapered to a blunt point at one end (Fig. 128b). The opposite end is expanded and a V-shaped trace of the shaft-hole is present where the specimen is broken. This example is from a probable French context in the refuse of the ditch.

Provenience:	2A6A9
Length:	247.0
Shaft dimensions at top:	17.0 x 20.0
Shaft dimensions at shaft hole:	24.0 x 36.0

Bi-pointed Hammer

Another example of a hammer or pick head is a complete specimen (Fig. 129a). It is rectangular in cross-section and has a rectangular central shaft hole. One edge is gently curved, the opposite more markedly curved. There is a point at each end of the specimen. It was made by shaping the two sides, inserting a wedge shaped piece of iron in the centre and then forge welding the specimen together, leaving space for the eye. The completed specimen has a boat-like shape. It was recovered from French rampart fill deposits. A nearly identical tool is illustrated by Diderot (Vol. I; Maçonnerie, Pl. XI, 89,90) and identified as a marteaux a deux pointes. The specimen appears on this basis to be a masons' tool although Diderot illustrates other bi-pointed tools as picks (Vol. I, Art Militaire, Fortification, Pl. XIII, Fig. 12).

Provenience:	2A9K4
Dimensions (in mm.):	
Length:	241.5
Width at shaft hole:	62.0
Width at points:	3.0
Thickness at shaft hole:	47.7
Shaft hole dimensions:	22.0 x 41.0

Crow Bar

A fragment of a large heavy pry bar or crow bar was recovered from a layer in the French rampart fill (Fig. 129b).

The specimen has a heavy shaft, round in cross-section, one end of which has been bent at an angle to the shaft. The bent portion has been flattened and expanded and is wedge shaped. A deep V-shaped notch is present in the centre of the flattened end.

A heavy bar of this type is a most useful tool in quarrying and moving rock and was probably used in the construction of the fort. An implement of similar form is illustrated by St. Remy (1745: 2,G); there are two letter "G"s on St. Remy's plate. One is a spade, the other is not identified in the text, but appears to be a crow bar.

Provenience:	2A9K14
Dimensions (in mm.):	
Overall length:	193.0 (incomplete)
Shaft diameter:	34.5
Width of flat end:	92.0
Length of notch on top side:	87.0
Width of notch:	21.0

Iron Edges, Shovel Blades

Thirteen examples of the iron blade edges of wooden shovels were recovered (Fig. 130 c,d). Both French and English contexts are represented, but the specimens are more commonly associated with the English period of the site. The complete examples are a broad based U-shape in form, having a flat wide base and two projections, one on each side. The cutting edge of the blade is straight to slightly irregular due to wear. The corners are rounded. The cutting edge is 3.0 mm. to 6.0 mm. in thickness. The upward projecting arms on the sides of the blade form U-shaped sockets at the lower end but become straight iron straps at the top. The wooden blade of the tool fitted into the grooved sides. The top edge of the metal blade, opposite the cutting edge, is also grooved to receive the wooden blade. One example has rivets in the lower part of the blade near the corners. Several specimens are fragmentary.

Noel Hume states that he has never found such an iron spade nosing later than 1700 (1969: 275). The association of these specimens with the English occupation at Castle Hill would place the dating of these artifacts in the last half of the 18th century.

There are also specimens of this type in sealed French rampart fills at Castle Hill which would place its early appearance at the site in the late 17th century. St. Remy identifies these as pelle de bois ferree (St. Remy 1745: Vol. 3, Pl. 2,h).

Provenience	Blade	Blade	Side-arm	Remarks	Context
	Width (in mm)	Length (in mm)	Length (in mm.)		
2A2B1		73.0	115.0	Incomplete	Mixed; very? French
2A6B1				Fragment	Mixed; very? English
2A6B1				Fragment	Mixed; very? English
2A6B1				Fragment	Mixed; very? English
2A10B11	215.0	80.0	180.0	Complete	English
2A10C2	230.0	55.0	85.0	Incomplete	English
2A10C5	245.0	70.0	205.0	Complete	English
2A6A6	237.0	90.0-110.0	228.0	Complete	English
2A6D6	257.0	70.0- 95.0	217.0	Complete	English
2A6D6	215.0	110.0		Fragment	English
2A12A3	257.6	89.0	133.0	Complete	Unknown
2A9E11	260.0	95.0		Incomplete	French
2A9E15	263.0	82.5		Incomplete	French

### Iron Spade

Two specimens of shovels or spades with solid iron blades were recovered (Fig. 130 a,b). One is a shank and hafting socket fragment while the other is a complete specimen. The fragment is from a layer of refuse in French rampart fill. The complete specimen is from lot 2A5C13, a mixed talus rubble deposit and culturally unidentifiable.

Noel Hume indicates that although he has not found such solid iron blades earlier than 1700, such specimens appear in much earlier illustrations (Noel Hume 1969: 275). It is unfortunate that the complete example from Castle Hill came from a mixed talus rubble zone and cannot be associated with either occupation. The fragment from the French context is small and could, perhaps, be some tool other than a spade. St. Remy illustrates a similar spade, beche (St. Remy 1745: Vol. 3, Pl. 2,G).

The complete specimen has been made from two sheets of iron, the lower half of the blade being forge welded solid. The upper half is wedge shaped in longitudinal cross-section and the interior is hollow. The spade has been created by bending the tops of the front and back sheets over one another to form an overlapped joint at the top on each side

of the handle socket. The handle socket consists of two central projections, one from each sheet of metal. A rivet through the socket is in situ. The cutting edge is concave, the indentation being 10.0 mm. at maximum in the centre.

Provenience:	2A5C13
Dimensions (in mm.):	
Overall length:	384.0
Blade length:	300.0
Haft length:	80.0
Socket diametre:	40.0
Blade width:	168.0
Thickness at footrest:	27.0
Thickness at cutting edge:	4.0

The fragment consists of the handle socket and adjacent blade.

Provenience:	2A9E15 (Fragment)
Socket length:	90.0
Socket diametre:	40.0

### Saw Blade

A fragment of the end of a large saw blade was found in lot 2A6D6, a probable English context (Fig. 131a). It is made of iron, the blade width tapers slightly and terminates in a rounded end. The saw

teeth do not continue to the end of the specimen.

Provenience:	2A6D6
Dimensions (in mm.):	
Length:	147.0 (incomplete)
Width:	70.0
Depth of teeth:	4.0
Thickness of metal:	2.0

### Masons' Trowels

Two fragments of masons' trowels were recovered (Fig. 131c). One (2A6A9) was from a probable French level and the other (2A6D12) from a probable English level of refuse in the ditch area. Both specimens are similar in size and shape. The shank and handle tang are missing, only a semi-circular scar at the back of the trowel remains. The back of the trowel is sloped toward the point end away from the heel. The sides taper toward the tip for two-thirds of the distance to the end, the curve toward the point. The edges of both specimens are battered in a fashion similar to that resulting from the frequent striking of the trowel against the masonry as can be observed in many masons' activity.

Provenience	Length (in mm.)	Width (in mm.)	Thickness (in mm.)
2A6A9	189.0	97.0	3.5
2A6D12	160.0	95.0	2.7



Trowel Heel?

A third possible example of the masons' trowel (Fig. 131b) is a fragment consisting of the heel portion of the blade and the attached lower part of the shank. A ridge of metal attached the shank to the blade. The specimen was recovered from an indeterminate context.

Provenience:	2A
Dimensions (in mm.):	
Blade thickness:	3.0
Blade width:	46.0 (incomplete?)
Shank height:	21.0 (incomplete)
Shank diameter:	13.0
Shank ridge thickness:	16.0

Files

Fragments of three files were found (Fig. 132). One, from lot 2A10F31, is rectangular in cross-section (Fig. 132c). It is only a fragment of the central portion of a file. It is from an English context.

Provenience:	2A10F31
Dimensions (in mm.):	
Length:	80.0
Width:	25.0
Thickness:	7.0

Two specimens are fragments of small files with triangular cross-sections. The specimen from lot 2A6A1 (Fig. 132a) is from an indeterminate cultural context. The other example is from a probable English rubble zone.

Provenience	Length (in mm.)	Thickness (in mm.)
2A6A1	85.0	9.0
2A10E1	102.0	6.0

#### Awls or Punches

Two specimens of short iron awls or punches were recovered (Fig. 132 d,e). They have rectangular heads and a long tapered shaft. The shaft is round in cross-section and the specimens taper to sharp points. The one from lot 2A6D10 is from a probably English context while the other specimen is from a sealed level of French rampart fill.

Provenience	Shaft		Head		
	Length O-A (in mm.)	Length (in mm.)	Diam. (in mm.)	Length (in mm.)	Head Size (in mm.)
2A6D10	52.0	38.0	5.0	14.0	9.0x10.0
2A9E15	90.0	74.0	6.0	16.0	9.0x 9.0

#### Sickle Blades

Two specimens have been interpreted as sickle blades

(Fig. 132 f,h). Both are fragmentary, and both came from a probably English ditch refuse level. The smaller specimen has a narrow straight blade with a tang at one end and a cutting edge along one side. The other specimen is a central part of a long curved blade with the cutting edge on the inside of the curve.

Provenience:	2A6D6
Dimensions (in mm.):	
Length:	81.0
Width:	15.0
Tang length:	25.0
Thickness:	1.0 to 4.0
Provenience:	2A6D6
Length:	170.0
Width:	23.0
Thickness:	4.0 to 0.05

#### Whetstone Fragment

A small sandstone whetstone (Fig. 132g) was recovered from 2A6D14, a probable English context in the ditch refuse. The specimen is trapezoidal in outline and oval in cross-section. The top surface is flat, the bottom rounded. The ends are flat. The specimen is complete except for a chipped corner.

It is grey in colour and tends to be crumbly.

Provenience:	2A6D14
Dimensions (in mm.):	
Length:	36.0
Width:	35.0 to 37.0
Thickness:	18.0 to 23.0

### Fascine Knife

This specimen is a large iron cleaver-like knife (Fig. 133). It has a large oval blade with a blunt back. Both the bottom and the end of the blade are beveled and form cutting edges. At the proximal end of the blade it has a thickened base and a long tang. Traces of wood adhere to the rectangular tang. At the point where the handle and blade meet a ferrule ring served as a socket for the end of the wooden handle; the diameter of the handle can be measured here.

The specimen is similar to a fascine knife recovered from the Philadelphia (sunk in 1776) and now on exhibit at the Museum of History and Technology in Washington, D. C. Other fascine knives have hook extensions (Peterson 1968: 185,186).

The example from Castle Hill is from a level of refuse in the ditch area classified as probably French.

Provenience:	2A6A9
Dimensions (in mm.):	
Length overall:	435.0
Tang length:	195.0
Blade length:	240.0
Blade width:	86.0
Thickness, blade back:	5.0
Thickness, blade base:	9.0
Tang diameter:	7.0 x 7.0
Ferrule width:	17.0
Ferrule diameter:	36.0
Estimated diameter of original wooden handle:	31.0

### Summary

In the following table the association of various types of tools with one occupation is summarized. In the tabulation the specimens from definite and probable contexts have been combined.

#### Number of Specimens by Context

Tool	French	English	Unknown
Sledge hammer	1		
Quarry chisel or wedge	5	1	
Hammered rod chisel?		1	

## Number of Specimens by Context

Tool	French	English	Unknown
Splitting wedge		1	
Hatchets	3		
Hewing axes		5	
Adz or mattock		1	
Pick	1	1	
Bi-pointed hammer	1		
Pinch or crow bar	1		
Iron edge for wooden shovel	3	9	1
Iron spade	1		1
Saw		1	
Masons' trowel	1	1	1
Files		1	1
Awls	1	1	
Sickle		2	
Whetstone		1	
Fascine knife	1		

Although the sample of tools is small some tentative observations can be made. Most of the heavy stone quarrying and working tools are found in French contexts while earth moving and timber working implements tend to be associated with English contexts. Few associations are exclusive, but the difference in axes appears to be well established.

### Scissors

Fragments of scissors were relatively common artifacts, 17 examples being recovered in the excavations (Fig. 134). Specimens were recovered from both French and English contexts. The bows (Himsworth 1953: 154) are solid, having the ends of the tails attached forming the loop or eye typical of the 18th century (Noel Hume 1970: 267-8). The section between blade and bow, the shank in Himsworth's terms (1953: 154), is plain on most specimens but hafts ornamented with knops or balusters are present. The trait is one which appears in the later 18th century (Noel Hume 1970: 269). A small specimen with a narrow point blade and a baluster shank (Fig. 134g) is probably embroidery scissors (Himsworth 1953: Fig. 159); it is from a probable French context. A specimen with a knop shank (Fig. 134m) is from an indeterminate context. A baluster shank fragment (Fig. 134p) is also from a French context while a less elaborately decorative shank is on a nearly complete example from a probable English context (Fig. 134l); its bow is fragmentary. An example with a possible tup shank (Himsworth 1953: 154) is from a French context (Fig. 134k) but its bow is distorted and the shank may have been bent. The specimens and their dimensions are listed in Table 114.

Utensils such as kettles, pans, knives, forks and spoons are described here. The complex of items represents an aspect of daily life which would relate these specimens to some of the others from the site, particularly the bottle glass, stemware and ceramics, all of which have been described elsewhere.

### Cast Iron Kettles

Fifty-one fragments of cast iron kettles were found in both French and English contexts (Figs. 135, 136, 137). All of the specimens appear to represent the same general vessel form although there are differences in rim profile and foot shape. The kettle bodies are globular with flared rims. An angular handle attached to rim and shoulder is present on some specimens. Two basal fragments with legs were also found. No evidence of an attachment for a wire bail was present on the fragments recovered. The specimens have a general similarity to cauldrons dating as early as the 15th century (Lindsay 1964: Fig. 111) except for differences in the shape of the body and rim.

The body is plain except for encircling cordon-like ridges on the exterior surface. These are found at the mid-point of the rim, around the shoulder, and



above the bottom just below the point of maximum vessel diameter. One specimen from 2A9J5, a French context, is a shoulder fragment with three parallel ridges and grooves forming a shoulder decoration.

The handles are round in cross-section and project outward at a slight downward angle from the mid-point of the rim. The handle makes a right angled downturn and attaches to the vessel shoulder. A vertical mould mark or raised bead is present on two rim examples. Vessel walls range from 3.0 mm. to 6.0 mm. in thickness.

Most of the fragments found in various lots of sub-operation 6D are probably fragments of a single kettle.

Two examples of legs were present, and are described below (Fig. 36).

One specimen is from lot 2A6A9 (Fig. 136g). This leg is rectangular in cross-section and slightly curved. It terminates in a round foot with toe-like indentations. Length: 110.0 mm. Cross-section dimensions: 13.0 mm. x 17.0 mm. Foot is 23.4 mm. in diameter and 5.0 mm. high. Probably French.

The second example is from lot 2A9J5. It is a fragment of a kettle base with the leg attached (Fig. 136f). The leg is round in cross-section and slightly

tapered so that its diameter ranges from 31.0 mm. to 22.0 mm. The front of the leg is slightly curved and is marked by two parallel grooves running the length of the leg. The leg terminates in a flat-bottomed oval foot which is expanded to larger diameter than the leg. Length of leg: 125.00. Foot height: 20.0 mm. Foot diameter: 30.6 mm. x 40.4 mm. From French rampart fill.

There are several different lip and rim shapes (Figs. 135, 136 a-e). The most common rim is a straight, outflared rim with a flat to rounded lip. This form is especially found in the several English lots in 2A6D (Figs. 135, 137a) which are probably English. A very similar rim, also from a probably English context, is from 2A8B1 (Fig. 136c). It is the same straight flared rim but has a beveled lip.

Rim examples from French contexts exhibit some slight differences. One example from 2A6D7, a probably French refuse level, is a fragment of a straight flared rim and has a rounded lip with an exterior thickening (Fig. 136b). Two different rims were recovered from 2A9J5, a French rampart fill zone. One is a straight flared rim (Fig. 136e) but is, like the 2A6D7 specimen, considerably higher than the English examples. One rim from 2A9J5 terminates in a rounded lip which is

slightly beveled (Fig. 136d). The other has a slightly channeled or collared lip (Fig. 136e).

A still different rim form is present on a specimen recovered from the surface of the site. It has wavy walls and a high channeled collar (Fig. 136a).

The French specimens suggest that the iron kettles in that period had high flared rims with channels or thickening. One shoulder sherd has three decorative cordons or grooves grouped together while other examples have the more widely spaced cordons. Both examples of kettle legs are from French contexts.

The English kettles appear to be generally similar, having straight flared rims, but these are low and have simple rounded lips. A decorative cordon around the rim is present as are the angular handles, a trait not represented on French specimens. No legs were recovered from English contexts but all specimens were fragments.

In terms of fragment counts, there are 11 fragments in French contexts and 30 from English associations, with eight specimens from culturally indeterminate lots. This could be interpreted as evidence that the iron kettle was more common during the English period. A count of rims which can be identified on the basis of size or shape as representing different vessels is perhaps more accurate; there are three French and four English examples on this basis.

Kettle fragments are tabulated in Table 115.

Long Handled Pan

An iron cooking pan with a very long handle was found in the rubble of the redoubt interior (Fig. 137c). The association can be classified as probably English.

The specimen has a long tapered handle of strap iron. The wide end of the handle is riveted to the pan body at the rim. The handle tapers and at the end is bent to form a loop for hanging. The pan body is thin, flat bottomed and has straight flaring sides. Only the back portion of the pan remains intact and the specimen was larger in diameter than this part.

The specimen was probably a frying pan. Although an alternative identification as a warming pan (Nutting 1965: 676, No. 1489) is possible, the specimen lacks an attachment for a lid. A very similar fragmentary specimen is illustrated and identified as a frying pan by Peterson (1968: 146-7).

Provenience:	2A10B1
Handle length:	815.0
Handle width:	40.0 to 20.0
Handle thickness:	10.0
Pan diameter:	250.0
Pan side height:	56.0
Pan metal thickness:	3.0

Table Knives

Six fragmentary specimens were identified as probable table knives although none is complete (Fig. 138).

Prov.	Length (in mm.)	Width (in mm.)	Thickness (in mm.)	Description
2A6B1	110.0	21.0	3.0	Blade fragment with a thickened bolster. (Fig. 138b).
2A10A1	160.0	24.0	3.0	Blade fragment with a thickened bolster. The edge is curved, the point is missing. The top has a concave profile. (Fig. 138a).
2A10C18	42.0	-	-	Probable fragment of a flat tang knife handle with one rivet present. (not illustrated)
2A10E22	115.0	22.0	2.5	Blade fragment with curved edge and straight back. (Fig. 138c).
2A6D10	121.0	18.0	2.5	Blade fragment with the cutting edge missing. The back is straight but downturned near the point. (Fig. 138e).

Prov.	Length (in mm.)	Width (in mm.)	Thickness (in mm.)	Description
2A sf.	75.0	14.0- 20.0	3.0	Handle fragment with a rounded heel. It formed a flat tang and has two attached rivets but the covering and blade are missing. (Fig. 138f).

### Miscellaneous Knives

Two probable knife fragments are larger than the specimens classified as table knives and may be fragments of butcher knives.

Prov.	Length (in mm.)	Width (in mm.)	Thickness (in mm.)	Dimensions
2A10D4	105.0	28.0		Piece of flat sheet iron with a perforation at one end. The fragment may be the handle end of a large knife. (Fig. 138d).
2A6D6	83.0	33.5	1.5	A fragment of a probable knife blade with a spike-like tang. Tang tapers from 3.0 mm. x 4.0 mm. to 4.0 mm. x 9.0 mm. in diameter and is 21.0 mm. long (Fig. 138g).

It is notable that all specimens of table and miscellaneous knives described above come from English contexts except the single specimen from a surface location.

### Knives

Several knives of sizes and shapes different from table knives were recovered (Fig. 139). Some of these are solid shanked while a few are clasp knives similar to the Revolutionary War specimens illustrated by Peterson (1968: 151). Some terminology employed in the descriptions is from Himsworth (1953: Fig. 41). The handles have bone coverings attached by means of rivets or studs.

One specimen is a knife handle with the blade missing (Fig. 139a). The proximal end of the blade is a thickened bolster from which a flat, tapered tang protrudes. Bone handle coverings were fastened by three studs. A rounded metal end completes the hafting. The specimen is not a clasp knife. It is from a mixed lot.

Provenience:	2A3A4
Dimensions (in mm.):	
Length:	115.0
Width:	16.0-26.0
Thickness:	19.0

Another specimen is the bone covered handle of a clasp knife with the blade missing (Fig. 139b). The specimen has an iron case, slotted for the blade. There are oval bone covers on the back half of the handle but the handle is not entirely covered. The bone cover is attached by means of four studs. The specimen is from probable English refuse in the ditch.

Provenience:	2A6D6
Dimensions (in mm.):	
Length:	98.0
Width:	21.0
Thickness:	17.0

This specimen is a clasp knife blade. It has a flat rectangular tang which has a transverse pivot (Fig. 139e). The tip of the blade is missing; the back is blunt. There is an angular choil at the tang end. The specimen is from a probable English level.

Provenience:	2A6D6
Dimensions (in mm.):	
Length:	99.0
Width:	17.4
Thickness, back:	4.0
Pivot size, long:	17.0
Pivot size, diametre:	3.0
Tang dimensions:	10.0 x 11.0 x 4.0



Another bone handled clasp knife fragment came from a probable English context. The specimen is missing the blade (Fig. 139c). The handle has a curved, flared end, and the iron lining is exposed where the proximal end of the blade is attached. There is a rectangular kick on the bottom of the blade tang.

Provenience:	2A6D6
Dimensions (in mm.):	
Length:	94.0
Width:	12.0
Thickness of handle:	14.0
Length of handle:	81.0

Another slotted handle of a clasp knife was also missing the blade (Fig. 139d). The handle tapers to a narrow, curved end. The handle is iron except for a central bone cover panel, the ends of the handle being bolstered. The bone cover is held in place by three studs. The specimen is from a probable English level.

Provenience:	2A6D6
Dimensions (in mm.):	
Length:	112.0
Width:	17.0
Thickness:	10.5

This specimen is another bone covered clasp knife handle (Fig. 139f). The thin flat bone handle cover is held to the iron case by five studs. The blade is short and tapers to a blunt point. One side of the blade is flared to form a hook-like blunt edge. The specimen was recovered from an English intrusion into French rampart fills.

Provenience:	2A9E5
Dimensions (in mm.):	
Length:	110.0
Width:	35.0
Thickness:	16.0

### Forks

Five examples of table forks (Fig. 140) were identified; all are made of iron and had two tines. One specimen retains part of the wooden handle. Two different types of handle tangs are present; the spike tang and the thin flat plate. The spike tangs are rectangular in cross-section and taper from 3.0 mm. x 4.0 mm. to 4.0 mm. x 5.0 mm. in size. The spike variety was inserted into the socket of the wooden handle. The flat tang is thin and shaped as the handle and has rivet holes for the attachment of flat handle plates on each side of the tang. The tines are poorly preserved. The specimen from lot 2A6D6 has a complete tine on one side; it is 48.0 mm. long and

is round in cross-section, tapering from 4.0 mm. to 2.0 mm. in diameter. The tines on the complete fork from 2A1A7 are 56.0 mm. in length.

Provenience	Length (in mm.)	Description
2A1A7	180.0	Complete specimen with remnant of wooden handle, on spike tang. Shank of fork above the tines is curved, and convex. (Fig. 140a).
2A8A2	90.0	Tine broken. Shank is incurved or concave. Tang is rectangular spike form. (Fig. 140c).
2A10E9	130.0	Shank is concave. Tang is flat plate type, perforated for rivets. (Fig. 140b).
2A11A1	125.0	Same as 2A10E9.
2A6D6	142.0	Concave shank and rectangular spike tang (Fig. 140d).

Most of these specimens are from English contexts. Lot 2A1A7 is a culturally mixed lot; this specimen could be French or English. Lot 2A11A1 is a turf zone identified as probably French but is a context subject to possible intrusive specimens. The identity of this specimen and one from 2A10E9, an English level, suggests such a problem.

Spoons

Cast pewter spoons (Fig. 140) were found in several different areas of the site. They are simple oval bowl specimens with a narrow handle shank and an expanded, flattened and rounded handle end. The handle shanks are D-shaped in cross-section.

Provenience	Length (in mm.)	Description
2A10D12	72.0	Handle fragment. Flared rounded end. (Fig. 140f).
2A4A1	60.0	Handle fragment; portion of shank with bowl fragment.
2A6B1	63.0	Handle fragment. Flattened and flared rounded end.
2A6D4	65.0	Round handle shank fragment and portion of bowl.
2A7A2	90.0	Small diameter handle fragment. Round in centre with flattened bowl at one end. Opposite end slightly flattened, end missing.
2A10B27	100.0	Nearly complete oval spoon bowl with handle shank attached.
2A10E3	45.0	Handle fragment, shank area.
2A10F12	120.0	Complete bowl and attached handle shank. (Fig. 140e).
2A6D12	70.0	Complete bowl (Fig. 140g).

The oval bowls are 70.0 mm. x 46.0 mm. and 72.0 mm. x 45.0 mm. in size in two well preserved specimens. The thickness of the bowl metal is 2.0 mm. On the back of the spoon the junction of the handle with the bowl has been strengthened by the addition of a triangular thickened reinforcement ridge.

Of the nine specimens recovered, two are from mixed contexts, 2A4A1 and 2A6B1, while five are from English contexts. Two specimens, 2A6D4 and 2A10B27, are from French levels. There are no obvious differences in these specimens, other than the round handle shank of the 2A6D4 specimen.

## MISCELLANEOUS ARTIFACTS

Buttons

Seventy-three buttons were recovered in the excavations, not including modern intrusive specimens. Many of the buttons are similar and can be grouped for descriptive purposes, but others are unique in the collection because of distinctive construction or decoration attributes. Thirty-one descriptive categories, numbered in sequence, have been established as a means of describing the 73 specimens. Buttons are illustrated in Figures 141, 142 and 143.

The 31 descriptive categories reflect minor variations in more general construction patterns and can be further combined into larger typological groups. Thirteen such groups were established and have been lettered A through M. The buttons are lettered and numbered appropriately in the description. These groups are comparable to the types described by South (1964) and Olsen (1963), but the numbers and letters used to label categories and groups in this report do not

correspond to those employed by South and Olsen. In many cases they are similar to South and Olsen types, but there are groups which are not similar, and not all of their types are represented in the collection from Castle Hill.

An attempt to use those designation systems would have resulted in a listing which omitted numbers and letters used by South and Olsen as well as requiring the addition of new numbers or letters to those they utilized. Such an approach would have resulted in a confusing rather than a systematic organization of this description of buttons from Castle Hill. A uniform typological code for buttons is needed but it is beyond the scope of this report to attempt to present a new formal button typology. Hence the lettered groups and numbered categories used here refer only to this report. Both group letter and category number are used in the following descriptions of the 31 button types established for this report. The descriptions include notations concerning the appropriate South and Olsen types.

The 13 groups (A-M) represent three major modes of button construction. Groups A through F include 15 descriptive categories of buttons of two-piece construction. Groups G through L include 15 categories

of one-piece buttons while group M consists of a single specimen made of horn.

A/1 Group A, Category 1. Two piece, metal back, 4 hole, crossed wire eye

Buttons in this category are made of two pieces of pressed brass with slightly convex faces and backs forming a lens shaped cross-section (Fig. 141a). The back is usually made of slightly thicker metal (0.5 mm.) than the face (0.3 mm.). The outer edge of the exterior of the back is a narrow flat flange over which the face was crimped. The assembled button was hollow but filled with a greyish paste, traces of which adhere to the interior surfaces. One example was full of the mastic which probably functioned to prevent crushing the hollow button.

Attachment was by means of two crossed brass wires which were passed through four equidistant holes in the central area of the back. The face is smooth and plain; there are no markings on the back. The eight examples of this button type are identical in construction but vary in size.

These buttons are similar in construction to Olsen's type B (1963: Fig. 1) except that they have metal rather than wood or bone backs. Parkyn indicates that wood and



bone backed buttons were replaced by buttons "...with the edge turned over a thin metal back. The button was fastened to the garment by a small metal shank" (Parkyn 1956: 4). The specimens described here lack the shank described by Parkyn and may not be the same type. It is possible that they represent a construction pattern intermediate between bone backed and later metal backed types.

Provenience	Diametre (in mm.)	Thickness (in mm.)
2A10F27	22	4.5
2A10E9	22	6.0
2A10F28	22	5.0
2A10D12	16	3.0
2A10G5	24	5.5
2A6D20	22.5	4.5
2A8B1	22	- (Back only)
2A6D7	16.6	- (Back only)

B/2 Group B, Category 2. Two piece, bone back, 4 hole, no groove.

This button is of two piece construction consisting of a pressed brass face and a bone back (Fig. 141b). The metal face is convex and has an embossed floral leaf design in the centre and also around the edge. The

button has separated revealing a once hollow interior. The bone back is concave on the interior and convex on the exterior. The perimeter of the exterior side of the back has been thinned to form a flange to receive the crimped metal face. There are four equally spaced holes in the centre of the back for attachment. This example is distinctive in lacking the incised circular groove through the attachment holes which is present on other buttons.

The specimen is similar to Olsen's type B (1963: Fig. 1) and South's type 3 (1964: 115).

Provenience:	2A2C5
Dimensions (in mm.):	
Diametre:	16.0 (face)
Thickness:	5.0 (complete button)
Thickness:	0.3 (sheet metal)
Thickness:	1.0 (bone back)
Diametre:	15.1 (bone back)

B/3 Group B, Category 3. Two piece, bone back, 4 hole, grooved.

This two piece button consists of a thin slightly convex sheet brass face crimped over a bone back (Fig. 141c). The exterior of the back is convex but its interior is concave so that the assembled button is hollow

and lens shaped in cross-section. The face is crimped over the outer edge of the back which has a thinned perimeter. At the centre of the back a circular groove, 6.0 mm. in diameter, has been incised. Four holes are located at quadrant points around the groove.

The face of the specimen is plain and smooth except for scratches and other evidence of wear; faint traces of gilt remain on the face. The specimen is similar to Olsen's type B (1963: Fig. 1) and South's type 3 (1964: 115). Parkyn describes buttons of this type as pre-dating the order of 21 September 1767 (Parkyn 1956: 3).

Provenience:	2A10G5
Dimensions (in mm.):	
Diameter:	25.0
Thickness:	6.0

B/4 Group B, Category 4. Two piece, bone back, 5 hole, grooved

This specimen is the back half of a two piece button (Fig. 141d). The back is made of bone, convex on the exterior and concave on the interior. It is similar to the B/3 bone backs with four attachment holes located on an incised circular groove. It differs in having a fifth hole in its centre. The face is

missing. The interior of the central hole is in a raised collar.

Provenience:	2A6D12
Dimensions (in mm.):	
Diametre:	22.8
Thickness:	1.9 (bone)
Thickness:	5.0 (domed back)

B/5 Group B, Category 5. Two piece, wood back

Buttons in this category are of two piece construction with gilt pressed brass faces crimped over a wooden back (Fig. 141 e,f). The backs have been thinned around the perimeter to receive the face. The buttons have a lens shaped cross-section. In one the central part of the back is missing; in the other it has four attachment holes. Buttons of this type are similar to Olsen's type B (Olsen 1963: Fig. 1) and South's type 3 (South 1964: 115) and are described by Parkyn (1956: 3).

The examples have embossed designs on the gilt face.

One specimen is embossed to simulate an over-under basket weave pattern (Fig. 141f).

Provenience:	2A10C18
Dimensions (in mm.):	
Diametre:	26.0
Thickness:	3.5

One specimen has an embossed pattern consisting of a central six leaf floral design. Concentric rows of small dots follow the outline of the floral pattern and cover the rest of the surface of the face (Fig. 141e).

Provenience:	2A10F17
Dimensions (in mm.):	
Diametre:	16.0
Thickness:	4.5

B/6 Group B, Category 6. Two piece, wood back?

This specimen is the sheet brass face of a two piece button (Fig. 141g). The back is missing but fragments of fiber are present under the crimped rim of the face; the back was probably made of wood. It is similar to B/5.

The face has been battered out of shape. Stamped into the face is an anchor fouled by an entwined rope. The anchor and rope design are similar but not identical to a Royal Marine button illustrated by Parkyn (1956: 242, Fig. 396).

Provenience:	2A10F27
Dimensions (in mm.):	
Diametre:	18.0
Thickness:	2.0 (face only)

C/7 Group C, Category 7. Two piece, bone back, 1 hole, eye

This is a two piece button with an embossed pressed brass face crimped over a bone back (Fig. 14lh). The embossed pressed brass face was originally convex. The back is slightly convex; the button had a lens shaped cross-section. The perimeter of the bone back is thinned to receive the crimped face. The back has a single central hole in which there is a looped brass wire eye for attachment.

The embossed design consists of scallops around the perimeter of the face and a six pointed leaf-like (fleur?) design in the centre. The specimen is similar to South's type 4 (South 1964: 116).

Provenience:	2A6D13
Dimensions (in mm.):	
Diameter:	15.7
Thickness:	2.7
Thickness:	8.0 (including eye, bent over)

D/8 Group D, Category 8. Two piece metal, eye, casting spur, 2 vent

Specimens of this type are made of cast brass in two pieces (Fig. 14li). They have a domed convex face

and a convex back. Faces are smoothed, plain; backs are spun.

Attachment is by means of a looped wire eye in the centre. The eye was cast in place and has a casting spur around its base. On the interior of the back the ends of the wire eye are bent over and covered by a boss; in some specimens the ends of the wire protrude through the boss. There are two vent holes in the back on opposite sides of the eye.

The backs are similar to South's type 2 (South 1964: 115) in form and vents and similar to South's type 6 (South 1964: 116) in the eye and associated casting spur.

Prov.	Diameter (in mm.)	Thickness (including eye) (in mm.)	Thickness (body) (in mm.)
2A6D6	21.5	16.7	9.0
2A6D6	22.5	18.0	11.4
2A6D6	22.9	16.0 (eye bent over)	10.5
2A6D6	21.9	11.4 (eye missing; trace of casting spur)	11.0

D/9 Group D, Category 9. Two piece metal, face only

Specimens of this type are the face half of two piece buttons similar to D/8 (Fig. 141j). The face is plain and smooth. The face is made of metal 0.9 mm.

to 1.0 mm. thick. This face may belong to a D9 back.

Provenience	Diametre (in mm.)	Thickness (face half) (in mm.)
2A10D7	22.0	6.0
2A6D6	22.0	6.5
2A6D6	22.3	6.0
2A6D20	22.0	6.5
2A6D6	16.0	4.2

D/10 Group D, Category 10. Two piece metal, back half only, 2 vent

These specimens are the back half of two piece brass buttons (Fig. 14lk). The back is concave on the interior and convex on the exterior. A looped brass wire eye passes through a central hole. The eye was cast in place and has a casting spur around its base on the exterior of the back. On the interior side the foot of the eye is bent over and covered or partially covered by a low domed interior boss. Two holes, one on each side of the eye, served as vents in the back. These backs are similar to South's types 2 and 6 as noted in D/8. The backs are made of metal which is 1.0 mm. to 1.3 mm. in thickness. They are smooth or spun. This type of back could belong to a D8 face.



Provenience	Diametre (in mm.)	Thickness (Back only) (in mm.)	Thickness (Incl. eye) (in mm.)
2A10E10	22.0	4.0	
2A10C18	16.0	3.0	10.0
2A6D6	22.0		12.0
2A6D6	22.0		11.9
2A6D6	22.0		10.0 (eye bent)

D/11 Group D, Category 11. Two piece metal, eye, casting spur, 1 vent

These specimens are the backs of two piece cast brass buttons (Fig. 1411). The backs are convex. The looped wire eye was cast in place and is surrounded by a casting spur. The wire used in the eye is D shaped in cross-section with the flat side toward the interior of the eye. The back is spun on the exterior and has a rough casting surface on the interior. As in the two vent examples, the perimeter of the inside of the back is flattened for the attachment of the face. These specimens differ in having a single vent hole located to one side of the central eye. These specimens are similar to South's types 2 and 6 as noted in D/8.

Provenience	Diametre (in mm.)	Thickness (including eye) (in mm.)
2A8B1	16.6	8.5
2A6D13	16.4	9.6
2A6D14	16.0	9.3

D/12 Group D, Category 12. Two piece metal, eye, casting spur, no vent

These specimens are backs of two piece cast brass buttons (Fig. 141m). Eyes formed by brass wire loops were cast in place and are surrounded by a casting spur. The exterior of the back is convex and spun; the interior is concave and has a rough cast surface. There is a faint incised groove surrounding the eye on the exterior of the back. On the interior the ends of the wire eye are bent over and usually covered with a cast boss, but the stumps of the wire occasionally protrude. Backs of this category lack vent holes and are similar to South's type 6 (South 1964: 116). The specimens vary in size.

Provenience	Diametre (in mm.)	Thickness (including eye) (in mm.)
2A6A6	22.0	11.0
2A6D6	21.6	11.5
2A6D14	21.4	11.5

Provenience	Diametre (in mm.)	Thickness (including eye) (in mm.)
2A6D11	16.4	10.0
2A6D13	16.2	9.5
2A6D6	16.0	7.6 (eye bent)

E/13 Group E, Category 13. Two piece metal, no casting spur, eye, 1 vent

This specimen is a two piece brass button with a domed convex face and a convex back, both smooth and plain (Fig. 141n). There is a single vent hole in the back. The eye is a looped wire passed through a central hole in the back and lacks a casting spur. The specimen is similar to South's type 2 (South 1964: 115).

Provenience:	2A6D6
Dimensions (in mm.):	
Diametre:	19.5
Thickness:	15.0 (including eye)
Thickness, body:	8.5

E/14 Group E, Category 14. Two piece metal, no casting spur, eye, 2 vent

These specimens are two piece domed brass buttons similar to E/13 except that they have two vent holes in the back (Fig. 141o). The specimen from 2A6D12 may

have had either one or two vents originally; it has one vent and in the position where a second vent would be, is pierced by a larger hole. The hole was made from back to front and was made by an awl or possibly a shot pellet. The eye of this specimen has a somewhat larger loop as well. It is similar to South's type 2 (South 1964: 115).

Provenience	Diametre (in mm.)	Thickness (incl. eye) (in mm.)	Thickness (body) (in mm.)
2A6D (Dirt pile)	19.0	15.0	9.0
2A6D12	19.6	12.0 (eye bent over)	6.8
2A6A6	17.3	11.5 (face dented in)	6.4

F/15 Group F, Category 15. Two piece, metal, U strap attachment

These specimens are two piece buttons made of brass (Fig. 141p). The face and back are convex and domed, forming a hollow button with an ovoid cross-section. The two halves are joined at the point of greatest diametre, the joint making a sharp line. Backs and faces are plain and smooth.

Attachment is located in the centre of the back and is a U shaped strap, 3.0 mm. to 4.0 mm. in width. Some of the straps show traces of iron or brass wire reinforcements.

Provenience	Diametre (in mm.)	Thickness (including eye) (in mm.)	Thickness (body) (in mm.)
2A10G10	13.0	13.0	9.0
2A7A6	22.0	9.0 (Flattened)	9.0
2A6A2	17.0	4.0 (Eye missing)	4.0
2A6A4	17.3	9.0 (Flattened)	4.4
2A6D6	22.9	12.4 (Slightly flattened)	8.0
2A6D6	21.4	14.0	9.0

G/16 Group G, Category 16. One piece casting, drilled shank

These specimens are made of brass with button and shank cast as a single piece (Fig. 142a). The flat shank has a rough cast surface, has parallel sides, a rounded smooth top, and is drilled. The concave back of the button and the flat outer edge of the back have rough cast surface textures. The smooth surface face has a low convex dome shape. A narrow flat offset rim encircles the face and the edge is beveled. Spun marks appear in this area. The specimens are similar to Olsen's type A (Olsen 1963: Fig. 1).

Provenience:	2A5A1	2A6D (Dirt pile)
Dimensions (in mm.):		
Diametre:	24.0	22.7
Thickness (face):	2.0	1.5

	2A5A1	2A6D (Dirt pile)
Thickness (incl. shank):	12.0	9.0 (incomplete)
Shank height:	10.0	8.0 (incomplete)
Shank thickness:	2.0	2.0

H/17 Group H, Category 17. One piece casting, round shank

These specimens are made of cast copper; the concave backs have a rough cast surface texture (Fig. 142b). The shank and eye are missing on the 2A5C9 specimen and all but the stump of the shank is missing from the specimen from 2A3A1. The shank was brazed to the bottom and was a round wire. The outer edge of the back is flat and varies from 1.0 mm. to 2.0 mm. in thickness.

The front of the button is a low convex dome and was plain and smooth. The specimens have a narrow, irregular, flange-like, spun, outer rim and a beveled edge. The specimens are similar to South's type 10 (South 1964: 118) but had a different type of attachment. They are similar in appearance to the face of G/16, but a different type of shank.

Provenience:	2A3A1	2A5C9
Dimensions (in mm.):		
Diameter:	26.0	17.8
Thickness of face:	1.9	1.3
Thickness (shank missing):	4.5	3.4

I/18 Group I, Category 18. One piece, eye cast in boss, flat

This specimen is cast of whitemetal with a ring eye cast in place in a central boss on the back of the button (Fig. 142c). The wire eye has pulled out of the boss; two holes for the wire penetrate through the face of the button. The boss has a mold seam and plug on the back. The back is irregular and battered but was originally plain and smooth. The button was flat. The face is also battered but remnants of a raised cast design can be seen. There is a crown at the top and an encircling thistle motif around each side, and a central thistle spray. The design includes a number at the bottom of the face but it is battered and difficult to read. The first digit is clearly an 8, the second may be a 9 or a 4. The specimen is nearly identical to one illustrated by Parkyn (1956: 279, No. 460). If the number is an 84 it may be a button of the 84th Royal Highland Emigrant Regiment of Foot (Parkyn 1956: 278).

The specimen is similar to Olsen's type C (Olsen 1963: Fig. 1) and South's type 8 (South 1964: 117).

Provenience:	2A10C7
Dimensions (in mm.):	
Diameter:	24.0
Thickness of face:	1.0
Thickness, including boss:	5.0 (eye missing)

I/19 Group I, Category 19. One piece, eye cast in boss, convex

These two specimens were cast in a single piece of whitemetal (Fig. 142d). Iron wire ring eyes were cast in place in the central boss on the back of the button. The boss bears a mold seam. A raised cast design is present on the face. The perimeter of the face is thinned and the face is a low convex shape. The thinned edge bears a rope design. The number 65 is cast on the centre of the face. These specimens are identical to one illustrated by Parkyn (1956: 279, No. 458) of the 65th Regiment of Foot (Parkyn 1956: 276, 277).

The back of the button is slightly concave and has a flat perimeter. The specimens are similar to Olsen's type C (Olsen 1963: Fig. 1) and South's type 8 (South 1964: 117).

Provenience	Diametre (in mm.)	Thickness (including eye) (in mm.)	Thickness (face) (in mm.)
2A6D6	24.4	10.0 (eye bent over)	2.0
2A8B1	24.6	10.0 (eye bent over)	1.5

I/20 Group I, Category 20. One piece, copper, eye cast in boss

This button is cast in one piece of copper, with



an iron eye in a central boss (Fig. 142e). It has a slightly concave spun back. The face is slightly convex and is plain and smooth except for scratches and slight irregularities. It is similar to South's type 7 (South 1964: 117) and Olsen's type D (Olsen 1963: Fig. 1).

Provenience:	2A10C18
Dimensions (in mm.):	
Diametre:	18.0
Thickness of face:	1.0
Thickness, including boss:	4.0 (eye missing)

I/21 Group I, Category 21. One piece, whitmetal, eye cast in boss

This specimen is cast of whitmetal and has a spun back (Fig. 142f). An iron eye was cast in place in a central boss but has broken off at the shank. The domed boss has a central raised ridge. The face of the button is slightly convex and bore a cast design which has been nearly obliterated. The remnant of decoration appears to be a central crown and encircling thistle motif. The specimen is similar to Olsen's type D (Olsen 1963: Fig. 1) but has a different boss as noted above.

Provenience: 2A10G3  
 Dimensions (in mm.):  
 Diametre: 16.0  
 Thickness of face: 1.0  
 Thickness, including boss: 5.0 (eye missing)

I/22 Group I, Category 22. One piece, brass, eye cast in boss

This specimen is cast of brass and has a spun back (Fig. 142g). An iron eye was cast in place in a central boss of the back but is missing. The face has a rounded beveled rim. The face is smooth, scratched, and has a central engraved design consisting of two concentric grooves with a ring of punctates between the lines. The button is similar to South's type 7 (South 1964: 117) and Olsen's type D (Olsen 1963: Fig. 1).

Provenience: 2A10E21  
 Dimensions (in mm.):  
 Diametre: 17.0  
 Thickness of face: 1.4  
 Thickness, including boss: 4.0 (eye missing)

I/23 Group I, Category 23. One piece, whitemetal, eye cast in boss

This specimen is cast of whitemetal and has a

central boss which has a mold seam. The boss is scarred where the missing eye has pulled out. The back surface is smooth and bears spun lines at the base of the boss. There is a slight rough ridge at the edge of the back; the rim is beveled. The face has a well preserved cast design consisting of a central crown and encircling thistle and rose motif. The crown has a depressed arch classified as a "St. Edward's Crown" (Brown 1968: 262). The button is similar to South's type 7 (South 1964: 117) and Olsen's type D (Olsen 1963: Fig. 1).

Provenience:	2A10F30
Dimensions (in mm.):	
Diametre:	24.0
Thickness of face:	1.4
Thickness, including boss:	5.0 (eye missing)

I/24 Group I, Category 24. One piece, copper, eye cast in boss

This specimen is a one piece button cast of copper (Fig. 142i). It has a plain smooth face with a beveled edge. The face is slightly convex and the back slightly concave. The eye is missing but was cast in place in a central boss.

Provenience: 2A6D12  
 Dimensions (in mm.):  
 Diametre: 25.0  
 Thickness of face: 1.5  
 Thickness, including boss: 5.0 (eye missing)

I/25 Group I, Category 25. One piece, copper, eye cast in boss.

This is a one piece button cast of copper (Fig. 142j). The face is slightly convex and the back slightly concave. The rim is beveled. The eye is of brass wire, cast in place in a central boss. There is a restrike anvil seam across the back. The number 59 is indented in the centre of the face. Parkyn (1956: 168,169) identifies it as the 59th Regiment of Foot.

Provenience: 2A6A8  
 Dimensions (in mm.):  
 Diametre: 25.0  
 Thickness of face: 1.4  
 Thickness, including boss: 9.6

J/26 Group J, Category 26. One piece, shank and eye cast with button

These specimens are flat to slightly convex, cast

of whitemetal, and the button, shank and eye were cast as a single unit (Fig. 142k) in a manner like those illustrated by Olsen (1964: 390, Fig. 1). The back bears a mold seam across its diameter. The face is plain but has a narrow, thinner outer rim. These buttons are similar to South's type 11 (South 1964: 118) and Olsen's type E (Olsen 1963: Fig. 1).

Provenience	Diameter (in mm.)	Thickness	Thickness
		of face (in mm.)	Incl. eye (in mm.)
2A2C8	28.0	2.0	14.0 (bent over to 7.0)
2A3A2	28.0	1.5	11.0
2A5B1	17.0	1.1	5.0 (bent over)
2A3A4	30.9	1.7	missing shank and eye
2A12A2	27.3	1.4	missing shank and eye
2A6D18	17.3	1.1	missing shank and eye

J/27 Group J, Category 27. One piece, silver, shank and eye cast with button

This is a one piece button with which the shank and eye were cast as a single unit (Fig. 1421). The eye is missing. The face is nearly flat but slightly convex and the back is slightly concave. The face was plain. The specimen was cast of silver or is silver plated. It is similar to South's type 11 (South 1964: 118) and Olsen's type E (Olsen 1964: Fig. 1).

Provenience:	2A6D7
Dimensions (in mm.):	
Diametre:	18.0
Thickness of face:	2.0
Thickness of button incl. stump of shank:	6.7 (eye missing)

J/28 Group J, Category 28. One piece, shank and eye cast with button

This is a one piece button in which the shank and eye are cast as a single unit with the button (Fig. 142m). It differs from the Group J, Category 26, buttons in the shape of the face. The specimen is small in diametre and has a flat face with beveled edges. The face is plain. The back is flat and has a mold seam across the centre. The specimen is from a French context in the redoubt interior.

Provenience:	2A10E22
Dimensions (in mm.):	
Diametre:	17.0
Thickness of face:	2.0
Thickness, including eye:	12.0

K/29 Group K, Category 29. One piece, disc with soldered eye.

This is a one piece button made of a flat brass

disc with a smooth undecorated face (Fig. 143a). The eye is missing but was soldered or braised to the back. A round scar in the centre of the back marks the former position of the attachment. The specimen is similar to Olsen's type G (Olsen 1963: Fig. 1) and South's type 9 (South 1964: 118).

Provenience: 2A10C2

Dimensions (in mm.):

Diametre: 16.5

Thickness: 0.5

A second, similar specimen has the stump of a rusted iron shank in place; the eye is missing (Fig. 143b).

Provenience: 2A6D11

Dimensions (in mm.):

Diametre: 23.0

Thickness: 1.1

L/30 Group L, Category 30. One piece, eye with casting spur

This specimen is a one piece button of cast brass with a flat, smooth, plain face (Fig. 143c). The back is spun and slightly concave due to a rim-like perimeter. A brass wire eye embedded in a casting spur and slight boss is located in the centre of the back. The specimen

is similar to Olsen's type D (Olsen 1963: Fig. 1) and South's type 7 (South 1964: 117).

Provenience:	2A6D15
Dimensions (in mm.):	
Diametre:	25.5
Thickness of metal:	1.6
Thickness including eye:	10.0

M/31 Group M, Category 31. Horn?

This specimen is a large button made of horn (Fig. 143d). The face is convex and the back slightly concave. The face is plain. In the centre of the face is a smooth sided cut-out hole 16.0 mm. in diameter. The back of the button is partly missing but apparently consisted of a disc the same size as the face. The back is solid in the centre so that behind the cut-out hole in the face it forms an inset panel in which there are two holes for attachment. The face and back were glued (?) together in the centre but not at the edges so that there is a very narrow space between front and back panels around the edge of the button. It was probably cloth covered.

Provenience:	2A10J2
Dimensions (in mm.):	
Diametre:	40.0
Thickness:	4.7



### Interpretation of Buttons

Based on comparisons with Olsen's and South's button types, the specimens from Castle Hill appear to represent types manufactured between about 1700 and 1790, a date range that corresponds with the occupation of the site. Most of the specimens are ones which would fall into the period after 1750 based on Olsen's typology and in the 1726-76 period in South's classification. The bulk of the specimens probably represent English buttons at Castle Hill, an observation which is not unexpected in view of the paucity of specimens recovered from French stratigraphic contexts. A few specimens may, however, be identified as buttons of the French period.

A tabulation of the buttons is presented in Table 116. The tabulation is broken down into categories of specimens from lots identified as English, French, probable English, probable French and Indeterminate. In Table 117 the button data from strata block A in sub-operation 6D are summarized. A large proportion of the total button sample came from the strata block and the bulk of those specimens were derived from lot 2A6D6. Lot 2A6D6 has been classified as probable English and lot 2A6D7 beneath it as probable French. Both lots are mixed to some extent.

Since such a large sample of the buttons came from these contexts, in the construction of Table 116 the percentage of button types in the total English category was calculated both with and without the sample from the 2A6D6 lot. This was in an effort to minimize the potential distortion of the button type distribution by the use of the probably English but mixed lot 2A6D6.

Only three buttons were found in contexts which could be regarded as unquestionably English and only three were found in unquestionably French deposits. Types A1, B2 and B3 were thus associated with the English period and types F15 and J26 with the French occupation. Types found in probable English levels and probable French deposits include many more specimen types, as shown in Table 116. Using these data it appears that the following types are found in English levels only and may be identified as English buttons: B2, B3, B4, B6, C7, D8, D9, D10, D11, D12, E13, E14, I18, I19, I20, I22, I23, I24, K28, and M30. The remaining types are found in either both French and English contexts or in French contexts only. These must be discussed individually because there are some conflicts between the typological classification of some specimens and these associations. A

few of the specimen types may be identified as probably French buttons with further analysis of the associational and type data.

Type A1 is represented in both French and English deposits, but it is probably not a French button type. Of the eight examples, seven are from English levels and only one is from a French context; in this case lot 2A6D7. This level is in the strata block in the fortification ditch and the specimen is probably intrusive into this predominantly French level in the ditch fill.

Type B5 is found in 2A10F17, a lot from within the refuse in the interior of the fort where intrusion is possible. The English specimen is from similar refuse in the interior. The specimen is of a form of the period 1700-90 and could be a type from either or both occupations at Castle Hill. It is most likely English judging from the association of the other group B buttons.

Type F15 is represented in lots of both occupational periods but although three are in English contexts and only two in French contexts, the relative frequency is much greater in the French sample. The two French specimens are from a sealed stratum of French refuse and from the masonry wall core, both unquestionable French deposits. The English examples are from

potentially mixed deposits. The type is probably a French button. Herst (Pers. Comm.) agrees but notes there is too little comparative French material for certainty.

Type G16 has not been recovered from any context which can be culturally identified at Castle Hill. It is a cast button with a drilled shank similar to others of the 1700-65 period (Olsen 1963). The plain face is almost identical with button type H17 which is similar except for the type of shank. Type H17 is represented by a single specimen which is from a deposit classified as probable French. There is a strong possibility that H17 is a French button and G16 may well be French too.

Button type I21 is a specimen from a rubble zone within the redoubt; although the level could not be classified it is probably a late deposit and most likely English. The specimen itself has a crown and thistle decorative motif and is surely an English button.

Button type I25 is a single specimen from what was interpreted as a pre-occupational turf zone and probably French. The button is of a form of the 1760-85 period and judging from the other group I button associations is more likely to be an English button than French. The specimen bears the number "59" on the face. It is here

interpreted as an English specimen intrusive in a French level.

L29 is also a type of the 1760-85 period. Found in the ditch fill rubble in a zone classified as probably French, the specimen is most likely of English origin and intrusive into the potentially mixed deposit in which it was found.

Buttons of types J26, J27 and J28 pose the most serious interpretive and identification problem. These buttons are cast with button, shank and eye being a single casting; they are similar to Olsen's type E of the 1750-1812 period. However, of the eight specimens found in the site, five are associated with French or probably French deposits and only one with a probable English unit. There thus appears to be a strong association of these types with the French occupation. The buttons are not identical with Olsen's type, and their plain faces are similar to those of the cast buttons of G16 and H17 types, also thought to be French at Castle Hill.

Further detail concerning the contexts of these specimens is worth presenting in order to more fully evaluate the French identification of these specimens. One specimen is from a French floor level in the powder magazine and one is from the rampart fill. The

remainder are from locations which could be subject to mixing and intrusion. One could put forth the hypothesis that the button from the magazine floor could have been dropped on the French floor early in the English occupation and that the one in the rampart fill could have been intruded via an English post-hole during stockade construction. The other examples could be explained away as intrusives. However, it seems to be stretching things a bit to do so and it would appear that group J buttons are probably French.

In summary, then, button types F15, G16, H17, J26, J27 and J28 are probably French buttons at Castle Hill. All other specimens are probably English although there is a possibility that examples of types A1, B5, I25 and L30 could be French.

The buttons can be grouped into clusters of similar specimens; these groupings are reflected in the letters preceding the type numbers. Groups F, G, H and J appear to be French types while Groups A, B, C, D, E, I, K, L and M are English. The most common English type of button is the Group D two piece type and constitutes 43 per cent of the specimens from English contexts. Groups A and I are next most common in the English period, amounting to 13

per cent each. Type Groups A, D and I are the major English button categories. The most common French types are those of Group J which accounts for 41 per cent of the specimens from French contexts. Group F buttons are second in frequency with 16 per cent and groups F and J are the most common French button categories.

#### Military Unit Identifications

A few of the buttons may be used as tentative identifications of particular military units at the site. These have already been cited in the descriptions.

One specimen, B/6, has an anchor and rope on the face and is probably a Royal Marine button. Duncomb's and Cochran's Regiments of Marines saw service in Newfoundland in the period 1743-45 (Weber n.d.).

Button I/18 has a battered face but has been interpreted as bearing the numeral "84", and is probably a button of the "84th Royal Highland Emigrant Regiment of 1779-1784" (Parkyn 1956: 277). Stewart (1962: 356) reports that recruits from Newfoundland were included in the first battalion raised in Canada and Weber lists the "84th Regt. of Foot (Royal Highland Emigrants)" and "The Young Royal Highlanders

(2nd Batt, 84th Regt.)" as serving in Newfoundland during the period 1776-79 (Weber n.d.).

Button I/19 bears the numeral "65" and is probably a button of the "65th Regiment of Foot" (Parkyn 1956: 276) which was in existence from 1758 to 1881. Parkyn lists the 65th as the 1st Battalion of the York and Lancaster Regiment (Parkyn 1956: 276). Weber lists the "69th Regt. of Foot (1st Batt. York and Lancaster Regt.)" (Weber n.d.) as serving in Newfoundland in 1775-76.

Button I/25 bears the numeral "59" on the face and is probably of the 59th Regiment of Foot, 2nd Battalion, East Lancashire Regiment (Parkyn 1956: 168). Stewart (1962: 255) also identifies the regiment and indicates that it served in Newfoundland. It was in Canada from 1758 to 1775 (Stewart 1962: 255).

All of these British units, identified from buttons found in the site, can be shown to have seen service in Newfoundland. Their periods of service there are all within the time span of the English occupation at Castle Hill. Thus, the historical data and archaeological evidence of these specimens correspond.



French Coins

Seven French coins were recovered, all from lots stratigraphically identified as French or probably French. Most of the specimens are badly worn and poorly preserved.

Provenience: 2A2C7

This specimen is badly worn and nearly illegible (Fig. 144c). The obverse shows traces of an encircling band with letters and traces of a portrait bust appear in the centre. The reverse is worn nearly smooth but one fleur-de-lis is visible. The specimen is probably similar to the one recovered from lot 2A7A13, below. The figure represented on the coin cannot be seen clearly but is possibly a bust of Louis XVI which would suggest that the specimen pre-dates 1793 (Chamberlain 1960: 113-4). The specimen was recovered from a French floor level in the magazine. Diametre: 22.5 mm. Thickness: 1.0 mm.

Provenience: 2A7A13

This specimen is probably like the one recovered from lot 2A2C7 described above and is in somewhat better condition (Fig. 144a). The obverse has an encircling

band of letters which are illegible; the centre bears a portrait bust. The reverse has the word FRANCE above the letter L in the centre. Below this are three fleurs-de-lis. The specimen came from an intermediate floor level in operation 7 which was thought to be a French occupation although it might also have been used by the English. Diametre: 21.3 mm. Thickness: 1.0 mm.

Provenience: 2A2A11

This specimen is so badly worn that it is illegible except for a trace of a single fleur-de-lis. It is of irregular diametre and very thin. It was recovered from the French floor of the magazine. Diametre: 23.5 mm. Thickness: 0.5 mm.

Provenience: 2A10A11

This specimen is a very thin coin of irregular diametre (Fig. 144d). The obverse bears an illegible design in the centre and illegible lettering around the edge. The reverse has a complicated cross design in the centre. It is composed of four interlocking pairs of opposed Ls surmounted by crowns. There are fleurs-de-lis in the quadrants. It is similar to a design illustrated by Carson (1962: No. 571). Letters around the edge are difficult to read but include

E T N R and L V. The specimen was recovered from deposits resting upon bedrock in the interior of the redoubt, a context which was probably French. Thickness: 0.5 mm.

Provenience: 2A10B17

This specimen is round and thin. The obverse is worn smooth and no design can be detected although traces of letters can be seen near the edge (Fig. 144b). The reverse bears illegible letters around the edge and a badly worn central design including two fleurs-de-lis. This specimen came from a rubble level which was classified as mixed, but in an area of concentration of French refuse in the interior of the redoubt. Diametre: 18.0 mm. Thickness: 0.5 mm.

Provenience: 2A6D9

This specimen is worn nearly smooth. The obverse has a male bust in the centre while illegible letters appear around the edge (Fig. 144c). The reverse also has lettering around the edge and in the centre a design including three fleurs-de-lis and is copper. The specimen was recovered from probably French ditch refuse. Diametre: 20.5 mm. Thickness: 1.0 mm.

Provenience: 2A9E2

This silver coin may bear the date 1698 (Fig. 144f). The words around the edge of the obverse appear to be DOMINI ---NED LOIVM 1698 ---NO-N-. The 8 is somewhat questionable. In the centre is a shield upon which are three fleurs-de-lis; the shield is surmounted by a crown. On the reverse is a series of letters around the thin and worn edge which appear to be LVD ---DGFR ETNR. The central design is composed of four pairs of opposed interlocking Ls surmounted by crowns and with fleurs-de-lis in the quadrants. Diametre is irregular, 21.2 mm. Thickness: 0.6 mm. This specimen was recovered from an occupational level within the French rampart fills.

Further study will probably result in a more accurate identification of the coins than is presented here. Their greatest significance in this site is that they tend to confirm the cultural identification of the strata in which they were recovered.

#### Cockade Holder

This specimen is made of sheet brass (Fig. 144g). It is a tapered tubular object which has been mashed flat. It has a stamped embossed decoration, one element of which appears to be a fleur-de-lis. It was recovered from the spoil heap and cannot be given a stratigraphic association.

Provenience:	2A6C2
Dimensions (in mm):	
Length:	56.0
Width:	15.0 - 25.0
Thickness of metal:	0.5

Specimens listed here are a variety of brass objects, some of unknown function.

#### Brass Plate

This specimen is a section of a brass plate (Fig. 144h) or strap, broken off at one end. It has three countersunk holes. The strap is flat but is thicker at the broken edge. It is from a probably English context.

Provenience:	2A6D12
Dimensions (in mm.):	
Length:	35.0
Width:	39.0
Thickness:	2.0 - 3.0
Hole diameter:	6.0

#### Riveted Brass Strap

This specimen is a narrow brass strip consisting of two straps which are overlapped and riveted together (Fig. 144i). There is a hole in the centre of the

double thickness portion. It is probably English.

Provenience:	2A6D6
Dimensions (in mm.):	
Length:	77.0
Width:	13.0
Thickness of metal:	1.0
Thickness in centre:	2.0
Length of overlapped area:	38.0
Hole diameter:	4.0

#### Brass Lever?

This specimen is a small flat brass strip which tapers at one end (Fig. 144j). The tapered end is curved slightly in semblance of an open hook. It is from a probable English deposit.

Provenience:	2A6D6
Dimensions (in mm.):	
Length:	60.0
Width:	2.5 - 4.0
Thickness:	1.8

#### Copper Sheets

Several pieces of sheet copper and sheet copper artifacts were recovered. They are found in both French and English contexts in the site (Fig. 145). They are tabulated in Table 118.

Waist Belt Buckles

Four specimens identified as waist belt buckles (Peterson 1968: 231, Nos. 4,5) were recovered (Fig. 146). All are made of brass and are plain and smooth. The buckles consist of elongated oval bows which meet at an indented central cross-bar. The bows are flat while the cross-bars are oval to D-shaped in cross-section. All of the specimens are incomplete; the two largest fragments lack the tongue on the cross-bar. Noel Hume illustrates this type as a wide belt or baldrick buckle (1970: Fig. 20, 11).

One specimen was from lot 2A9F6, a French rampart fill zone. Two fragments were from lot 2A11A1, a turf level classified as probable French and the final example is from lot 2A6D3, a mixed level of ditch fill.

Provenience	Length (in mm.)	Width (in mm.)	Cross-bar	Bow
			Diametre (in mm.)	Thickness (in mm.)
2A6D3	70.0	34.0+	4.0	
2A9F6	77.0	31.0+	4.0x5.0	7.0x5.0
2A11A1	63.0+			
2A11A1	Fragment			

Shoe Buckles

The most common buckle fragment has been identified

as the shoe buckle (Figs. 146 , 147). These are large rectangular buckles curved to fit the shoe and made of several pieces. These components are the buckle top, the hinge pin, a tined ring or loop and a fork-like tongue (Noel Hume 1970: 86). The top is a narrow edged open centred rectangle with squared or rounded ends. Most of these fragments are made of brass but whitemetal, copper and iron specimens are present. Most are decorated but some are plain. One example is nearly complete, retaining the tined ring and tongue in place (Fig. 147a), but most are separated parts. The complete specimen and the parts are of the type illustrated by Peterson (1968: 230, Nos. 1,2), and Noel Hume (1970: Fig. 20,12).

The ring segment of the buckles consists in general of a straight basal hinge with a central gap for insertion of the base of the tongue. From the hinge base the ring curves or flares outward to form a rounded D, a flattened D or a trapezoidal ring. Pointing downward from the top on the inside of the open ring are one, or more commonly, two tines. These parts are made of brass, iron or whitemetal.

A short two-tined fork-like tongue with a straight cylindrical basal hinge is the third major component of the buckle. Its base fits into the gap in the basal hinge of the ring where it is held in place by a hinge



pin. Both brass and iron examples are present.

Iron hinge pins are the final buckle part. The hinge pin pivots in holes in the buckle top and is usually found oriented at right angles to the curvature of the buckle top and across its shorter axis (Noel Hume 1970: 86).

These components, the pin, tongue and ring are parts of shoe buckles as illustrated by Peterson (1968: 230) but may also have had other functions. Similar specimens are among the buckles from post-1760 Fort Michilimackinac where they are apparently identified as buckles for canvas straps on British uniforms (Maxwell and Binford 1961: 90, 118, Pl. II, b and c). Shoe buckles were of small size from 1700 to circa 1725 and fairly large by the 1740s (Cunnington and Cunnington 1964: 80) and medium sized in the 1750 to 1775 period (Cunnington and Cunnington 1964: 229). Decorated buckles are of the 1750-75 period while very large smooth buckles are of the 1775 to 1788 time range. Buckles were replaced by strings ca. 1791 (Cunnington and Cunnington 1964: 229).

Thirty-six of the 42 specimens were recovered from English contexts in the site. Three specimens are from unidentifiable lots 2A4A1, 2A5B1 and 2A5C13, and three are from French levels. Of the possibly French specimens

two come from probable levels of mixed ditch fill. These are a fragment of a rectangular top from lot 2A6D7 and a hinge pin from 2A6A9. It is notable that the other example from 2A10B18, another probable French level, is different in shape, having an angular ring top. The majority of the shoe buckle specimens are from the English period of occupation at Castle Hill. On the basis of the Cunningtons' size and decoration criteria, the specimens would appear to be of the 1750-88 time range which coincides with the English occupation of the Castle.

The shoe buckle fragments are tabulated and described individually in Tables 119 and 120.

#### Breeches Knee-band Buckles

The breeches knee band buckle (Fig. 148) has a distinctive T shaped flange for insertion in a button-hole as well as being smaller in size than the shoe buckle (Cunnington and Cunnington 1964: 66; 216, Fig. 75, b and c). The flange is also illustrated by Peterson (1968: 231, No. 6). The pivot or hinge usually went across the long rather than the short axis (Noel Hume 1970: 86). As seen in the illustrations cited above, these buckles also utilized the two-tined fork-like tongue.

The specimens from Castle Hill are described and tabulated in Table 121.

None of the specimens from Castle Hill were recovered from English contexts. Three examples, 2A5A1, 2A5C13 and surface, are from culturally unidentified lots. The remainder are from French or probably French contexts.

#### Miscellaneous Buckles

Several buckles which do not appear to fit into the shoe and knee buckle categories (Figs. 148 i-m) are also present and are described below.

Prov.	Material	Description	Dimensions	Figure
2A3A1	Iron	Rectangular with concave sides and rounded ends. With central cross piece or pin. Curved and therefore could be small shoe buckles.	48.0 33.0	148j
2A3A1	Iron	Same as above.	48.0 33.0	
2A10F15		Plain smooth buckle top is rectangular with rounded corners, has central hinge. Hanging down from hinge is central two-tined fork tongue. Also hinged to	37.0 23.0	148k

Prov.	Material	Description	Dimensions	Figure
2A10F15		centre is broad U shaped bar with riveted ends; probably for attachment to leather strap.		
2A9J5	Iron	D shaped buckle top, small size. On central hinge are a single central tine tongue and a split flange or clip. A leather? strap probably went in the clip slot.	33.0 25.0	1481
2A5C12	Iron	Complete rectangular buckle top. Rounded corners. Long narrow buckle with pivot holes on long axis.	48.0 34.0	148m
2A6D14	Brass	Fragment of long narrow top with rounded ends. Pivot holes on long axis.	44.0 21.0	
2A6D6	Copper	Buckle or plate with studs on back. Flared scalloped end. Slotted centre. Stud length suggests attachment to leather strap.	45.0 30.0	148i

The two specimens from lot 2A3A1 are probably from belts or spurs (Noel Hume 1970: Fig. 20, 1-3). A strap end fitting similar to the one of the specimen from 2A9J5 is illustrated by Noel Hume (1970: Fig. 20, 10) as are stud or rivet strap fastenings (2A10F15) (Noel Hume 1970: Fig. 20, 7). Elongated buckle tops like the ones from lots 2A6D14 and 2A5C12 may be stock buckle fragments (Peterson 1968: 231, No. 3).

The specimens from lots 2A10F15, 2A6D6, 2A6D14 are from English contexts, while 2A9J5 is a sealed French refuse layer. The other specimens are from mixed or indeterminate lots.

#### Metal Finial

A small pewter finial was recovered from an English context in the redoubt (Fig. 149a). It has a small diameter shaft with encircling cordon and a bulbous pointed top.

Provenience:	2A10D21
Dimensions (in mm.):	
Length:	21.0
Diameter (maximum):	10.0

#### Pewter Object

A flat pewter object was recovered from an English

floor level in the magazine (Fig. 149b). It is an incomplete handle-like object of unknown function. It tapers from a broken end to a flared and pointed end. Several engraved letters or symbols, some indistinct, are present. Some are S- and e-shaped lines; the letters IARO are legible. The specimen is plano-convex in cross-section.

Provenience:	2A2A7
Dimensions (in mm.):	
Length:	78.0
Width:	10.0 to 20.0
Thickness:	4.0

### Jews-Harps

Two jews-harps made of iron were recovered from English contexts in the site (Fig. 149 c,d). One is complete. They are made of stock which is rectangular in cross-section and have a round frame head and two separated parallel (?) shanks. The specimens are similar in size and shape to modern jews-harps. Comparable iron jews-harps were present in the French levels of 1734 at Fort Michilimackinac (Maxwell and Binford 1961: 105). These specimens are probably Series B, Type 1, Variety a (Stone 1970: 94).

Provenience:	2A10G5
Dimensions (in mm.):	
Length:	65.0
Loop diameter:	38.0
Thickness:	4.0 to 8.0
Provenience:	2A6D6 (Fragment)
Dimensions (in mm.):	
Length:	37.0 (incomplete)
Loop diameter:	29.0
Thickness:	4.0

### String

A short section of charred string was recovered from a French rampart fill level (Fig. 149e). It was Z-twisted, being composed of three S-twist yarns composed of many small fibers.

Provenience:	2A9D2
Dimensions (in mm.):	
Length:	37.0
Yarn diameter:	2.0

### Cork

A small fragment of a cork was recovered from a mixed level. It has a hole in the centre, probably from damage by a corkscrew. It is of a diameter of

the size range of Castle Hill bottle neck interiors and cork has long been used as a wine bottle closure (Noel Hume 1961: 110), but because of its context it could be a modern specimen.

Provenience:	2A5B1
Dimensions (in mm.):	
Diameter:	20.0

#### Slate Specimen

A specimen which could be a slate marker was recovered from probably English rubble in the redoubt interior. It tapers to blunt points at each end.

Provenience:	2A10C2
Dimensions (in mm.):	
Length:	40.0
Diameter:	4.0

#### Clay Marble

A light brown clay marble was recovered from a mixed rubble level. It was a slightly irregular sphere.

Provenience:	2A5A1
Dimensions (in mm.):	
Diameter:	13.0



### Leather Fragments

Three perforated fragments of thin brown leather (Fig. 149f) were found in lot 2A9C2, a level from the French rampart fill. Each has a large hole 5.0 mm. in diameter and two smaller nail (?) holes, one on each side of the larger perforation. These are probably fragments of shoes.

One thick fragment of nearly black leather was found in lot 2A1A3, a mixed context. It may be a fragment of a shoe upper.

A boot heel was found in lot 2A9F8, a French rampart fill level. It is made up of at least 18 thin layers of leather held together by a central, square cross-sectioned, tapered peg. The heel lift is made up of many small fragments of leather as well as larger pieces of the D-shaped form of the complete heel. Numerous small peg holes are found perforating these pieces. Around the perimeter of the uppermost lift is a row of very small nearly continuous holes, probably peg holes. The specimen appears to be similar in construction to those from Fort Beausejour (Rahman 1971). It came from the ground in poor condition.

Provenience: 2A9F8  
 Dimensions (in mm.):  
 Long: 71.0  
 Wide: 61.0  
 High: 30.0+  
 Provenience: 2A9C2  
 Three heel lift fragments?  
 Provenience: 2A1A3  
 One vamp or quarter fragment?

Boot parts are diagramed in Wright (1922: Pl. 48) and reconstructed shoes of a form similar to the fragments recovered are illustrated by Peterson (1968: 230).

### Combs

A large fragment of a bone comb was recovered from lot 2A2A11, a French floor level in the magazine (Fig. 150b). The letters CIR or GIR have been scratched on one side of the solid central rib of the comb and are probably initials. The date 1698 is scratched on the opposite side of the specimen, a date which conforms with the stratigraphic position and occupational dates. The date is important supporting evidence for the identification of the floor as French.

The specimen is rectangular with a solid end and centre. Teeth are present on both sides of the solid

central bar. On one side they are 1.0 mm. wide and 20.0 mm. long; on the opposite side they are finer and more numerous being 0.5 mm. wide and 20.0 mm. long.

Provenience:	2A2A11
Dimensions (in mm.):	
Length:	83.0 (incomplete)
Width:	62.0
Width, central bar:	15.0
Width, solid ends:	7.0
Thickness:	3.0

Another fragment of a bone comb is the solid end piece with two scratches indicative of the position of the lines where the teeth and the central bar meet (Fig. 150a). This example is from a French rampart fill level.

Provenience:	2A9F8
Dimensions (in mm.):	
Length:	51.0
Width:	8.0
Thickness:	2.4

A third fragment of polished bone may also be an end panel from a comb but its identification is less certain (Fig. 150c). It is also from French rampart fills.

Provenience:	2A9E11
Dimensions (in mm.):	
Length:	47.0
Width:	10.5
Thickness:	6.6

### Bone Artifact

A polished bone artifact with a drilled central hole was recovered from a probably French context but cannot be identified as to function (Fig. 150f). It is tapered and flat.

Provenience:	2A6D7
Dimensions (in mm.):	
Length:	32.5
Width:	4.5 to 9.5
Thickness:	2.0 to 3.0
Hole diameter:	4.0

### Ivory Finial

This specimen is a conical carved ivory object (Fig. 150d). It has a hollow threaded socket 10.0 mm. deep in its larger, basal, end. It tapers to a rounded point and has nine ridges or cordons of varying width encircling the tapered sides. It is from an English context in the interior of the redoubt.

Provenience:	2A10E2
Dimensions (in mm.):	
Length:	31.0
Diametre of base:	10.0

#### Bird Bone Whistle

A small bone whistle carved from a segment of a bird bone was recovered from probably English refuse in the ditch (Fig. 150e). The ends of the naturally hollow bone are cut square and smoothed. A small angled notch has been cut near one end. There is a 1.0 mm. diametre hole in the bottom of the notch. The bone used for the whistle has been identified as probably **Cormorant**, *Phalacrocorax* spp.

Provenience:	2A6D6
Dimensions (in mm.):	
Length:	49.0
Diametre:	7.0
Distance of hole from end:	6.0

#### Celuloid Box

A fragment of a celluloid box was recovered from a probably French level of ditch fill (Fig. 150). It is a basal fragment of cylindrical shape, is white and has a cordon-like ridge around the base. There are

red stains on the exterior surface. Black letters on the exterior are TRIES, part of an incomplete word. The specimen could be a cosmetic box and may be a modern intrusion into the site, although it was found deep in probable French refuse in the fortification ditch.

Provenience: 2A6D8

Dimensions (in mm.):

Thickness: 0.5

#### Fish Hooks

A large number of fish hooks (Figs. 151 b-j) and hook fragments are present, not unexpectedly in view of the significance of Placentia as a cod fishery. No typological differences between specimens from French and English contexts were noted. All are J-shaped hooks with a single barb and a long shank. The shank is round in cross-section except at one end where it is flattened and flared for the attachment of the line. These hooks are similar in size to those used today for cod jigging.

Only two specimens are notable. One, a barb fragment from 2A9K14, a French lot, is heavier and larger than usual (Fig. 151g). Another from lot 2A9J5, also French, has been straightened to form a barbed shaft

(Fig. 151j). Cod hooks straightened in similar fashion and mounted on the end of a long pole are still used in Newfoundland as lobster spears and this specimen was probably used in that fashion. (Lobster shell was recovered from the site.) Specimens from the following contexts are probably or definitely French: 2A6D7, 2A9E2, 2A9J5, 2A9K14, 2A2C8, 2A2C4, 2A3A4, and 2A6A4. Specimens from lots 2A5C12 and 2A5A1 are from mixed levels. All other specimens are from English contexts. The specimens are tabulated in Table 122.

The hooks with the flattened shank were termed "curved" hooks as opposed to "cross-eyed hooks" (modern) by fishermen on the field crew. These flattened hooks were tied on with a rolling hitch and one crew member claimed to have used them himself while another reported that his grandfather had used such hooks.

### Gaff

A double pointed S-shaped iron hook was recovered from an English rubble level (Fig. 151a). The iron rod is 8.0 mm. in diameter at the centre and tapers to blunt points at each end. This specimen was identified as a cod gaff by one of the fishermen on the field crew. The specimen, of course, could be an S-shaped hook for suspension of a variety of objects.

Provenience:	2A10C5
Dimensions (in mm.):	
Length:	150.0
Diametre:	8.0 to 2.0

### Tin Boxes

Several fragments of tinned, thin rusted iron were present. These are flat, unlike the more obvious recent tin can fragments described elsewhere. Some have traces of rolled edges. Such specimens could have been used as containers for military accoutrements or for ammunition (Peterson 1956: 237; Peterson 1968: 67). They are from English and French contexts. Probable French specimens are the ones from lots 2A11A1, 2A6A9, 2A6D7, 2A9E11 and 2A9G14. All others are from English associations.

Provenience	Number of Specimens
2A5A1	3
2A6A9	1
2A6D2	6
2A6D6	31
2A6D7	1
2A6D10	11
2A6D11	2
2A6D12	24



Provenience	Number of Specimens
2A6D13	2
2A6D20	5
2A6E6	1
2A9E11	1
2A9G14	1
2A10A1	2
2A10B11	2
2A10G7	1
2A10H2	1
2A10H3	1
2A11A1	1

### Flanged Iron Bearings

Several tapered iron cylindrical tubes with wedge shaped flanges on opposite sides have been identified as probable axle bearings (Fig. 152a). The specimens from lots 2A2A5 and 2A2C7 are probably French contexts while the remainder are probably English.

Prov.	Length (in mm.)	Exterior Diameter (in mm.)	Interior Diameter (in mm.)	Width at flange (in mm.)	Flange Thickness (in mm.)
2A2A5	38.0	26.0	15.0	43.0	7.0
2A2C7	38.0	27.0	15.0	38.0	7.0
2A6D6	37.0	25-28.0	15.0	39.0	7.0
2A6D12	38.0	25-30.0	15.0	40.8	7.0
2A6D6	Fragment				

Chain Links

Several chain links or fragments were recovered (Fig. 152 b,c). Some of the smaller links are of the size and weight used on cannon trunnion cover lynch pins. The larger link fragments are from a very heavy chain such as a light ship anchor. Chains were used to protect the entrance to the harbour (Proulx 1969: 158) and probably for numerous other purposes. All examples recovered are from English contexts.

	Diametre (in mm.)	Link Length (in mm.)	Link Width (in mm.)	Remarks
2A6D21	25.0	48.0 inc.	85.0	Large
2A10C8	25.0	Incomplete	87.0	Large
2A10D13	25.0	Incomplete	83.0	Large
2A10C2	7.0	Fragment		Light
2A10E13	3.0	45.0	15.0	Light
2A10G5	11.0	45.0	36.0	Light, tapered

Ice Creeper

A stirrup-like artifact from an English association is identified as an ice creeper (Fig. 152d). It is made of iron. It consists of a flat strap which has been cut and bent at each end. A flared central tang is bent upward at each end and each tang has a central hole. The

four corners have been bent downward and taper to points.

Provenience:	2A2A7
Dimensions (in mm.):	
Length:	104.0
Strap width:	31.0
Strap thickness:	6.0

### Hook

Several hooks of varying sizes and types were found and are described below.

#### Tanged Hook

This iron U-shaped hook has a tip which has been blunted by rolling the lip (Fig. 153b). It has a straight back and at right angles, a curved, pointed tang for insertion into wood or masonry. The shank is rectangular in cross-section. It came from a mixed level.

Provenience:	2A5C13
Dimensions (in mm.):	
Length:	63.0
Distance across hook:	46.0
Tang length:	40.0
Tang thickness:	7.0 x 7.0
Shank thickness:	6.0 x 9.0
Hook diameter:	8.0

Hook Fragment

A fragment of a curved hook with a rounded tapered hook end and a flat iron shank was recovered from an English level in the ditch (Fig. 153a).

Provenience:	2A6D11
Dimensions (in mm.):	
Length:	56.0
Width across hook:	30.0
Shank thickness:	6.0 x 7.5

Rod Hook

This hook is a bent piece of iron rod which has a rounded, blunt end. It is also from an English level (Fig. 153c).

Provenience:	2A6D12
Dimensions (in mm.):	
Length:	77.0
Width across hook:	49.0
Rod diameter:	8.0

Large Rod Hook

This large hook end is made from an iron rod bent to a J shape. The tip of the hook has been bent back on itself to blunt it (Fig. 153d). It came from an English context.

Provenience:	2A6D10
Dimensions (in mm.):	
Length:	124.0
Width across hook:	52.0
Rod diametre:	9.5
Diametre at tip:	7.0

### Cargo Hook

This specimen is a double ended iron cargo hook. Each end of the rod is bent to a U shape, but the U at each end is in a different plane, one being at right angles to the other. The ends of the hooks are tapered (Fig. 153e). It is also from an English context.

Provenience:	2A6D6
Dimensions (in mm.):	
Length:	180.0
Width across hooks:	50.0 and 60.0
Cross-section dimensions:	8.0 x 13.0

### Flanged Hook

This hook is made from rectangular iron stock. It tapers at its rounded tip (Fig. 152e). It has a long curved shank which terminates in a broad flattened flange. The end could be an opened rolled socket for hafting instead of a flange. It is an English specimen.

Provenience:	2A6D6
Dimensions (in mm.):	
Length:	192.0
Width across hook:	44.0
Flange or socket length:	56.0
Flange or socket diameter:	14.0

### Handles

Several handles of different sizes were recovered. These specimens could have been used on doors or chests.

### Drawer Pull

This is a small loop handle made of iron stock which is round in cross-section (Fig. 154a). At each end a loop has been formed by bending the rod. The loops have been twisted at right angles to the loop and form pivot holes. The specimen could be a sling swivel (Priess: Pers. Comm.).

Provenience:	2A6D6
Dimensions (in mm.):	
Length:	52.0
Width of loop:	33.5
Wire diameter:	8.0
Loop diameter:	4.0

Handle

This specimen is made of iron stock which is rectangular in cross-section (Fig. 154c). It has been twisted as well as curved to form the curve of the loop. The terminal end has also been thinned and splayed and has a single hole for attachment. The specimen is incomplete. An alternate identification is a corner bracket fragment (Priess: Pers. Comm.).

Provenience:	2A6D6
Dimensions (in mm.):	
Shank size:	8.0 x 9.0
End plate diameter:	21.7
Hole diameter:	4.5

Door Pulls

Two similar specimens are probably door pulls judging from their size (Fig. 154 b,e). They are simple loops but taper near the terminals. At the terminal ends are flat plates of rounded diamond shape with three perforations for attachment. One specimen is incomplete and has only one plate. The larger example is complete and on terminal plate also has a slot in the middle; it is a thumb latch handle (Priess: Pers. Comm.).

Provenience:	2A5G2
Dimensions (in mm.):	
Length:	140.0 (incomplete)
Loop height:	50.0
Handle diameter:	7.0 x 10.5
Plate dimensions:	43.0 x 30.0
Thickness of plate:	2.0
Provenience:	2A6D12
Dimensions (in mm.):	
Length:	219.0
Loop height:	64.0
Handle diameter:	10.0 - 16.0
Plate sizes:	66.0 x 51.0; 60.0 x 47.0
Plate thickness:	2.0 - 5.0
Slot size:	8.0 x 21.0

### Strap Handle?

A segment of strap iron bent into the shape of a loop handle is a probable handle but is incomplete and cannot be positively identified (Fig. 154d). It lacks the terminal ends.

Provenience:	2A6D7
Dimensions (in mm.):	
Length:	124.0 incomplete
High:	26.0
Strap width:	14.0
Strap thickness:	3.0



## Summary

The specimen from 2A6D7 is from a probably French context but is a questionable example. The specimen from 2A5C2 is also from a level classified as probably French. All of the remaining specimens are from English contexts in the site.

## Horseshoes

A horseshoe was recovered from a French floor level in the magazine (Fig. 155b).

Provenience: 2A2C7

Dimensions (in mm.):

Length: 75.0

A U-shaped bar of iron identified as a possible blank for a horseshoe was recovered from a French occupational level (Fig. 155a).

Provenience: 2A10B25

Dimensions (in mm.):

Length: 100.0

Width: 74.0

## Ox Shoe

An ox shoe, made of iron, and having four rectangular nail holes was recovered from a French rampart fill level. It is a rounded L-shape with a cleat on the end (Fig. 155).

Provenience:	2A9J4
Dimensions (in mm.):	
Length:	118.0
Width:	25.0 to 36.0
Thickness:	7.0
Cleat thickness:	11.0

### Bit

An iron bit for horse harness was recovered from a probably French level of refuse in the fortification ditch (Fig. 155 ). It consists of two links, joined together by means of interlocking loops at one end and with a loop at each free end. The rod is round in cross-section.

Provenience:	2A6D7
Dimensions (in mm.):	
Length:	132.0
Link length:	73.0 and 71.0
Diametre of iron rod:	5.0

### Thimbles for Ropes

Four iron thimbles for insertion into rope eyes were recovered, but all were from mixed or unclassifiable contexts (Fig. 155e). They could have been used on training tackle for cannon carriages, or on any similar gear at the site. They are ovoid channeled eyes made of a single bent strap of iron.

Prov.	Length (in mm.)	Width (in mm.)	Hole Diameter (in mm.)	Channel Width (in mm.)	Metal Thick (in mm.)
2A6D2	20.0	43.0	30.0	12.0	
2A6E6	54.0	44.0	28.0 x 38.0	22.0	3.0
2A9H2	62.0	60.0	36.0 x 38.0	30.0	7.0
2A10C17	17.0	50.0	40.0	5.0	

### Clevis

This large iron specimen was recovered from a French level in the magazine (Fig. 156a). It is made of heavy strap iron of irregular thickness. It has a large ovoid looped end and two straight separated shafts; it is rather like a large jews-harp in form.

Provenience:	2A2B8
Dimensions (in mm.):	
Length:	110.0
Width of loop:	75.0
Width across shafts:	45.0
Width between shafts:	15.0

### Blunt Pointed Rod

This specimen is from an English context. Made of iron rod, it is tapered to a blunt point (Fig. 156b). The rod was made by rolling a piece of strap iron and a

seam can be seen on one side.

Provenience:	2A6D10
Dimensions (in mm.):	
Length:	126.0
Diametre:	9.0 x 11.0, tapers to 4.5

#### Rod with Flat Ends

This is a fragmentary specimen consisting of an iron rod with irregularly flattened ends (Fig. 156c). Its cultural association is unknown.

Provenience:	2A5A1
Dimensions (in mm.):	
Length:	135.0
Diametre:	8.0
Width of ends:	13.0 and 15.0
Thickness at ends:	4.0

#### Bent Tang?

This rod is rectangular in cross-section and bent at right angles (Fig. 156d). One end is flattened and may be a tang. It is from an English context.

Provenience:	2A6D6
Dimensions (in mm.):	
Length, each arm:	44.0
Thickness:	10.0 x 11.0
Flat end thickness:	6.0 x 7.5

Bent Iron

This specimen is a small strap iron artifact (Fig. 156f). Near one end it has been thinned and the end has been rounded and bent to an angle of 130 degrees. Its context is English.

Provenience:	2A6D10
Dimensions (in mm.):	
Length:	203.0
Length angled end:	60.0
Width:	22.0
Thickness:	6.0

Rod with Head

A short small iron rod with a flat rectangular head was found in an English context (Fig. 156e).

Provenience:	2A6D20
Dimensions (in mm.):	
Length:	67.0
Width:	13.5
Thickness:	3.5
Head:	14.0 x 21.0
Head thickness:	4.0

Splayed Strap Iron

This artifact is made of strap iron, one end of

which has been splayed into a rounded expanded D-shape which is very symmetrical. It is probably French (Fig. 156g).

Provenience:	2A6D8
Dimensions (in mm.):	
Length:	118.0
Width:	20.5
Thickness:	6.0
End dimensions:	21.0 x 36.0 x 7.5

#### Unknown Objects

These iron specimens are fragments of unidentified artifacts (Fig. 157). They are U-shaped spike-like projections from a fragment of strap iron. The projections taper to points. They could be fragments of ice creepers but are unlike the more complete example described elsewhere. One specimen is French, the other English.

Provenience:	2A6D8
Dimensions (in mm.):	
Length:	42.0 (Fragment)
Width:	70.0
Provenience:	2A6D10
Dimensions (in mm.):	
Length:	67.0
Width:	50.0

2A6D10

Spike diametre:	8.0
Short foot:	12.0 x 9.0

Strap With Bars

A fragment of sheet iron or a segment of strap iron with two raised ridges or bars (Fig. 157e) was found. There are two examples from an English context. They could be lock fragments.

Provenience	2A6D11	2A6D11
Dimensions (in mm.):		
Length:	83.5	100.0
Width:	27.0	27.0
Thickness:	3.0	3.0
Thickness at bars:	8.0	8.0

Loop Handled Key

This specimen is made of iron and resembles a sardine can key although it lacks a slot (Fig. 157b). It is a long straight shafted artifact with a loop handle at one end. The handle top is flat. The handle is formed by bending the rod back on itself and forge welding. It is from a French context.

Provenience:	2A9J5
Dimensions (in mm.):	
Length:	87.0
Shaft diametre:	7.0
Head size:	19.0 x 29.0

Cotter Key?

Several curved triangular iron specimens have been identified as probable cotter keys but could have served some unknown function (Fig. 157f).

Provenience	Length (in mm.)	Width		Thickness (in mm.)	Remarks
		Base (in mm.)	Point (in mm.)		
2A3A4	125.0	31.0	6.0	4.0	
2A5C13	72.0+	30.0	8.0	5.0	Twisted
2A5C13	110.0	29.5	7.0	3.0	
2A9F4	94.0	16.5	3.0	3.5	
2A9F4	67.0	16.0	10.0+	5.0	
2A9F4	76.0	21.0	7.0	5.0	
2A9G14	111.0	42.5	6.0	4.5	
2A9J5	79.0+	25.0	16.0+	4.0	Fragment

The specimens from operations 3A and 5C cannot be associated with an occupation, but all of the other examples are from sealed French rampart fill deposits.

Tongued Latch?

This specimen is an unidentified iron artifact (Fig. 157g). It has a long curved handle with a rounded end at right angles to an equally long strap shaft. At the end of the shaft is a hook-like, open, U-shaped section below which is a slot with a piece of iron in



situ. The terminal part of the shaft is a right angled, curved, projecting arm which ends in a pair of rolled gudgeons. Held in place between this by a pintle is a long tongue. The specimen would appear to be some sort of a latch or lever but has not been identified. The specimen is from a mixed context.

Provenience:	2A6D5
Dimensions (in mm.):	
Length of curved handle:	90.0
Length of shaft:	127.0
Thickness of strap shaft:	14.0 x 6.0
Length of gudgeon arm:	44.0
Width of arm:	18.0 - 24.0
Tongue length:	50.0
Tongue width:	10.0
Tongue thickness:	4.0

### Iron Tube

An iron tube was recovered from a mixed level.

Provenience:	2A4A2
Dimensions (in mm.):	
Length:	36.0
Interior diameter:	12.0
Metal thickness:	3.0

Iron Wedge

A thin triangular iron wedge was recovered from an English floor level.

Provenience:	2A10G5
Dimensions (in mm.):	
Length:	120.0
Width:	17.0 to 3.0

Unidentified Iron Artifacts

A tapered iron rod with U-shaped end, bent to a gentle curve, was recovered from a French refuse layer. It may be a linch pin.

Provenience:	2A10B23
Dimensions (in mm.):	
Thickness:	19.0 to 4.0

A twisted metal strip, possibly a cotter key, came from a mixed lot.

Provenience:	2A6D1
Dimensions (in mm.):	
Length:	85.0
Width:	27.0

An irregular piece of iron which tapers to an end with a rounded contour came from a French level in the magazine.

Provenience:	2A2B9
Dimensions (in mm.):	
Length:	64.0
Width:	19.0
Thickness:	5.0
Diametre of end:	6.0

### Iron Eyes

A solid iron loop, somewhat irregular, was recovered from an English context. It is wrought and closed by welding an overlap.

Provenience:	2A10G5
Dimensions (in mm.):	
Length:	45.0
Width:	32.0

A small iron eye on the end of a shank was found in a mixed level. It was formed by looping the rod back on itself.

Provenience:	2A3A1
Dimensions (in mm.):	
Length:	55.0
Exterior diametre of loop:	35.0
Hole diametre:	25.0

### Wire

Several examples of iron wire were recovered from

both French and English contexts in the site. These are mostly short pieces which are bent and twisted. A few have been twisted to form a loop or hook on one end. French specimens are indicated below; all others are from English contexts.

Provenience	Length (in mm.)	Diametre (in mm.)	Remarks
2A2C7	118.0	3.0	French.
2A10C10	133.0	2.0	
2A10C18	105.0	3.0	Loop at end.
2A10C18	100.0	2.0	
2A10C18	75.0	2.0	
2A10E13	105.0	4.0	
2A10F1	25.0	3.0	
2A6D6	50.0	3.0	Loop end, 12.0 mm. in diametre.
2A6D6	57.0	3.0	
2A6D12	25.0	3.0	
2A6D20	125.0	3.0	Hook end. Pail bail?
2A6D20	170.0	3.0	Hook end. Pail bail?
2A8B1	35.0	4.0	Loop end, 10.0 mm. in diametre.
2A9G11	89.0	4.0	French.
2A9G11	63.0	3.0	French.
2A13A2	68.0	4.0	
2A10H2	78.0	2.0	U-shaped.

Provenience	Length (in mm.)	Diameter (in mm.)	Remarks
2A6D11	81.0	3.0	
2A9K14	57.0	2.0	French.
2A6D6	87.0	5.0	
2A9E2	84.0	5.0	French.
2A6D-dirt	38.0	3.0	Double strand bent to form hook and eye, probably as hanging device.
2A6D-dirt	70.0	3.0	
2A6D-dirt	42.0	3.0	Loop end, 9.0 mm. in diameter.

### Miscellaneous Iron Artifacts

A number of iron artifacts, complete or fragmentary and otherwise difficult to classify are grouped in Table 123 for tabulation and description.

### Perforated Strap Iron

Large quantities of strap iron were recovered from the site. Many of these specimens were perforated in one or more locations. Some include rivets in situ. A variety of sizes is represented. Many examples are fragmentary and cannot be further classified. Some of

the riveted specimens may be fragments of barrel hoops.

The strap iron specimens with perforations were grouped together for descriptive and tabulation purposes; plain strap iron is described in another section. This division is, of course, an arbitrary one.

The perforated strap iron is tabulated in Table 124.

#### Plain Strap Iron

The non-perforated specimens of strap iron are tabulated in Table 125.

#### Scrap Iron Fragments

Miscellaneous scrap iron fragments are tabulated in Table 126. These are specimens of irregular size and shape which cannot be further identified.

Fragments of strap iron, both plain and perforated, and scrap iron are all more abundant in English contexts within the site as indicated in Table 127.

#### Wood Fragments

Several pieces of wood were found in the site. These larger timbers which were parts of structural elements have been discussed in connection with the buildings in which they were found. The tabulation

below lists the many small fragments of wood and possible artifacts found in the general excavations.

Provenience	Number of Specimens	Description (in mm.)
2A1A3	3	
2A1A6	1	
2A2A1	8	
2A2A5	9	
2A2A12	1	
2A2B5	15	
2A2C5	7	Three are cylindrical; pegs?
2A5C2	1	45.0 long, 15.0 diameter, whittled to point; peg?
2A6A6	1	Wood disc. 34.0 diameter, 7.8 thick
2A6A6	1	62.0 long, 34.0 diameter, wood finial with round headed nail. Probably modern.
2A6D2	4	
2A6D5	2	Charred branches, modern picnic debris.
2A6D6	22	Charred branches, modern picnic debris.
2A6D7	8	Charred branches, modern picnic debris.
2A6D8	12	Charred wood. Modern?

Provenience	Number of Specimens	Description (in mm.)
2A6D10	3	Charred branches, picnic debris.
2A6D11	1	Charred branches, picnic debris.
2A6D13	3	Modern plywood, 1 charred stick, 1 tarred board.
2A6D20	1	Charred stick.
2A7A7	1	Cylindrical, peg?
2A8A1	1	Cylindrical, peg?
2A9E1	2	Modern wood, a wood shotgun disc?
2A9E2	1	Fragment of wood with rose head nail <u>in situ</u> .
2A9E11	29	Charred wood.
2A9E11	3	Cylindrical and tapered; possi- bly pegs. Length: 36.0, 74.0, 75.0 Diametres: 16.0, 17.0, 20.0
2A9F4	7	Charred and rotted wood fragments.
2A9G10	1	Charred fragment.
2A9G15	2	Charred wood fragments.
2A9G16	2	Wood fragments.
2A9K8	1	Wood fragment.
2A10B3	2	
2A10B5	3	
2A10B17	1	Peg?
2A10C2	1	
2A10C6	2	



Provenience	Number of Specimens	Description (in mm.)
2A10C17	9	
2A10D16	1	
2A10F3	1	
2A10F12	1	
2A10H3	1	Stick 97.0 long, 33.0 diameter, cut to tapered point. Socket in end 21.0 deep and 19.0 in diameter.
2A6D17	1	Wedge shaped section of wood including knot hole.
2A9E2	1	Irregular fragment of wood with mortar adhering to surface.

### Coal

Several small fragments of coal were found in various locations within the site as well as in the deposit on the floor of the magazine. Almost all specimens listed below are from English contexts, or mixed levels, only one being French.

Provenience	Number of Specimens
2A6D6	1
2A8B1	1
2A6C2	1
2A6E2	1

Provenience	Number of Specimens
2A6E5	2
2A9D sf.	1
2A6D12	1
2A12A1	1
2A6D18	1
2A9F2	1

### Clinkers

Several specimens identified as clinkers from a fire or possibly badly burned and melted fragments of pottery were recovered. Most of them have mortar stains on them suggesting that they were utilized in or associated with the masonry construction.

Provenience	Number of Specimens
2A8B1	1
2A9K14	1
2A5C13	1
2A6A6	1
2A6E2	1
2A6D12	1
2A9E11	2
2A9E15	2
2A9G11	1

Material Sample

A black to dark brown tar-like substance with a strong ammonia odor was found in lot 2A9G11.

Modern Intrusive Specimens

Castle Hill has been open to the public for years and the excavations inside the redoubt indicated the presence of old picnic fires and other recent activity. It is not surprising therefore that a number of modern specimens were found in various excavations. Most common of these were sherds of modern bottle glass. It would be difficult to drop a bottle on the site and not break it. It was only with great difficulty, and incomplete success, that breaking bottles in the excavations was prevented. Even having a watchman on site during weekends did not prevent some vandalism. It is to such activities that the presence of modern intrusives were attributed.

Provenience	Item
2A10F21	U. S. penny, 1946
2A6D1	Newfoundland penny, 1942
2A10C2	Electric insulator
2A11A1	Plastic button
2A12A1	Brass shell casing, Dominion 30-30
2A9F1	Lead pencil

Provenience	Item
2A6D11	Screw top bottle cap
2A4A11	Brass shell casing, centre fire, 32 S&W W.R.A.Co.
2A9E1	Plastic comb fragment
2A5A2	Plastic comb fragment
Miscellaneous	Bottle glass, 443 sherds Bottle caps, 7 .22 casings, 29 Bottle opener, 1 Toy car grille, 1 Metal pipe, 1 Rubber shoe sole, 1 Drain pipe fragment, 1

### Tin Cans

A number of badly crushed and rusted tin cans were found in the excavations. Since canning was not developed until 1809, about the time Castle Hill was being abandoned and the use of tin cans appear much later, these specimens must be regarded as modern intrusives in the site. With few exceptions they are found in levels which contain other recent intrusive artifacts. The most disturbing presence of cans is on the floor levels of operation 1. However, such

intrusives on the floor could be interpreted as evidence that the walls in this area collapsed in recent times. Local informants visiting the site reported knocking a dangerous wall down prior to the tercentennial celebration.

Provenience	Number of Specimens
2A1A5	3
2A1A7	22
2A1B1	1
2A1B2	4
2A3C2	2
2A6A8	3
2A6D1	1
2A6D2	3
2A6D3	4
2A6D6	3
2A6D12	2
2A8A1	1
2A10A1	5
2A10B3	4
2A10C1	2
2A10C2	2
2A10C3	2
2A10C4	1
2A10C16	2

Provenience	Number of Specimens
2A10E7	2
2A10E8	1
2A10E16	2
2A10E21	1
2A10F1	3
2A10F3	2
2A10F6	9
2A10F15	3

