Archaeological Investigations at the
Hudson's Bay Company Rocky Mountain
House, 1835-61
by Donald N. Steer, Harvey J. Rogers
and Gregory J. Lutick
1979

Volume I
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Abstract

Archaeological investigations were conducted by the Archaeological Research Division, Parks Canada, National Historic Parks and Sites Branch, Ottawa, at a mid 19th-century fur trade fort site in Rocky Mountain House National Historic Park during the summers of 1975, 1976 and 1977. The site designated 15R is identified as the Hudson's Bay Company Rocky Mountain House, 1835-61. Excavations principally centred on peripheral remains of the fort, including palisade enclosures, elevated walkways, gateways, interior fort separations and bastions. Limited excavation of the interior of the fort took place. Detailed descriptions of the investigated structural remains, artifacts and faunal remains is given.
Acknowledgements

Several individuals to whom we are deeply indebted were either directly or indirectly involved in the three-year Rocky Mountain House Project and the site 15R investigations, research and analysis.

Initially, we would like to acknowledge the assistance of David Smyth, project historian, for his comprehensive historical reports and continuous information input during the course of the archaeological investigations and research.

Sincere appreciation is extended to the following field assistants who participated in the recording of excavations. They include, Shelley Burgess Rogers, Suzanne Plousos and Linda Southwood.

We also extend our appreciation to the Photogrammetric and Hand Recording Section, Technical Data Services Division, Ottawa, in particular to Robert Mitchell for his extant recording.

Particular gratitude is extended to Patsy Haupt, Field Records Clerk, for her invaluable assistance in the field and office. Her assistance is greatly appreciated considering the amount of clerical and recording work connected with the project.

We wish to thank the staff at Rocky Mountain House National Historic Park, namely Ross Innes, Area Superintendent (Alberta) for his operational assistance and the several guides who provided interpretative information to the visiting public over the three field seasons.

Special thanks goes to the following Material Culture Researchers with the Archaeological Research Division, Ottawa, for their help in preliminary identification of certain artifacts. These individuals include, Olive Jones (glass), Eileen Woodhead (metal), Lester Ross (metal), Lynne Sussman (ceramics) and Clarence Richie (clay smoking pipes). In addition to these researchers, project research assistants Linda Southwood, Shelley Burgess Rogers and Adrienne Jex are acknowledged for their preliminary descriptions and cataloguing of certain artifact categories.

Certain members of the technical support staff, Archaeological Research Division, Ottawa, were of particular help. They include, Rock Chan, photographer, for artifact photography and preparation of report photographs, and Karen Gillies and Dorothy Kappler, drafting illustrators,
for preparation of artifact line drawings and maps.

Certain members of the Parks Canada, Western Region Office, Calgary, deserve recognition for their assistance. These people include Rick Lalonde (drafting), Karen Androsoff and Linda Driscoll (Word Processing), Susan Currie (Records Clerk).

We are grateful to Heather Nicol, Faunal Analyst, Zooarchaeology Division, National Museum of Man, Ottawa, for her detailed analysis and identification of faunal remains from site 15R. The results of her studies are found in Appendix A of this report.

Special thanks goes to Mrs. Jean Fisher and Gordon Fisher from Rocky Mountain House for providing useful information on farming activities in the park.

Finally, we would like to thank the Conservation Division, National Historic Parks and Sites Branch, Ottawa, for the many man-hours spent cleaning and stabilizing metal objects and conducting wood sample and metal identifications.
Introduction

Since 1931 it has been recognized that the Rocky Mountain House area is of national importance. In that year the remains of the last Hudson's Bay company fort to operate in the area was commemorated. Recognizing the historic significance of the Rocky Mountain House area, archaeological investigations were conducted in 1962-63 and in 1966. In 1968 the then Historic Sites and Monuments Board of Canada recommended that a National Historic Park be established at Rocky Mountain House. It was further recommended by the Board that the known sites (two) be incorporated into the interpretation of three major themes. These themes were the fur trade, David Thompson and the role of the Peigan (Blackfoot) Indians. With ministerial approval of the recommendation and the purchase of 541 acres of land in the area, Rocky Mountain House National Historic Park was created.

Park and site development brought about the formation of the Rocky Mountain House Project Development Team in April 1975, consisting of operations, research, planning and interpretative specialists. A report, "Rocky Mountain House Conceptual Development Objectives and Plan", was prepared. The report outlined 'the collective resources, restraints, potentials, and proposals for the various aspects of the project development' (Project Team 1976: VI). Archaeological and historical research were paramount to the development program.

Archaeological investigations were initiated in Rocky Mountain House National Historic Park in 1975. Between 9 June and 31 July an extensive archaeological survey was carried out concentrating in the southeast portion of the park. Also included were areas showing high potential for site location. Three principal area survey methods were employed: ground survey, test excavation, and air photo reconnaissance and thermal infrared linescanning. The techniques employed and the results of the area survey are presented in a separate report (Steer 1976). Efforts from the initial survey resulted in the location of two previously unidentified fur trade fort sites. The sites were designated 15R and 16R (Fig. 1). Between 1 August and 8 October 1975 excavations focused on sites 15R and 16R. Site 15R was tentatively identified as the Hudson's Bay Company Rocky Mountain House, 1835-61. Site 16R was not identified. However, archaeological
evidence at the time suggested that the site dated to the first quarter of the 19th century. The location of the two sites brought the total number of located historic fort sites within the park to four. The two other sites had been subject to previous excavation, at which time only one could be validly identified. The identified site was 1R, the final Hudson's Bay Company Rocky Mountain House, 1865-75, which was partially excavated in 1966 (Vaucher 1968). The other site, 13R, was excavated in 1962 and 1963, and was tentatively identified as the North West Company Rocky Mountain House, 1799-1821 - Hudson's Bay Company Rocky Mountain House, 1821-35 (Noble 1973).

In June 1976 the park area survey was resumed and completed. As a result remaining areas within the park were investigated principally through ground survey and test excavation. No additional sites were located (Steer 1976).

Between 1 July and 30 October 1976, and 30 May and 1 September 1977 detailed excavation of sites 15R and 16R was conducted. Excavations at site 16R were more extensive than those carried out at site 15R. Approximately 98 percent of site 16R was excavated. The limited number of features not totally investigated were all exposed and recorded, and in some cases partially excavated. The findings of the site 16R investigations are presented in a separate report entitled "Archaeological Investigations at an Early Nineteenth Century Fur Trading Fort, Rocky Mountain House National Historic Park, 1975-77" (Steer and Rogers 1978). After a thorough examination and analysis of the available historical information, structural remains and artifacts, site 16R was tentatively identified as the North West Company Rocky Mountain House, 1799-1821. In addition, stemming from the site 16R investigations, the fort site designated 13R was tentatively re-identified as the Hudson's Bay Company Acton House, 1799-1821 - Hudson's Bay Company Rocky Mountain House, 1821-35.

Excavations at site 15R concentrated on palisade enclosures, gateways, elevated walkways or galleries, interior separations and bastions. Limited excavation was conducted on the interior of the fort. The investigations at site 15R confirmed earlier speculations that the fort was the Hudson's Bay Company Rocky Mountain House, 1835-61. The results of the site 15R investigations are the subject of this report and a previous report by the
This report is divided into two sections. The first of these consists of a detailed discussion of the structural remains. The second section gives a general overview of the artifacts recovered during excavations. Certain artifacts groups in the assemblage are dealt with more extensively in support of site interpretation and identification. An analysis of faunal remains from certain contexts is presented in Appendix A.

The major objective of this report has been to provide a descriptive and interpretative record of archaeological data from the site which can be utilized in on-site ground and Visitor Reception Centre interpretative programs. As archaeological remains were identified as a key resource for interpretative planning at site 15R, and the park as a whole, archaeological investigations were necessary and essential to such a record. Reflecting the prime objective, this report presents a detailed description of the archaeological data gathered to date. This data is interpreted in an attempt to date and identify the fort and its individual structures and features, and to provide information pertaining to construction methods and artifacts appearing in the Western Canadian Fur Trade.
Historical Background

The historical information presented in this report was taken primarily from the report entitled The Fur Trade Posts at Rocky Mountain House which was prepared by D.E. Smyth of the National Historic Parks and Sites Branch, Ottawa (Smyth 1976). H.A. Dempsey's A History of Rocky Mountain House was also a source of information (Dempsey 1973).

The historical data has been divided into three sections. The first of these provides a general history of the fur trade posts at Rocky Mountain House. The final two sections present location and descriptive information concerning the forts which existed from 1835 to 1861, and which is represented by the remains at site 15R.

Chronology
In 1799, during a period of intense fur trade rivalry among the Hudson's Bay, North West and XY companies, Acton House (Hudson's Bay Company) and Rocky Mountain House (North West Company) were established at separate locations along the north bank of the North Saskatchewan River, a short distance upstream from its confluence with the Clearwater River.

The main reason for establishing the forts was to draw trade from mountain dwelling Indians, notably the Kootenays. However, the forts failed to attract a significant amount of Kootenay trade because of the long distance to be travelled from within the mountains, and the hostility of the tribes of the Blackfoot Alliance toward the establishment of trade relations between the companies and the Kootenays. This failure led to the closure of the forts after the 1801-02 trading season.

David Thompson had used Rocky Mountain House as a base of operation in 1801 and 1802 during an unsuccessful attempt to find a route through the mountains to the Pacific. He returned to Rocky Mountain House in 1806. Acton House had been reopened in 1805 and it is very likely that Rocky Mountain House had reopened at the same time. The renewed failure to attract significant Kootenay trade and the establishment, by Thompson, of Kootenaie House west of the Rocky Mountains resulted in another abandonment of the posts following the 1806-07 trading season.
The forts were again occupied in 1810. The traders hoped that the reopening would pacify the Peigan Indians, who did not wish to trade at the more northerly posts and who threatened hostility because transmountain trade supplied guns to their enemies. However, the danger of Peigan aggression slowly lessened and the discovery of the Athabasca Pass by Thompson helped lead to the abandonment of both forts in 1812. The companies believed that it was economically advantageous to receive Peigan trade at Fort Augustus and Edmonton House. These posts continued to handle Peigan trade for several years despite skirmishes at the forts between Peigan and both Cree and Stoney Indians.

Acton House and Rocky Mountain House were re-established in 1819. The Hudson's Bay Company found it necessary to open Acton House when the Peigans threatened to trade at a North West Company post within the mountains rather than at Edmonton House.

Both Rocky Mountain House posts remained open year-round until 1821 when the North West Company and the Hudson's Bay Company amalgamated. No record remains to indicate which, if either, of the two posts was retained and which was abandoned following the merger. Following 1821 a single post was maintained throughout the year at Rocky Mountain House until the 1822–23 trading season.

The lack of competition resulting from the 1821 merger, along with the new economic restraint measures initiated by Governor Simpson of the Hudson's Bay Company resulted in an 1823 abandonment of Rocky Mountain House. This closure took place despite protests made by the Peigan Indians since they did not want to trade at Edmonton House. As a result most of the Peigan trade went to Company posts west of the Rockies rather than to Edmonton House.

The loss of Peigan trade at Edmonton House along with the threat of American fur traders in Idaho, led to the reopening of Rocky Mountain House on a trial basis in 1825. This reopening was successful in retaining the Peigan trade for a number of years. However, following the 1831 opening of Fort Peigan by the American Fur Company on the Missouri River, in the heart of Blackfoot country, the Hudson's Bay Company was forced to counter with the establishment of Peigan Post on the upper Bow River in 1832. Rocky Mountain House was therefore abandoned. Peigan Post remained open until
January of 1833 when hostile Blackfoot Indians forced the traders to move back to Rocky Mountain House. Peigan Post was reopened in the fall of 1833, but in January of 1834, it was permanently abandoned and replaced again by Rocky Mountain House.

Because of the dilapidated state of Rocky Mountain House the construction of a new fort began in 1835. The fort which was built remained open during every trading season, except for the 1847-48 season, until the spring of 1861 when starvation, lack of trade, and the hostility of Blackfoot Indians forced abandonment. During the fall of that year a group of Blackfoot burned the unoccupied fort.

The Hudson's Bay Company decided to re-establish Rocky Mountain House in 1864. The principal reason for doing so was to keep the Blackfoot Indians separated from the Crees and Stonies trading at Edmonton House. The Company also wished to keep Blackfoot trade away from the free traders situated around Edmonton House. Also of importance was an increased desire of the Blackfoot to trade with the Hudson's Bay Company. This was caused by the degraded treatment given the Indians by American fur traders as a result of the gold rush in Montana.

A temporary fort was erected and occupied in 1864. It was inhabited until 1868 while a permanent fort was being constructed. The construction of the final Rocky Mountain House began in 1865 and it was first inhabited in 1868. The new fort remained open throughout the year until 1875, the final year of occupation. Factors such as the loss of exclusive trading rights by the Hudson's Bay Company in 1870, the diminished numbers of buffalo, the coming of the North West Mounted Police and the movement of missionaries onto the plains led to a substantial reduction in trade at Rocky Mountain House, and finally to abandonment of the fort.

As was indicated by Smyth, historical research has proven conclusively that five separate forts existed in the Rocky Mountain House area: (1) North West Company's Rocky Mountain House (1799-1821 (357)); (2) Hudson's Bay Company's Acton House (1799-1821 (357)); (3) Hudson's Bay Company's Rocky Mountain House (1835-61); (4) Hudson's Bay Company's Rocky Mountain House (1864-68); and (5) Hudson's Bay Company's Rocky Mountain House (1865-75). He also indicated that historical evidence suggested a weak possibility of there having been three other forts: (1) Hudson's Bay Company post, 1821-35; (2) Hudson's Bay Company post 1828-35, and (3)
Hudson's Bay Company post, 1860-61 (Smyth 1976: 149). Also suggested was the possibility of there having been posts for which there is no written record. Significant gaps occur in the historical records relative to Rocky Mountain House.

Fort Location
Site 15R is located 1.2 km (0.75 miles) above the mouth of the Clearwater River, on an elevated terrace on the north side of the North Saskatchewan River. Historical references alluding to the location of Rocky Mountain House (1835-61) help to establish site 15R as the 1835-61 post.

Dr. James Hector, a geologist with the Palliser expedition, is the main source of information regarding the fort's location. In his 1859 journal he estimated that Rocky Mountain House was "about half a mile above the mouth of the Clearwater River..." (Palliser 1863). In his 1858 journal, he noted that "three hundred yards below the fort there is a rapid in the river channel, and a fall of three feet, caused by ledges of greenish sandstone that cross the stream" (Palliser 1863). This may refer to what is now swiftly flowing water about (444m) 486 yards downstream from the centre of the east palisade. Hector also referred to Rocky Mountain House (1835-61) as being located "in a large plain" (Palliser 1863) and on a terrace standing 20 feet above the river (Palliser 1863). Site 15R is on a terrace 27 feet above the river and this terrace is situated in a large plain. Hector's 1858 drawing of Rocky Mountain House (Fig. 7) places it near a meander cut bank along a bend in the river, as is site 15R. Hector's description, then, corresponds well with the location of site 15R and confirms the identification of the site.

Fort Description
Historical documentation relating to the 1835-61 fort structures is incomplete but does provide a general conception of the fort's appearance. Most of this descriptive data has been found in the Rocky Mountain House post journal (1836-37) of Louis Leblanc, Reverend Robert Terrill Rundle's journals (1841-45), Paul Kane's oil painting and watercolour (1848), Henry Moberly's reminiscences (1929), and James Hector's journal of 1858 (Palliser 1863).
Construction of the post began in January 1835 under chief trader John Edward Harriot. During this first winter they were able to erect "a good strong fort" (Smyth 1976: 57). Additional construction, however, continued into the spring of 1837. During the 1836–37 season, Louis Leblanc was put in charge of construction and repairs. That season's journal (HBCA 1836-7) is the main source of information regarding fort layout and construction. The journal for this season mentions the existence of a number of structures and features: a hall (dining hall?), small houses, men's houses, a store, a kitchen, an ice house, blacksmiths' bellows, a bastion, a gallery, gates, inner fort separations, chimneys, a saw pit, a boat yard, a garden and caches. Possible reference is made to a barn or stable, as the men "were put to tye up Hay into Bundles and put it into the Fort" (Smyth 1976:95). This journal also refers to a number of building methods: mudding the roof of the men's houses, laying a floor in one of the small houses, mudding chimneys, using short pickets for separating the interior of the fort into sections, cutting pickets to enclose the boat yard, taking bark off the pickets, squaring logs for the bastion, cutting posts for a gallery, whitewashing, and digging holes in the ground to make caches (Smyth 1976: 94-96).

In addition to these structures, Reverend Rundle, a visitor to the fort from 1841 to 1845, mentions an Indian House and a "Big House". The latter was able to accommodate at least 67 persons for morning prayers. He also mentions Louis' House (Louis Leblanc?) and "English house". (Smyth 1976: 97-98).

Paul Kane's 1848 oil painting (Fig. 6) and watercolour (Fig. 5) is another of the more important sources of information regarding the fort's appearance. He depicts a flat—topped palisade whose eastern side is composed of two sections set at an obtuse angle to each other. This side of the palisade has two gates: a small one at the apex of the angle formed by the two palisade sections, and a larger one toward the south end of this side of the palisade. Kane also portrayed southeast and northeast roofed bastions set out from the palisade lines. The top portions of these bastions overhanged the bottom portions. No bastion was depicted at the northwest corner of the fort. Within the fort itself is shown the roof and chimney of a large building located along the west palisade. This was
probably a two story structure, and may have been the "Big House" or dining hall. A high flagstaff is also shown between the northeast and southwest corners of the fort.

Henry Moberly, an apprentice clerk in charge of the post at Rocky Mountain House during 1854-55 also provided a description of the fort in his reminiscences, which he wrote at the age of 91. He mentioned that the palisade pickets were 28 feet (8.5m) high with a bastion at each corner, and a gallery along all four sides, four and one-half feet (1.4m) from the top. He identified four squares within the fort. One was formed by the officers' houses, mens' houses, stores and general trading shop; another was between the former square and the pickets for boat-building, and contained forges and carpenter shops; a third square was for horses; and a fourth was for general purposes. He also mentions two gates: a main north gate, and a smaller south gate leading into a long hall. He also describes a small blockhouse against a stockade. The stockade had 20 inch (50.8 cm) square portholes for conducting the rum trade (Smyth 1976: 100-1).

In 1858, James Hector describes the fort as being in a "ruinous condition" (Smyth 1976: 102). He states that the fort is a "roughly constructed group of log huts, consisting of a dwelling house, stores and workshops, and surrounded by a palisade." (Smyth 1976: 102).

Early in 1860 a proposal was made to set up new bastions and stockades. That summer, the old fort was to be torn down and a "new" fort built. This "new" fort was probably an extensively renovated fort rather than a new fort on a new site (Smyth 1976: 105-6). In March of 1861, Rocky Mountain House was abandoned. Blackfoot Indians set fire to it the following autumn (Smyth 1976: 106).
Previous Archaeological Investigations

Archaeological research in Rocky Mountain House National Historic Park was first conducted in 1962. At that time Richard Forbis of the Glenbow-Alberta Institute carried out test excavations at site 13R (FcPr-1) (see Figs. 1-4). The following year almost complete excavation of the site took place under the direction of William Noble (1973), again under the auspices of the Glenbow-Alberta Institute. Noble interpreted site 13R as representing two different fort building phases on the same site, one fort being a revamped version of an earlier fort. He suggested that the first fort existed between 1799 and 1828 and that it probably was occupied by the North West Company prior to 1821 and by the Hudson's Bay Company between 1821 and 1828. He viewed the last phase as being the construction mentioned in the post journals of 1828-31. The rebuilt fort would then have been occupied by the Hudson's Bay Company until 1834 (Noble 1973: 155-60).

More recent archaeological investigations (1975-77) at a second early period fort site (16R) at Rocky Mountain House and subsequent site-related research as well as a re-evaluation of archaeological data from site 13R by the present authors, has led to a significant change in identification of these sites. The authors believe that site 13R was the location of the Hudson's Bay Company Acton House, 1799-1821 - Rocky Mountain House, 1821-34, and that site 16R was the location of the North West Company Rocky Mountain House, 1799-1821 (See Historical Background). The latter interpretations were based primarily on a thorough examination and analysis of artifact assemblages and to a lesser degree on locational and structural information (Steer and Rogers 1978).

In 1966, Claude Vaucher of the Department of Archaeology, University of Calgary, under contract with the National Historic Parks and Sites Branch, Ottawa, partially excavated site 1R (FcPr-2). Vaucher's excavations, supported by historical data, have confirmed the site as the last fort at Rocky Mountain House, 1865-75 (Vaucher 1968).

In 1975 salvage excavations were conducted at site 1R by Parks Canada (Steer, Rogers and Hamilton 1978). At that time portions of the east side
of the fort were excavated and recorded prior to landscaping and river bank stabilization.

In 1969 and 1971, Mark Skinner from the Department of Anthropology, University of Alberta, Edmonton, excavated 12 historic period graves associated with the Seafort Burial Site (17R). On the basis of the recovered artifacts, he dated the site to the second quarter of the 19th century. He felt that the graves were associated with the Hudson's Bay Company Rocky Mountain House, 1835-61 (Skinner 1971-72).
Natural Setting

It is probably most worthwhile to describe the natural environment of the Rocky Mountain House area as the inhabitants of site 15R recognized it. That would give us some specific ideas concerning the environment of that period and what was, to the inhabitants, some of its more important or obvious aspects. Fortunately, this is possible since a journal of a visitor to site 15R still exists. This journal was written by Dr. James Hector during one of his visits to Rocky Mountain House in 1858. In it he describes a variety of environmental aspects. Excerpts from this journal are reprinted here. Following his description is a more detailed one of present and probable past environmental conditions in the Rocky Mountain House area.

...After breakfast set off to a hill about two miles to the west, in order to get a view of the mountains.

After passing into the woods behind the fort, the trail led through a large frozen "muskeg," in which was a heavy growth of spruce and larch. The terrace level on which the fort stands is 20 feet above the river, and in proceeding back a slight descent is made to the "muskegs," which lie along the base of a second terrace like the first, composed of shingle, made up of fragments of quartzite gneiss, and of a deep blue and also light fawn-coloured limestone. This second terrace is covered with pines, and being free from underwood presents a fine open glade, easily passed through, quite a contrast to the woods of spruce, which are almost impenetrable. On reaching the hill I found it to rise about 80 feet above the second terrace level, and nearly 150 feet above the river, and as the timber had been all burnt from its surface it afforded a commanding view. The surrounding country presented a rolling irregular surface, everywhere densely clothed with dark green pine forest, and having the southwest horizon bounded by the abrupt and bold outline of the Rocky Mountains, I made a careful sketch of their outline, and took bearings of the different peaks.
(iii)...With a train of dogs borrowed from the fort, as my own were too tired, I started up Clear-water River, travelling on the ice for about 12 miles. The banks of the river were high and steep, and present sections of the argillaceous sandstone, sometimes forming very picturesque and ruinous cliffs, which peep out from among the dark green pines. The timber is good everywhere, but never of a large size. On the high grounds I observed here what I think must be the Pinus resinosa, although all the pines are termed by the Company's servants le Cyprès, which, however, is more properly the Pinus Banksiana. The tree which I suppose to be P. resinosa I have never seen lower down than the Saskatchewan. It rises with a beautiful straight trunk, with light branches, to the height of 70 feet, its trunk being often 16 inches in diameter, and finely tapered like a mast. The cones and foliage are somewhat like another pine, which grows abundantly on the shingle terraces. This tree answers nearly to the Pinus inops, or New Jersey scrub pine, but it presents a more sturdy habit, and also several peculiar characters. It is the same that was noticed at the "Horse Guard," near Carlton; but from that point it was not again seen along the Saskatchewan till after leaving Fort Edmonton, and never in any quantity till near the Mountain House. It seems to grow only on loose sandy soil, and prefers the surface of the terraces. Besides these pines, I observed here, for the first time since leaving the canoe route, the silver spruce (Abies balsamea) or Le Sapine of the voyageurs, with its beautiful foliage, dark green above and silver below. It is not a common tree here, however, the mass of the forest being still made up of the white spruce, canoe birch, and poplars, along with the pines before mentioned.

.....Rode to the White Mud Hill, so called because here they have a pit from which they dig the white calcareous mud used at all the Company's posts at the Saskatchewan as whitewash, and for which purpose a large quantity if taken down in the boats every spring.

.....There is very little known of this part of the country during the summer months, as the fort is abandoned every spring
until the following autumn. When the Company's people first arrive, which is generally in October, they get plenty of wappiti and other kinds of deer round the fort, and not far distant moose and reindeer are always to be found.

The prairie antelope only comes near this place in spring, when it seeks shelter in the woods from the wolves during the breeding season on its return from its southern migration.

The Indians say there is a greater display of wild flowers in this neighbourhood than in any other part of the Saskatchewan, and that butterflies and other gaudy insects are very abundant, whereas in other parts of the country we have found them unduly rare. Sometimes before abandoning the fort in the spring, the Company's servants have planted potatoes, and down barley and turnips; and what was left by the Indians of the resulting crop until their return in the autumn, was sufficient to prove that the soil and climate are very favourable to agriculture: and several other circumstances lead me to think that the latter is even more favourable than that at Edmonton, notwithstanding that place having 800 feet less elevation. Every day we had here soft winds from the west, which cause a rise in the thermometer, sometimes even to above the freezing point, and the winter is said to be always much milder, and the spring earlier, than places further to the eastward (Palliser 1863).

Climate
The Rocky Mountain House area has a cool temperate climate characterized by a short cool summer (Hardy 1967: 66-7), the frost free period averaging 60 to 80 days. The average July maximum temperature is approximately 21° to 24° C, while the average minimum January temperature is -15° C to -18° C. Precipitation averages 50 cm to 56 cm per year, 30 cm to 36 cm of which falls during the growing season. Annual snowfall is 127 cm to 202 cm. The area generally receives a large number of hailstorms and thunderstorms (Drinkwater et al. 1969: 14-17).
Geomorphology
The vicinity of Rocky Mountain House makes up part of the Western Alberta Plains, situated between the Rocky Mountain Foothills to the west and the Eastern Alberta Plains to the east (Drinkwater et al. 1969: 9). The landscape is flat to rolling, well forested, and is marked with rivers, creeks, small ponds and muskegs.

Site 16R is located along the north bank of the North Saskatchewan River upstream of its confluence with the Clearwater River and within Rocky Mountain House National Historic Park. The park occupies part of a large alluvial flood plain of the North Saskatchewan River. The entire park and surrounding area are marked by meander scars, high fluvial terraces, steep cut banks and gentle slip-off slopes, evidence of past and present lateral shifting of the river channel. Significant river bank erosion by undercutting and slumping is evident.

The alluvial flood plain on which the park is found consists of a cap of 0.3 m to 2 m of sandy silt to silty fine sands and clays over sands, coarse gravels and cobbles. Buried lenses of organic matter are found in the alluvial material. Although soils are generally well drained, poorly drained areas are found back from the river in organic terrain, specifically in the southwest portion of the park. In most cases abandoned river channels are well drained because the underlying gravels and sands are only slightly veneered by finer silts, sands and clays. In the southwest portion of the park this is not the case, for channels and sloughs are very poorly drained as a result of a high localized water table.

At the time the fort was established, the park and surrounding area were probably heavily forested with a lower foothills transitional taiga, which would have been associated with grey wood soils. This type of soil has a leaf mat less than 5 cm thick. The surface horizons are leached, leaving the soil low in natural fertility (Hardy 1967: 89).

Flora
The lower foothills transitional taiga is dominated by white spruce (Picea glauca) although black spruce (Picea mariana) muskegs are common. Trembling aspen (Populus tremuloides), balsam poplar (Populus balsamifera)
and lodgepole pine (Pinus contorta) are present, especially in recently burned over areas (Hardy 1967: 158). The Rocky Mountain House area is close to and possibly mixed with the boreal mixedwood forests. This forest type is made up mainly of white spruce and poplar species (Populus sp.). Other trees of this forest type include balsam fir (Abies balsamea), black spruce, tamarack (Larix laricina) and jack pine (Pinus banksiana). The latter species is characteristic of the sand hills of Alberta (Hardy 1967: 156). Other less common tree species which occur in the area include alpine fir (Abies lasiocarpa), white birch (Betula papyrifera), water birch (Betula occidentalis), Alaska birch (Betula neoalaskana), speckled alder (Alnus rugosa), black cottonwood (Populus trichocarpa) and willows (Salix sp.) (Hosie 1969).

Excavation of site 15R has revealed two tree species utilized in the fort's construction: spruce and lodgepole pine. Oak and larch have also been identified from site 15R. They were probably not used for construction purposes, but occurred as fill material in palisade trenches and a pit.

Fauna
A large variety of animals occur or have occurred near Rocky Mountain House, including representatives of both the mountainous habitat to the west and the open prairie habitat to the east. Some of the more important animals with regard to the fur trade are those which provided fur and/or food for the traders. In this respect, mammals of some importance include: beaver (Castor canadensis), muskrat (Ondatra zibethicus), snowshoe hare (Lepus americanus), coyote (Canis latrans), wolf (Canis lupus), red fox (Vulpes vulpes), black bear (Ursus americanus), grizzly bear (Ursus horribilis), shorttail weasel (Mustela erminea), longtail weasel (Mustela frenata), least weasel (Mustela mivalis), mink (Mustela vison), marten (Martes americana), fisher (Martes pennanti), badger (Taxidea taxus), lynx (Lynx canadensis), mountain lion (Felis concolor), mule deer (Odocoileus hemionus), white-tail deer (Odocoileus virginianus), moose (Alces alces), wapiti (Cervus elaphus), bison (Bison bison bison), wood bison (Bison bison athabascae), woodland caribou (Rangifer caribou), Bighorn sheep (Ovis canadensis) and mountain goat (Oreamnos americanus) (Burt and
Grossenheider 1964; Banfield 1974). Pronghorn (Antilocapra americana) were also present. In 1858, Hector reported "the prairie antelope only comes near this place in spring, when it seeks shelter in the woods from wolves during the breeding season on its return from its southern migration" (Palliser 1863: 75). Not all of these species lived in the fort's vicinity, but were included within its trading range. These animals varied greatly in abundance from species to species and probably form year to year and season to season. The same is true of the following bird and fish species.

There are approximately 170 species of birds which occur in the region, although relatively few are permanent or winter residents (approximately 31 species). Most are summer residents only (approximately 102 species) or spring and/or fall migrants (approximately 37 species). Some of the more economically important species include: permanent residents - blue grouse (Dendragapus obscurus), spruce grouse (Canachites canadensis), ruffed grouse (Bonasa umbellus) and sharp-tailed grouse (Pedioceter phasinellus); migratory birds - whistling swan (Olor columbianus), snow goose (Chen hyperborea) and various ducks; and summer residents - Canada goose (Branta canadensis) and various ducks. The now extinct passenger pigeon (Ectopistes migratorius) also probably occurred in the area. (Robbins, Bruun and Zim 1966; Godfrey 1966).

There are approximately 35 species of fish found in the Rocky Mountain House area today. The larger species include: lake sturgeon (Acipenser fulvescens), cutthroat trout (Salmo clarki), rainbow trout (Salmo gairdneri), brown trout (Salmo trutta), brook trout (Salvelinus fontinalis), dolly varden (Salvelinus malma), lake trout (Salvelinus namaycush), cisco (Coregonus artedii), lake whitefish (Coregonus clupeaformis), mountain whitefish (Prosopium williamsoni), arctic grayling (Thymallus articus), goldeye (Hiodon alosoides), northern pike (Esox lucius), suckers (Catostomus sp.), burbot (Lota lota), trout-perch (Percopsis omiscomaycus), yellow perch (Perca flavescens), sauger (Stizostedion canadense) and walleye (Stizostedion vitreum). A number of these have been introduced into the area relatively recently. These include brown trout, brook trout, rainbow trout, cutthroat trout and lake whitefish (Scott and Crossman 1973; Drinkwater et al. 1969: 42).

The above animal species are those which probably occurred in the vicinity of site 16R. For those species which were actually recovered from the site, see Appendix A of this report.
Use of Food Resources

Although a variety of wild foods were available in the area, they were not necessarily abundant. Hector, in 1858, writes:

When the Company's people first arrive, which is generally in October, they get plenty of wapiti and other kinds of deer round the fort, and not far distant moose and rein-deer are always to be found (Palliser 1863: 75).

However, the fall of 1865 was not as promising. It was reported that there was a scarcity of provisions in August, and that in late November and early December their sole source of food was rabbits, which were very numerous (Smyth 1976: 112). As noted by Henry, gardening was not a sure way to make up for any possible scarcities (Smyth 1976: 175). However, Hector states in his 1858 journal that

Sometimes before abandoning the fort in the spring, the company's servants have planted potatoes, and down barley and turnips; and what was left by the Indians of the resulting crop until their return in the autumn, was sufficient to prove that the soil and climate are very favorable to agriculture (Palliser 1863: 75-6).

The traders, then, probably had to rely occasionally, at least, on outside supplies of food, either from trade with the Indians or from other company posts.
Site Stratigraphy

The overall site stratigraphy consisted of three major layers. The uppermost of these was formed as a result of 20th century farming and road building activities. The middle layer consisted of 19th century cultural deposits, while the bottom layer was undisturbed soil.

Over most of the site, the uppermost layer consisted of sod and dark brown silty to sandy loam which contained charcoal, cinders, bone fragments, stones and silty clay. Along a portion of the eastern edge of the site, this layer consisted of light to medium grey-brown clay mixed with or covered by gravel or sand. In most cases, the uppermost layer had been the direct result of cultivation. The composition of the upper layer along the east edge of the site, however, was due to road construction. The layer exhibited a large amount of mixing of 19th and 20th century cultural materials. It varied in thickness from 6 cm to 24 cm.

The composition of the middle layer varied in accordance with the type of feature it was associated with, and whether it was of early or late period origin. For example, the palisade fill and posthole fill usually consisted of a single homogeneous deposit, while cellar and pit fill often consisted of several layers of various soils, ash, charcoal and wood. Also, late period features sometimes contained a darker and more mottled fill than those of the early period. Over many areas of the site, this 19th century cultural layer was not present, the sod and topsoil having rested directly on undisturbed soils. This layer had a maximum thickness of approximately 2.03 m (F.86).

The bottom layer consisted of undisturbed soils. This was generally light brown silty clay, often mixed with or overlying sand and gravel. These soils were sometimes organic-brown and often contained bands of grey-brown silt or sandy silt.
Excavation Procedure

A permanent datum point consisting of a concrete pillar and lead plug was placed near the southwest corner of the site. This datum point was used to establish a site 15R baseline, and was tied into a master control baseline situated within the park. A grid system was subsequently established running perpendicular and parallel to the site baseline (Figs. 2-9). It contained 3 m by 3 m grid squares.

All measurements were recorded in the metric system. Surveying, contour mapping and 'as found' drawings were done by a hand recording team from Technical Data Services of the Engineering and Architecture Branch, Ottawa. This team was aided by members of the archaeological field recording crew. Site related elevations were recorded through the use of the permanent datum point (968.55 m A.M.S.L.).

The National Historic Parks and Sites Branch system of archaeological recording was utilized (Swannack 1973; Wilson and Henderson 1977). Since little was known about the nature of the structures and features to be investigated, horizontal control was maintained by the grid system. 'Operations' and 'sub-operations' were described in terms of grid coordinates. Vertical control was maintained by designating 'lots' in terms of distinct soil strata. A 'lot' also represented the precise location of a specific feature, artifact or grouping of artifacts.

Normal excavation procedures were used. In almost all excavation units the overlying sod layer was removed by pick and shovel. Below this layer, hoes and trowels were utilized until structural remains or features were encountered, at which time trowels were employed. Screening was carried out on most of the sod and on select areas.

A large number of permanent field records were made during investigations. These included black and white photographs and colour slides of specific soil levels, unit profiles, features and overall structural remains. In addition, planview and unit profile drawings were made, as well as comprehensive field notes.

A field laboratory handled the cleaning, sorting, numbering, recording and packing of artifacts preceding shipment to Ottawa for analysis.
Structure and Feature Descriptions

This section presents the description and interpretation of all fort related structures and features exposed at site 15R. Structure and feature interpretations rely primarily on structural makeup, location and size. In some cases, historical references in the form of journals and graphic materials have been used to substantiate and expand on the archeological findings.

Structural descriptions include the following information:
1. Location and orientation of the structure.
2. Shape and dimensions of the structure.
3. Detailed descriptions of all associated structural features which could include posts, sills, flooring, fireplaces, trenches and cellars.
4. Discussion of all relevant archaeological data geared principally to determining the function of the structure and establishing a relative structural chronology for the site. Relevant historical data specific to Rocky Mountain House posts and comparative historical and archaeological information from other fort sites is used in structural interpretation.

Miscellaneous or non-structure-related features are described using a slightly different format. This format is as follows.
1. General location of the feature within the fort.
2. Shape and dimensions of the feature.
3. Description of the soil stratigraphy associated with the feature.
4. Discussion of all relevant archaeological data geared to determining the function of the feature and establishing a relative date.

The structures and features that were exposed at site 15R, and which are described in this report, include the early and late period palisades and galleries, one early period and three late period exterior gateways, early and late period bastions, 12 interior fort separations, one late
period building, 31 miscellaneous pits, 5 miscellaneous posts and post holes, 3 miscellaneous trenches and 25 other miscellaneous features.

Four of the exterior miscellaneous pits associated with site 15R were exposed as part of the 1975-76 14R area survey of Rocky Mountain House National Historic Park (Fig. 4). A number of other excavation units in the vicinity of site 15R yielded artifacts which are associated with the site.

The results of the 14R area survey have been discussed previously by the author (Steer 1976).

Palisades
Palisade walls surrounded the post during each of two major palisade construction phases at site 15R. An expansion of the fort involved the construction of a new palisade enclosure outside of the original enclosure, on each side of the fort. There were significant differences in construction style between the two major construction phases.

Early Period Palisade

Location and Orientation (See Figs. 9, 10, 12-20)
Although the original east and west palisade walls were actually oriented toward the north-northeast, for the sake of simplicity the present report will treat these walls as if they were oriented toward the north. All other fort related features will be described relative to a north-south orientation of these palisade walls.

The early period south palisade wall was approximately 60 cm inside of and was roughly parallel to the final south palisade wall. The early period west palisade was an average of over 90 cm east of the final west palisade wall. The distance between these walls varied between 70 cm, near the southwest corner of the original fort, and 1.1 m, near the northwest corner of the original fort. Due to the irregular shape of the final fort
enclosure, distances between the original north and the final north palisade walls varied greatly. The northwest corner of the original fort was approximately 7.65 m south of the north palisade of the final fort enclosure. The distance between the two north palisade walls gradually lessened with movement eastward, the minimum distance being 2.35 m near the northeast corner of the original palisade enclosure. Similarly, the distance between the original east palisade wall and the final east palisade wall varied greatly, because the final east wall was somewhat V-shaped. The maximum distance between these walls was approximately 8.5 m and the minimum distance was 40 cm.

Shape and Dimensions
The original palisade enclosure was rectangular-shaped, measuring approximately 39 m (E-W) by 50.5 m (N-S).

Associated Structural Features
Features associated with the early period palisade were builder's trenches, palisade posts, inner filler posts and king-posts. Horizontal planks were inconsistently found at the trench base.

Palisade Trenches (See Figs. 40, 42-6). The entire early period west palisade trench and portions of the north, south and east palisade trenches were exposed (Fig. 10). Selected sections of these trenches were completely excavated. These selected sections were situated along each side of the palisade enclosure.

The upper levels of the palisade trenches averaged approximately 65 cm in width. The upper trench width varied considerably. Exposed sections of the east palisade trench averaged 83 cm in width. Those along the north palisade averaged 53 cm in width. The west palisade trench averaged 58 cm wide; the north two-thirds of the west palisade trench was noticeably wider (average width 68 cm) than the south one-third (average width 47 cm). The average width of the upper levels of the early period south palisade trench was not obtainable since the upper portion of the south side of that trench was removed during the excavation of the late period south palisade.
Along the south one-third of the early period west palisade, trench walls were tapered inward slightly to a somewhat concave-shaped trench bottom (Fig. 46). Although the inner wall of the east palisade trench was tapered inward, the upper portion of the outer edge of the trench was shelf-like (Fig. 40). In many cases the shelf-like feature had a curved, rather than an angular cross-section. The surface of the shelving was often uneven. Similar shelving occurred along the outer edge of much of the north two-thirds of the early period west palisade trench and along a portion of the original north palisade trench near the northeast corner of the original palisade enclosure. As was mentioned previously, the upper portion of the outer edge of the original south palisade was obliterated by the final south palisade trench. The inner edge of the original south palisade trench had a slight inward taper toward the trench base (Figs. 42, 45).

The average depth of the trenches below the base of the cultivation layer was approximately 67 cm. The average depth at the time of fort occupation was estimated to be approximately 77 cm. The trench fill consisted of a mottled light to medium brown silty to sandy clay with lenses of black silt and gravel. Often mottled in this fill were wood fragments, ash, charcoal, and bones. Much of this refuse may have been deposited following the dismantling of the early period palisade. Several horizontal planks were also found in the palisade trenches.

Palisade Posts. Many sections of the early period palisade were disturbed during and following the construction of the final palisade. This disturbance included the complete removal of many palisade posts from the trenches. Several gallery postholes, interior separation trenches and pits which were associated with the late-period fort were dug through the original palisade trench. Palisade posts along the original south palisade were generally displaced from their original line. These south palisade posts were not vertical within the trench, but leaned toward the outside edge of the trench. This may have been a result of the digging of the adjacent final south palisade trench or the breaking or chopping off of the palisade posts at ground level. The palisade posts along the east, west and north sides of the original enclosure were close to vertical and were adjacent to the outer edge of the trenches, except where the outer edge of
the trench was shelved. When shelving occurred, the posts were adjacent to
the inner lip of the shelf (Fig. 40).

The early period palisade posts (See Figs. 47, 48, 52) were
longitudinally sectioned logs averaging 18 cm wide and 6.5 cm thick. The
flat side of these posts faced outside of the fort and the curved side
faced inward. Although the posts had originally been placed edge to edge,
gaps between the posts and the presence of round filler posts inside of and
between the posts suggested that the original palisade posts had not been
straight-edged. The bases of the posts appeared to have been sawn flat.
Wood samples were taken from five original palisade posts from varied
locations along the original enclosure. Each of the posts was made of
spruce.

Inner Filler Posts. Round-shaped posts averaging 5 cm to 6 cm in diameter
were placed just inside of the longitudinally sectioned palisade posts to
block gaps between the sectioned posts. Although the bases of some of
these posts were sharpened, many were blunt. The depths of the bases of
these posts were similar to those of the palisade posts. Five wood samples
were taken from inner filler posts. Each of the posts was made of
spruce.

King Posts. King posts or anchor posts were spaced at three metre
intervals along the north and west palisades. In some cases the king posts
served as gate posts. In other cases they served as end posts or corner
posts. Gallery support posts were situated an average of 1.2 m inside of
most of the king posts. There was no evidence for consistently spaced king
posts along the south or east palisade lines. A majority of the king posts
were rectangular-shaped averaging 11.5 cm in thickness and 14 cm in width.
Others were only partially squared. Several were round-shaped averaging 10
cm in diameter. The king posts were sunk to a greater depth than the
palisade posts. Horizontal planks and vertical posts sometimes acted as
braces between the inner and outer sides of king posts and the palisade
trench walls. Occasionally rocks were found wedged between the trench
walls and king posts. Wood samples taken from two of the king posts
indicated that these posts were made from spruce.

Horizontal Basal Members. Planks of varying sizes were inconsistently
found at the bottom of the palisade trenches, below the bases of some of
the palisade posts. Several of the planks were parallel to the palisade
line. Others were at varying angles relative to the palisade line. Many
of the planks appeared to have been the waste products of construction activities. They appeared to have performed a levelling function.

Artifact Associations
Artifacts found within the fill and overflow of the early period palisade trenches include 1 gunfint, 2 lead balls, 1 lead shot, 1 folding knife, one quarter-round file, 2 square pieces of iron stock, 1 round piece of iron stock, 1 iron rivet, 1 carved antler object, 1 copper wire fragment, 1 upholstery tack, 2 round-tipped needles, 1 triangular needle, 1 brass snowshoe netting needle, 1 iron barrel hoop fragment, 1 brass bushing, 30 plain clay pipe bowl fragments, 43 plain clay pipe stem fragments, one clay pipe bowl fragment with ribbing, one clay pipe fragment marked IF on the spur, 18 glass beads, 1 brass ring, 1 jewellery chain, 2 buttons of variety C1SAT1Va, 1 button of variety C7SBT1Va, 1 button of C7SCT1Va, 29 hand-wrought nails, 3 machine-cut nails, 130 nail fragments, and 1 round staple. Ceramics include 1 sherd of variety SCT2Wg, 1 of SCT2Wj, 1 of SCT2Wt, 2 of SCT2Wn, 1 of SCT2Vcc, 3 of SCT2Vdd, 1 of SCT2Vee, 1 of SCT2Vjj, 1 of Category B and 3 of Category C. Glass includes 15 olive green round bottle fragments, 4 light green round bottle fragments, 2 clear lead bottle fragments, 1 clear lead square bottle fragment, 2 clear lead tumbler fragments, 11 miscellaneous clear lead glass fragments, 3 miscellaneous clear unidentified glass fragments and 38 window glass fragments.

Discussion
The longitudinally sectioned palisade posts of the early period enclosure were either split or sawn from logs, the latter being the more probable. Although some may have been half-logs, most were smaller log sections. The palisade posts may have been produced as a part of the process of the squaring of logs and planks to be used for other construction purposes. The depths of the palisade trenches and archaeological and historical information from other sites were used to estimate the height of the
palisades of the original enclosure. It is suggested that these palisades were at least 4 m high and that they were probably closer to 4.5 m.

A reference in the Edmonton House journals of 1828 provided an indication of the function and the height of the inner filler posts: "putting up short inside pickets so as to block up the appertures between each Stockade" (Smyth 1976: 88). The inner filler posts at site 15R probably were shorter than the palisade posts, but for defensive purposes would have been higher than at least 2 metres. Most of the inner filler posts probably were put into place during the erection of the palisade, rather than driven into the trench following the erection of the palisade.

The complete excavation of several early period trench sections indicated that the wider trench sections corresponded with the shelf-like feature along the outer edge of some of the palisade trenches. Although other possibilities exist, it is suggested that the shelving was probably related to the repair or the replacement of sections of the palisade.

Palisade construction techniques of the earlier Rocky Mountain House forts are somewhat similar to those used for the palisade at the early period site 15R fort. Historical records related to Rocky Mountain House during the 1799-1835 period suggested that the palisades during that period were of a ribbanded construction style. The palisade remains at the two early period fort sites (13R and 16R) in the park were also indicative of such (Noble 1973: 46-66; Steer and Rogers 1978). It is significant that very few of the palisade posts at site 16R were longitudinally sectioned. Although some "longitudinally split half-posts" (Noble 1973: 64) were encountered at site 13R, many were round-shaped posts similar to those at site 16R. Of note were consistently spaced inner filler posts associated with the fort expansion at site 13R.

Late Period Palisade

Location and Orientation (See Figs. 9, 11, 12-18, 20)
As was indicated previously, the late period palisade enclosure was outside
of the original enclosure. Distances between the two enclosures varied considerably, as was discussed previously.

**Shape and Dimensions**
The final period palisade enclosure was irregularly shaped. The west palisade wall was approximately 60 m long. The east side consisted of two unequal sized segments (20.5 m and 36 m) meeting at an angle of approximately 140 degrees. The east wall protruded outward from the fort interior.

**Associated Structural Features**
Features associated with the late period palisade enclosure were builder's trenches, palisade posts, king posts, grooved sills at the trench base and horizontal filler planks between the palisade trench walls and the palisade posts.

**Palisade Trenches.** (See Figs. 41-6). The entire late period west palisade trench, and portions of the north, south and east trenches were exposed. Selected portions of these trenches were completely excavated. These selected sections were situated along each side of the palisade enclosure.

The upper levels of the trenches averaged approximately 68 cm in width. The exact width of the upper levels of the south palisade trench is not known because of the overlap between it and the original south palisade trench. Less trench width variation was shown in association with the late period palisade than with the early period enclosure.

The sides of the trench wall tapered slightly inward toward a nearly flat trench bottom. The upper edges of the trenches were often somewhat bevelled. The trenches averaged 76 cm in depth below the site's cultivation layer. The average depth at the time of fort occupation was estimated to be approximately 86 cm.

The trench fill consisted of a mottled light to medium brown sandy to silty clay with lenses of black silt and gravel. Often mottled within this fill were wood fragments, ash, charcoal and bones. Many horizontal filler
planks (Figs. 45 and 49) were found in the excavated sections of the east and south palisade trenches. These planks were found at varying levels within the trenches and were often layered. They were found between the palisade posts and the outer and the inner sides of the trench walls. The planks were probably waste materials resulting from construction activities, which were thrown into the trench fill to provide extra support for the palisade walls.

**Palisade Posts.** The late period palisade posts were not placed against the walls of the palisade trenches. However, most were somewhat off-center within the trenches. The posts were longitudinally sectioned logs averaging 19 cm in width and 6.5 cm in thickness. The flat side of these posts faced toward the outside of the fort and the curved side faced inward (Figs. 49, 50, and 53). Many of the posts appeared to have been straight edged. Below surface many were practically edge-to-edge, often with little or no space between them or between palisade posts and king posts. The bases of the palisade posts probably had been sawn level. Some of the posts, however, had bevelled bases which fitted snugly into the grooved sills at the trench base (Fig. 53). Ten wood samples taken from palisade posts from varying locations along the late period palisade enclosure were spruce.

**King Posts.** King posts averaged 4.2 m apart along each side of the late period palisade enclosure. These king posts also served as end-posts, corner posts and gate posts. A large majority of the king posts exposed were squared on four sides. These posts averaged 16 cm in thickness and 20 cm in width. Several posts were round-shaped below the fort occupation surface level, and averaged 30 cm in diameter. These round posts served as end posts and gate posts. A few posts were partially squared, having average maximum diameters of 30 cm. The king posts were sunk to a greater depth than the grooved sill plates at the base of the palisade posts. Vertical posts, and sometimes horizontal planking or rocks were found between the king posts and the walls of the palisade trenches. Of note was a horizontal wood member found below one of the king posts. Wood samples taken from two of the king posts indicated that these posts were made from spruce.

**Grooved Sills.** Channelled or grooved logs were situated at the base of the palisade trenches (Fig. 51). These sills ran between and abutted the sides
of the king posts. Many of the sills appeared to have been made from longitudinally sectioned logs. The channels would have been gouged out of the flat portion of the sectioned log and ran the entire lengths of the logs. The channelled portion of the logs faced upward and the rounded sides faced downward. The bases of the palisade posts were placed in the grooves. Horizontal members or shims were sometimes used to level and stabilize the sill plates.

The sills averaged 19 cm in width and 12 cm in thickness. The grooves averaged 6 cm deep and 7.5 cm wide. The sills levelled and aligned the palisade walls and provided a means of load distribution.

Wood samples taken from two sill sections indicated that both were made of spruce.

Artifact Associations
Artifacts found within the fill and overflow of the late period palisade trenches include 1 gunflint, 9 lead shot, 1 iron projectile point, 1 weighing stone, 1 flat file fragment, 3 pieces of square iron stock, 1 gullet-toothed sawblade fragment, 2 iron roves, 1 carved antler object, 1 carved bone object, vermillion, 2 copper alloy wire fragments, 1 round pointed needle, 1 triangular pointed needle, 3 needle fragments, 5 flat-headed pins, 1 Britannia-metal spoon handle with the ASHBERY trademark, 1 iron barrel band, 64 plain clay pipe stem fragments, 31 plain clay pipe bowl fragments, 7 clay pipe bowl fragments with ribbed or frond-like design, 3 clay pipe fragments marked TB on the spurs, 3 clay pipe fragments possibly marked IF on the spurs, 4 miscellaneous musical instrument parts, 107 glass beads, 1 silver ring fragment, 1 metal pendant, 1 button of variety C7SCT1Va, 1 button of series C8SB, 60 hand-wrought nails, 3 machine-cut nails, 2 iron tacks, 202 nail fragments, 1 bolt head, 1 round staple, 1 miscellaneous copper alloy object and 1 miscellaneous ferrous object. Ceramics include 1 sherd of variety SAT1Va, 1 of SCT2Vf, 4 of SCT2Wg, 1 of SCT2Wk, 2 of SCT2Xp, 5 of SCT2 Xu, 2 of SCT2Xw, 3 of SCT2Xaa, 1 of SCT2Xdd, 1 of SCT2Xrr, 3 of SCT2Xvtt, 1 of SCT2Xuu, 6 of Category A and 13 of Category B. Glass includes 4 olive green round bottle fragments, 5 light green round bottle fragments, 4 clear lead round bottle
fragments, 1 clear lead fiddle-shaped bottle fragment, 6 light green angular bottle fragments, 11 miscellaneous clear lead glass fragments, 1 miscellaneous olive green glass fragment and 74 pieces of window glass.

Discussion
Like the early period palisade enclosure, the late period enclosure contained longitudinally sectioned palisade posts which were probably sawn from logs. Although a few may have been half-logs, a vast majority were smaller log sections. The posts could have been produced during the process of preparing squared planks or logs which were used for other construction purposes.

The late period palisade enclosure probably was higher than the early period enclosure. On the basis of archaeological and historical information from other sites and late period palisade trench depth data it is suggested that the palisades were over 4.5 m high. Henry Moberly, a clerk in charge of Rocky Mountain House during the 1854-55 season described 28 foot pickets associated with the fort's palisades. As was indicated by Smyth, "as Moberly was 91 years old when he set down his reminiscences, there is a strong possibility that he was inaccurate in his description" (Smyth 1976: 101). Although the palisades probably were not 28 feet high, his description nevertheless did suggest that the 1854-55 palisades were of a substantial height. Of note was a plan of Fort Carlton drawn in 1845 by Lieutenant Vavasour, a visitor to the fort, indicating that the palisade at that fort was 25 feet high. The original palisades at, Fort Pitt, constructed in 1829, were 15 feet (4.57 m) high (Pusch 1973: 6).

Historic palisade-related information relative to Rocky Mountain House 1835-61 proved helpful in the interpretation of the late-period palisades at site 15R. Paul Kane's painting and watercolour suggested that the Rocky Mountain House palisades were quite high and that they were flat topped (Figs. 5 and 6). Horizontal plating very probably capped the palisade posts. The palisade wall facing the river was not a straight palisade line, but rather was made up of two unequal-sized segments angling out from the fort interior and meeting to form a salient angle. It appeared to have been an irregularly shaped fort like the Rocky Mountain House described by
Woolsey in 1857, "...though irregularly formed, is somewhat quadrangular" (Smyth 1976: 101). It was unlike the rectangular-shaped straight-walled early period enclosure at site 15R.

The late period palisades were probably similar to those associated with Edmonton House during the 1860s as was described in historical documentation presented and interpreted by Smyth (1976: 104-5, 111). At Edmonton House the tops of the palisade posts very probably fitted into grooves along the base of horizontal plating. This plating would probably have been fastened to the tops of king posts through mortice and tenoning. The plating at Edmonton House was grooved through a hewing process. The edges of the posts were hewn straight to provide a tight fit between the posts. Although there was not direct reference to grooved sills associated with the palisades at Edmonton House, the presence of these sills cannot be discounted.

The late period palisade enclosure was more elaborately constructed than those associated with the early period palisade enclosure at site 15R and those associated with earlier sites (Noble 1973: 64-67; Steer and Rogers 1978). The grooved sill plates at the base of the palisade trenches of the late period site 15R enclosure were unique among the palisade enclosures associated with the fort sites.

Despite the absence of grooved sills at the base of the palisade trenches associated with the final Rocky Mountain House (1865-75) fort site (Site 1R) (Vaucher 1968: 62-67), this enclosure was very similar to that at site 15R. It was a modified type of frame construction. Jean L'Heureux's sketch (1873) of the fort indicated that horizontal plating capped the palisade posts and king-posts associated with the fort. Vaucher found that the king-posts were 12 feet (3.66 m) apart. The palisade posts were longitudinally sectioned logs, which he called halfposts. This was in agreement with a statement in the final Rocky Mountain House post journals, "...rip logs in two as we do Stockades, and it will made good Flooring..." (Smyth 1976: 120). Despite the above, the dimensions given by Vaucher relative to the palisade posts along with 1975 excavations at the site (Steer, Rogers and Hamilton 1978) suggested that many of the sectioned posts were smaller than half-posts and that they were quite similar to the sectioned palisade posts at site 15R.

Of comparative value were the palisade remains associated with Fort
Carlton 1855-85, as were excavated by Anthony Ranere (1967: 22-26). Elements making up the palisade enclosures at that fort included palisade posts and king posts. The palisade posts were sections sawn or split from spruce logs. These longitudinally sectioned posts were both "half-logs" and "slabs". The thinner slab type of post having been more common. The bark side of the palisade posts faced inward and the smooth side faced outward. King posts associated with the palisades were squared logs spaced at 12 foot (3.66 m) intervals along the palisade lines. Scrap timber was found in the back dirt within the palisade trenches. These trenches averaged 4 feet (1.22 m) deep and 3 feet wide (94.1 cm).

Galleries
Galleries (elevated walkways) were present in both the original and expanded versions of the fort. Evidence for these galleries consisted of postholes and their associated posts (See Table 1). These posts would have formed the major supportive structure of the gallery. In some cases, no posts were present within the postholes. In most of these instances, the posts were probably removed to facilitate expansion of the fort. One of the postholes associated with the original palisade contained two posts; one of these probably served to replace or reinforce the other.

Gallery Associated with the Original Palisade

Location and Orientation
The gallery for the original palisade was situated along the west side and probably along the north and east sides of the fort (See Figs. 9 and 10). There was no definitive evidence to indicate that the gallery also extended along the south side. Many of the gallery support posts/postholes were situated opposite king posts or gateway posts, or diagonally to corner posts.
Shape and Dimensions
That part of the gallery along the west side extended along its entire length. Fourteen western gallery support posts were spaced an average of 3.1 m apart. These posts were placed, on the average, 1.2 m from the west palisade line.

Five gallery support posts/postholes were excavated along the north palisade. One (F.114) was located 3 m east of the west palisade and 1.2 m south of the north palisade. Another (F.116) was situated 5.5 m east of the west palisade and 1.25 m south of the north palisade. Two posts were within the same posthole (F.10), 3.25 m west of the east palisade. One of these two was 1.0 m south of the north palisade, while the second was 0.85 m south of the palisade. A fifth post (F.14) was 0.4 m west of the east palisade and 1.0 m south of the north palisade. These posts, in combination with a possible gallery posthole (F.2) set 17.5 m from the west wall and 1.3 m from the north wall, suggests that the gallery ran along the entire length of the north palisade. Other gallery support posts along the north palisade may exist in unexcavated areas. It would appear that at least one gallery post and post-hole was destroyed during excavation of a pit feature (F.8) associated with the fort expansion. Slightly less than one-half of the north palisade was exposed during excavation.

No gallery support posts or postholes were exposed along the east palisade. Only slightly more than one-half of the east palisade was exposed, and many of the areas excavated probably did not extend far enough west to include any support posts that may exist.

No early period gallery support posts or postholes were exposed along the south palisade, although nearly half the length of the south palisade was excavated from 1.5 to 3.0 m north of the palisade line.

Associated Structural Features (See Fig. 56)
Postholes. Gallery support postholes associated with the original fort were generally somewhat square in cross-section; their average maximum horizontal dimension was approximately 0.6 m at an elevation nearest the original occupation level. These postholes had an average depth of approximately 60 to 70 cm below the estimated occupation level.
Posts. Round posts were found in ten of the fourteen postholes along the west palisade and in four of the five postholes along the north palisade. The average diameter of the posts was 15.6 cm. One of these gallery support posts was identified as being made of spruce.

A single gallery support posthole contained two posts (F.10). One of the posts may have been associated with miscellaneous feature 12 (see Miscellaneous Features) or used to replace or reinforce the other.

Artifact Associations
Artifacts found within the fill of the early period gallery support postholes include 1 iron rove, 1 keyhole saw blade fragment, 3 plain clay pipe stem fragments, 1 plain clay pipe bowl fragment, 4 glass beads, 2 hand-wrought nails, 1 machine-cut nail, 7 nail fragments and one ceramic sherd of Category A. Glass includes 1 olive green round bottle fragment, 1 light green round bottle fragment, 1 light green round bottle fragment, 2 clear lead round bottle fragments and 1 light green angular bottle fragments.

Discussion
It is probable that a gallery existed along the west, north and east palisades of the early period fort. Such was not the case with the south palisade. A three-sided gallery such as this would have served a defensive purpose on those sides of the fort which were not sufficiently protected with bastions.

Historically, references have been made to a gallery at the 1835-61 fort. On 24 March, 1837 Harriot sent men "to cut posts for to erect (?) a Gallery." On 6 April, "four men working at a Gallery that is to be made round the inside of the fort Pickets." (HBCA, B.184/a/4, Rocky Mtn. House Post Journal, 1836-37). Work was recorded on the gallery up to 13 April (Smyth 1976:96). The gallery mentioned in 1837 was most likely that associated with the original fort.

Galleries were present at many fur trade forts dating to the mid 1800s. They occurred at Fort Edmonton III (1812-1915), Fort Carlton
Fort Langley (1827-39), Fort Okanagan (post 1813-ca. 1831), and Fort Pitt (1829-90). At Fort Okanagan a gallery was supported by posts set approximately 3 m apart and 1.0 m inside the palisade posts (Graebert 1968: 8). At Fort Carlton, the gallery support posts were eight inches (20.3 cm) square and placed four feet (1.2 m) inside the palisade. These gallery posts were placed opposite 8 inch (20.3 cm) square king posts (Ranere 1967: 24-5).

Gallery Associated with the Final Palisade

Location and Orientation
A gallery probably stretched along all four sides of the final palisade. (See Figs. 9 and 11). Evidence for a gallery was uncovered in practically all of the areas excavated which were just within the final palisades.

Shape and Dimensions
Twenty-seven gallery support posts (and 28 postholes) were associated with the final palisade. They were placed on the average, 1.3 m from the palisade and were an average of 4.25 m apart. Thirteen gallery support postholes were excavated along the west palisade, two along the north palisade, nine along the east palisade, and four along the south palisade. Only the west palisade was fully excavated. The postholes excavated probably represent a full gallery running along the inside of the entire palisade. Nearly all gallery support posts and postholes were placed opposite palisade king posts or gate-posts, or diagonally to cornerposts.

Associated Structural Features (See Figs. 54-6)
Postholes. Postholes associated with the final fort at site 15R were
generally somewhat rectangular in cross-section, their maximum horizontal dimensions averaging approximately 75 by 84 cm at an elevation nearest the original occupation level. One posthole was round-shaped, and had a maximum diameter of 85 cm. The average depth of these postholes was approximately 71 cm below the estimated occupation level.

**Posts.** Round to rectangular posts were found in 26 of the 28 gallery support postholes associated with the expanded fort. The average diameter of the round posts was 21.6 cm, while the average dimensions of the rectangular posts were 13 cm by 18.9 cm. Four of the gallery support posts were identified as being made of spruce.

**Artifact Associations**
Artifacts found within the fill of the later period gallery support postholes include 1 gunflint, 1 small chisel, 1 needle fragment, 1 iron barrel hoop, 10 clay pipe stem fragments, 6 clay pipe bowl fragments, 1 clay pipe bowl fragment with ribbing, 7 glass beads, 1 button of variety ClSAT1Va, 11 hand-wrought nails, 1 machine-cut nail, 25 nail fragments and 1 latch guide. Ceramics include 1 sherd of variety SCT2Vt, 1 of SCT2Vff and 1 of Category B. Glass includes 1 olive green round bottle fragment, 11 clear lead round bottle fragments, 1 light green angular bottle fragment and 3 pieces of window glass.

**Discussion**
The existence of a full gallery at the expanded version of the 15R fort is well documented archaeologically. Historically, the documentation is incomplete. Aside from the reference mentioned previously with regard to the early period fort, William Gladstone wrote that "From the gallery of the fort we could see the battle," referring to a bloodless battle between some Stony and Blackfoot Indians (Smyth 1976:100). Henry Moberly, an apprentice clerk in Rocky Mountain House in 1854-5, wrote in his reminiscences that there was "a gallery running all round inside about four and a half feet from the top." (Smyth 1976:100).
Exterior Gateways

Four gateways were exposed at site 15R. One was associated with the early period fort and three were associated with the late period fort (See Table 2). Other gateways probably existed, especially for the early period fort. Evidence for some early period gateways may have been destroyed by construction activity associated with the late period fort. This would be particularly true along the original east palisade, where palisade posts have apparently been removed from the palisade trench, and where building construction associated with the later fort was documented.

Original West Gateway: Feature 94

Location and Orientation

This early period gateway was located approximately central to the west palisade (Figs. 9 and 24). The north gate-post was 21.4 m from the north palisade. The distance from the point where the south gate-post may have been located to the line formed by projecting the south palisade to the west was approximately 27.2 m.

Shape and Dimensions

This gateway had a width of between 2 m and 3.4 m. It would have consisted of a horizontal sill, and either a one or two leaf gate between two gate-posts. Only one of these gate-posts was exposed.

Associated Structural Features

Associated with this west gateway was a trench, one gate-post and a horizontal sill.

Trench. The trench associated with this gateway was 57 cm wide at the
upper levels and 30 cm wide at the lower levels. Its depth was approximately 71 cm below the estimated occupation level. The trench fill included a horizontal log and several horizontal planks. This material probably represented debris from construction activities associated with the early period fort.

Gate-posts. Two posts would have been associated with this gateway. However, only the north post was exposed. This was rectangular in cross-section and measured 13 cm wide by 15 cm thick. The depth of the posthole was the same as that for the trench. The south gate-post has either not been exposed or was disturbed by the construction of a gallery support post (F.91) associated with the final palisade. It is estimated that the width of the gate is between 2 m and 3.4 m, depending on exactly where the south gate-post was located.

Horizontal Sill. One plank, having a width of 14 cm and a thickness of 6 cm formed the gate's sill. It rested within the upper layers of the trench fill, and extended from the north gate-post to the southern limit of excavation. The top surface of the sill had been charred, suggesting that the gate and palisade may have been burnt. The sill was identified as being made of spruce.

Discussion

This gateway was associated with the early period fort, and was the only early period gate exposed. Historically, a Hudson's Bay Company journal (1836-37) mentions that two men were "repairing the Fort Gates" (Smyth 1976:95). The same journal also mentions "shutting up all the door and Gates" (Smyth 1976:96). These two entries are the main references to gates at the early period fort. More detailed references are made of the gates that were part of the late period fort.
Location and Orientation
This late period gateway was located approximately central to the west palisade (Figs. 9 and 24). The north gate-post was situated 29.7 m from the north palisade. The distance from the point where the south gate-post should be located to the line formed by projecting the south palisade to the west is approximately 27.8 m.

Shape and Dimensions
This gateway had a width between 1.8 and 2.2 m. It would have consisted of a horizontal sill, and either a one or two leaf gate between two gate-posts. Only one of these gate-posts was exposed.

Associated Structural Features
Associated with this west gateway was a trench, one gate-post and a horizontal sill.
Trench. The trench associated with this gateway averaged 65 cm wide at the upper levels, and had a depth of 31 cm below the estimated occupation level. The trench fill included a number of rocks near the north post which may have been added to provide additional support.
Gate-posts. Two posts would have been associated with this gateway. However, only the north post was exposed. This post was rectangular in cross-section and measured 28 cm wide by 18 cm thick. The depth of the associated posthole was 85 cm below the estimated occupation level, and approximately 54 cm deeper than the trench. The south gate-post was not located due to disturbance in that area. However, it would have been located between the south end of the sill and the first palisade post to the south.
Horizontal Sill. The sill associated with this gate was retangular in
cross-section. It was 17 cm wide, 10 cm thick, and 1.8 cm long. Its length may have been incomplete due to disturbance at the south end of the sill. The sill rested within the upper layers of the trench fill, and extended to the south from the north gate-post. The sill was identified as being made of spruce.

Discussion
This gateway was associated with the late period fort, and was one of three gates exposed. Historically, there are no known sources of information regarding a gate on the west side of the fort. However, there are three major sources of information describing other gates of the late period enclosure. These are the painting and watercolour done by Paul Kane (1848) (Figs. 5, 6), the reminiscences of Henry Moberly (1854-55), and a rough sketch, drawn by James Hector (1858) (Fig. 7).

Kane’s works are probably the most reliable of the three sources. He depicts a large gate in the southern section of the east palisade and a smaller gate at the apex of the two sections making up the east palisade. Only the north and east palisades are portrayed by Kane. He does not depict a gate in the north palisade.

The rough sketch drawn by Hector appears to be an imitation of Kane’s works. However, Hector shows only one gate, and that is found in the north section of the east palisade. He does not show a gate in the north wall. The description provided by Moberly is probably unreliable, since it was written at an age of 91, many years after he had served at the fort. He writes that "There were two gates, the main gate on the north and a smaller one on the south side leading through a narrow passage the height of the stockade into a long hall." (Smyth 1976: 100). The description of a gate on the north side of the fort does not agree with either Kane’s or Hector’s portrayals.
Northeast Gateway: Feature 18

Location and Orientation
This gateway is situated at the apex of the north and south sections of the final east palisade (Figs. 9, 23, 25). The north gate-post is approximately 20.6 m from the line formed by projecting the north palisade to the east. The south gate-post is approximately 34.4 m from the line formed by projecting the south palisade to the east.

Shape and Dimensions
This gateway had a width of 1.2 m. It would have consisted of a horizontal sill, and probably a one-leaf gate between two gate-posts.

Associated Structural Features
Associated with the northeast gateway were a trench, two gate-posts, and fragments of a horizontal sill.
Trench. The trench associated with this gateway had an average width of 62 cm and extended to a depth of approximately 102 cm below the estimated occupation level.
Gate-posts. Both the north and south gate-posts were exposed. Both posts were round in cross-section but were probably squared above the ground surface. The north post had a diameter of 28 cm and the south post had a diameter of 30 cm. The bottom of the postholes were at the same level as the bottom of the trench.
Horizontal Sill. The exposed sill consisted of two fragments. One was 40 cm long, 19 cm wide and 2 cm thick, while the other was 20 cm long, 10 cm wide and 1 cm thick. The sill probably had originally abutted both the north and south gate-posts.
Discussion

This gateway was associated with the late period fort and was the smaller of the three late period gates exposed. Historically, this gate is apparent in the painting and water-colour of Paul Kane. It is similar in both size and location to that depicted by Kane.

Southeast Gateway: Feature 45.

Location and Orientation

This late period gateway was located in the south section of the east palisade (Figs. 9, 26). The north gate-post was 20.3 m from the south gate-post of the northeast gateway (F.18). The south gate-post was approximately 10.6 m from the line formed by extending the south palisade to the east. In addition, a third gate-post was located approximately 35 cm north of the south gate-post.

Shape and Dimensions

This gateway had a width of approximately 3.1 m. It probably would have consisted of a two leaf gate hung between two gate-posts, and possibly a horizontal sill. However, no sill was exposed. The third gate-post exposed, just north of the south gate-post, may have represented a slightly earlier and smaller gate. This earlier gate may have been approximately 2.6 m wide if the earlier north gate-post was in the same location as the later north gate-post. However, there was no positive evidence to indicate the existence of an earlier north gate-post.

Associated Structural Features

Associated with this gateway were a trench, three gate-posts, and two posts
serving as supports for two of the gate-posts.

Trench. The trench associated with this gateway had an average width of 63 cm at its uppermost levels. Most of the trench had a width of 56 cm, but this width increased to 90 cm near the two south posts. The average depth of the trench was 90 cm below the estimated occupation level. The trench fill contained a large number of rocks near the inner south post. These may have been used to fill in a depression caused by the post. The trench fill also contained a diagonally placed board near the south post. The board was 20 cm long, 20 cm wide and 3 cm thick, and was identified as oak. This was probably debris used as trench fill. The board most likely came from a wooden barrel.

Gate-posts. Three posts were associated with this gateway: one north post and two south posts. The more southern of the two south posts probably served to replace the inner post. This is presumed since the inner south post had deteriorated to a greater extent than the more southern post. Also, a large number of rocks were placed above the inner post, suggesting that the hole created by the decaying post had been purposely filled.

The inner south post had been squared on two edges, and was 20 cm wide, and 15 cm thick. The bottom of this post extended to a depth of about 80 cm below the estimated occupation level, approximately the same level as the bottom of the trench. This post was identified as being of spruce.

The most southern gate-post was squared on its upper portion, measuring 30 cm wide by 20 cm thick. The lower section of the post was round, having a diameter of 30 cm. The posthole had a depth of 114 cm below the estimated occupation level, so was set deeper than the rest of the trench.

The north gateway post was squared along its entire length, and was 21 cm wide by 12 cm thick. Its associated posthole had a depth of 125 cm below the estimated occupation level. This posthole, then, was also set deeper than the rest of the trench.

Support Posts. A support post abutted the east side of both the north and south gate-posts. They apparently were installed at the same time as the main gate-posts. The north support post is round in cross-section, having a diameter of 11 cm. The south post is square in cross-section, measuring 18 cm wide by 15 cm thick.
Discussion
This gateway was associated with the late period fort, and was the larger of the three late period gates exposed. It was oriented toward the river and probably served as the fort's main gate. The presence of an inner south gate-post suggests that the gate either had to be replaced or expanded after its initial construction. Historically, this gate is depicted in the painting and watercolour of Paul Kane (Figs. 5, 6). It is similar in both size and location to that shown by Kane.

Bastions

At least five, and possibly six, bastions were constructed at site 15R. Two or three were associated with the early period fort and three with the late period fort. Two construction methods were employed: a variation of en pile construction for the initial southeast bastion, and post-on-sill construction (Fig. 89) for the remainder.

Early Period Bastions
One and possibly two bastions were associated with the southeast corner of the early period fort. A third bastion was associated with the southwest corner. With regard to the southeast corner, one bastion of en pile construction was probably replaced during early period fort occupation by a second bastion of post-on-sill construction.

Southeast Corner Bastion I (See Figs. 9, 14, 16, 57-60)
Location and Orientation. This bastion was located just south and east of the projected intersection of the early period south and east palisades, and its walls were oriented parallel to these palisades. The east palisade trench intersected the approximate centre of the north wall of the bastion. The south palisade trench ended approximately 25 to 75 cm north and 35 cm west of the projected northwest corner of the bastion.
Shape and Dimensions. The bastion was rectangular-shaped, and measured approximately 3.05 m (E-W) by 2.72 m (N-S).

Associated Structural Features. Associated with this bastion were trenches and grooved sills.

Trenches. Six sections of trench were associated with this bastion: east, south and west bastion trenches; a bastion trench at the east half of the north wall; a combination bastion/palisade trench at the west side of the north wall; and one interior trench running from north to south.

The east, south and west bastion trenches, and the bastion trench at the east half of the north wall contained grooved sills which would have held vertical posts forming the walls of the bastion. These trenches had an average maximum width of 45 cm and an average depth of approximately 58 cm below the estimated occupation level.

The combination bastion/palisade trench at the west side of the north bastion wall did not contain a sill. Originally, this trench was probably part of the south palisade, which was later incorporated as part of the north bastion wall. This trench had a maximum width of 40 cm and a depth of approximately 66 cm below the estimated occupation level.

The interior trench did not contain any structural remains. It extended from the south bastion trench to within 5 cm of the north bastion/palisade trench. The fact that it did not extend into the north trench suggests that it and the other bastion trenches were dug after the north bastion/palisade trench and the associated south palisade had been constructed. This trench did not serve any apparent structural function, and may simply have represented an error in planning. It had a maximum width of 38 cm and a depth of approximately 59 cm below the estimated occupation level.

Grooved Sills. Grooved wooden sills were found in each of the east, south and west bastion trenches, and in the bastion trench at the east half of the north bastion wall. These were cut flat on the bottom and grooved along the entire length on top. These grooves would have received upright posts similar to the palisade posts. The ends of the sills were cut to interlock with each other: the south sill overlapped the east and west sills and the north sill overlapped the east sill. The north end of the west sill and the west end of the north sill were cut flat where they intersected the north bastion/palisade trench. This may indicate that the
sills were put into place after that trench and corresponding palisade wall had been constructed. The sills had an average width of 22.3 cm and an average thickness of approximately 12 cm. The grooves had an average width of 7 cm and an average depth of 7.3 cm. Small wooden shims had been placed beneath the sills in order to level them.

Artifact Associations. Artifacts found within the fill of the southeast corner bastion trenches include blue pigment, 1 iron barrel hoop fragment, 3 clay pipe stem fragments, 1 clay pipe bowl fragment with ribbing and frond-like decoration, 1 glass bead, 1 button of C7 Category 1, 17 hand-wrought nails, 1 nail with a tapered head, 93 nail fragments, 1 square staple and 1 piece of window glass.

Discussion. It appears that this bastion had been erected after the early period palisade: the west half of the north bastion/palisade trench appeared to be a continuation of the east and south palisades rather than a continuation of the north bastion trench; this section of trench did not contain a sill; the sills in the bastion trenches were cut at the ends which intersected the palisade/bastion trench; and the interior bastion trench did not extend into the north bastion/palisade trench.

This bastion probably consisted of upright longitudinally sectioned posts set into the grooved sills. The make-up of the above-ground structure is not known, but the small upright posts and the lack of any substantial corner posts would have made a weak foundation for a superstructure. This bastion may have been intended as a very temporary structure.

Southeast Corner Bastion II (See Figs. 9, 14, 16)

Location and Orientation. This bastion would have been located between the adjacent end-posts of the early period south and east palisades. Its walls probably were oriented parallel to these palisades.

Shape and Dimensions. This bastion would have been square - or rectangular-shaped. In order to have spanned the gap between the palisade posts, the bastion would have had minimum dimensions of 1.9 m (E-W) by 3.0 m (N-S). It probably would have been larger, and may have measured closer to 4 m square.
Associated Structural Features. No structural features were associated with this bastion. However, an absence of posts in the southeast corner of the early period palisade trenches and the original southeast bastion trenches indicated that a second early period southeast corner bastion may have existed.

Discussion. The absence of posts in the southeast corner bastion I trenches, and in the southeast corner of the palisade suggests that they had been purposefully removed. The purpose of their removal may possibly have been to replace the original southeast bastion. This second bastion probably would have been a sturdier structure of post-on-sill construction.

The major historical reference to bastions at the 1835-61 fort which seems to relate to the early period is the 1836-37 company journal of Louis Leblanc. This journal states that on 15 November 1836 "four men were sent to square wood for a Bastion". For the next two weeks, men were squaring and hauling bastion logs. By 28 November, men were "employed putting up the Bastion". Work continued on the bastion until 2 December (Smyth 1976: 96). These references seem to describe the construction of a bastion made up mostly of squared logs. This bastion, then, would not correspond with the original southeast corner bastion. The remarks may refer to either the early period southwest corner bastion or to the second early period bastion in the southeast corner.

Southwest Corner Bastion I (See Figs. 9, 17, 18)

Location and Orientation. This bastion would have been located between the adjacent end posts of the early period south and west palisades. Its walls probably were oriented parallel to these palisades.

Shape and Dimensions. This bastion would have been square - or rectangular-shaped. In order to have spanned the gap between the palisade posts, the bastion would have had minimum dimensions of 1.7 m square. It probably would have been larger, and may have measured closer to 4 m square.

Associated Structural Features. No structural features were associated with this bastion.

Discussion. The lack of structural remains in this corner of the palisade
suggests that the bastion was of post-on-sill construction. This may be
the bastion referred to by Louis Leblanc in his 1836-37 company journal
(See discussion under Southeast Corner Bastion II).

The early period bastions at site 15R appear to exhibit construction
styles intermediate between those which were excavated at the earlier sites
of 13R (1799-1831) and 16R (1799-1821) and the late building phase at site
15R and site 1R (1865-75). The one bastion exposed at site 16R was of en
pile construction while the two full bastions excavated at site 13R were of
en pile and post-in-ground construction. While one early period bastion at
site 15R was of a variation of en pile construction, the remaining early
and late period bastions were of post-on-sill construction. The two
bastions exposed at site 1R were apparently of post-on-sill construction.
Thus, at Rocky Mountain House, there seems to have been a development from
en pile to post-in-ground to post-on-sill bastion construction techniques.

Final Period Bastions
Three bastions were associated with the late period fort. These were
located in the southeast, southwest and northeast corners of the fort. All
were probably of post-on-sill construction.

Southeast Corner Bastion III (See Figs. 9, 14, 16)
Location and Orientation. This bastion was located between the adjacent
end posts of the final period south and east palisades. Its walls were
probably oriented approximately parallel and perpendicular to the south
palisade.
Shape and Dimensions. This bastion probably would have been square - or
rectangular-shaped. In order to have spanned the gap between the palisade
posts, the bastion would have had minimum dimensions of 2.4 m (E-W) by 1.2
m (N-S). It probably would have been larger, and may have measured closer
to 4 m square.
Associated Structural Features. No structural features were associated
with this bastion.
Discussion. The lack of structural remains in this corner of the palisade suggests that the bastion was of post-on-sill construction. This bastion was probably the southeast bastion depicted by Paul Kane (1848) in his painting and watercolour. He shows the bastion as being constructed of squared logs. The bastion protrudes somewhat from the palisade. The upper portion of the bastion is roofed and overhangs the lower portion. Two loopholes or windows are shown in the upper east side. This depiction corresponds well with the late period southeast bastion at site 15R.

Southwest Corner Bastion II (See Figs. 9, 17, 18)

Location and Orientation. This bastion was located between the adjacent end posts of the final period south and west palisades. Its walls were probably approximately parallel to these palisades.

Shape and Dimensions. This bastion probably would have been square- or rectangular-shaped. In order to have spanned the gap between the palisade posts, the bastion would have had minimum dimensions of 2.5 m square. It probably would have been larger, and may have measured closer to 4 m square.

Associated Structural Features. No structural features were associated with this bastion.

Discussion. The lack of structural remains in this corner of the palisade suggests that the bastion was of post-on-sill construction. The southwest corner of the fort was not depicted in Paul Kane's painting or watercolour.

Northeast Corner Bastion (See Figs. 9, 13, 15)

Location and Orientation. This bastion was located between the adjacent end posts of the north and east palisades. Its walls were probably oriented approximately parallel and perpendicular to the north palisade.

Shape and Dimensions. This bastion probably would have been square- or rectangular-shaped. In order to have spanned the gap between the palisade posts, the bastion would have had minimum dimensions of 2.9 m (E-W) by 1.8 m (N-S). It probably would have been larger, and may have measured closer to 4 m square.
Associated Structural Features. No structural features were associated with this bastion.

Discussion. The lack of structural remains in this corner of the palisade suggests that the bastion was of post-on-sill construction. This bastion was probably the northeast bastion depicted by Paul Kane (1848) in his painting and watercolour. This bastion appears to be identical to the bastion shown in the southeast corner (See Southeast Corner Bastion III). This depiction corresponds well with the late period northeast bastion at site 15R.

Interior Fort Separations

Historical references to separations at Rocky Mountain House 1835-61 were found in the 1836-37 journals and in the writings of Henry Moberly. The post journals indicated that at least some of the separations inside the fort were constructed with short pickets, that at least some of the pickets were barked and that they divided the fort into sections (Smyth 1976: 95). A security separation was described by Moberly, "leading through a narrow passage the height of the stockade into a long hall" (Smyth 1976: 100). The long hall referred to above was the Indian hall.

Interior fort separations were associated with both the original and expanded palisade enclosures at site 15R (See Table 3).

Feature 12

This feature (Figs. 9, 61) probably was associated with the late period fort.

Location and Orientation

This separation ran southwest to northeast at an approximate $45^\circ$ angle to the late period north palisade. The northeast end of the separation is
situated approximately 2 m south of the east end of the north palisade.

Shape and Dimensions
This separation was linear in form and approximately 1.7 m in length. Its original height is unknown.

Associated Structural Features
A trench and five longitudinally sectioned posts were associated with this feature.
Trench. This trench had an average width of approximately 40 cm and an average depth of approximately 45 cm below the estimated occupation level. A number of horizontally placed planks were included in the trench fill.
Posts. The longitudinally sectioned posts within this trench averaged 17.6 cm wide and 2.6 cm thick.

Artifact Associations
One nail fragment was recovered from the fill of this separation trench.

Discussion
The northeast end of this separation probably adjoined the southwest corner of the late period northeast bastion. The function served by this separation is unknown.

Feature 15
This feature (Figs. 9, 62) was associated with the late period fort.
Location and Orientation
This separation ran west from a point along the late period east palisade approximately 1.5 m north of the north gate-post of the small east gateway. It ran at least to the limit of excavation, 1.5 m from the east palisade. It may have extended across the entire fort, and have been continuous with an interior separation trench (F.102) exposed on the west side of the fort.

Shape and Dimensions
That portion of the separation exposed was linear in form. Its original length and height are unknown.

Associated Structural Features
Two parallel adjoining trenches and two lines of longitudinally sectioned posts were associated with this separation.

Trenches. The south trench of this feature had been dug into the north trench. The separation represented by the south trench probably served to replace that of the north trench. Together, these trenches had a width of 58 cm and an average depth of approximately 60 cm below the estimated occupation level. The south trench was slightly deeper than the north trench.

Posts. One row of longitudinally sectioned posts was associated with each trench. The posts of the north row had an average width of 17 cm and an average thickness of 2.7 cm. The posts of the south row had an average width of 19 cm and an average thickness of 4.8 cm.

Artifact Associations
One nail fragment and one olive green round bottle fragment were recovered from the fill of this separation trench.
Discussion

The double trench and lines of posts suggests that there were two construction phases for this particular separation, the south separation being the more recent. Both, however, would have been associated with the late period fort.

This separation was approximately in line with and may have been continuous with a separation (F.102) exposed on the west side of the fort. The west separation, however, consisted of only one trench and a single row of posts. This suggests that, if a separation did span the entire width of the fort, it did so only during one of the two construction phases.

Feature 21

This feature (Fig. 9) was associated with the late period fort.

Location and Orientation

This separation ran west from a point on the east palisade 6.3 m south of the south gate-post of the small east gate. It extended 8.4 m west of the east palisade and paralleled the north wall of a late period building.

Shape and Dimensions

This separation was linear in form and 8.4 m long. Its original height is unknown.

Associated Structural Features

One trench, one row of longitudinally sectioned posts, and one round post were associated with this feature.

Trench. This trench was 8.4 m long and had an average width of 40 cm.

Posts. The longitudinally sectioned posts within this trench averaged 18
cm wide and 4 cm thick. One round post, 17 cm in diameter, was situated at the junction of the inner separation and outer east palisade trenches.

Artifact Associations
Artifacts recovered from the fill of this inner fort separation trench include 1 piece of iron stock, 1 plain clay pipe bowl fragment, 5 nail fragments, 1 ceramic sherd of SCT2Vb and 1 ceramic sherd of SCT2Vdd.

Discussion
This separation may have served as a partition prior to the construction of the building just to the south. When the building was constructed, it may have been replaced by the smaller separation (F.22) at the northeast corner of the building. The one round post may have served as a gate-post for an inner passageway. Alternately, it could have been used to reinforce the palisade, or as a king post for the separation itself.

Feature 22
This feature (Fig. 9) was associated with the late period fort.

Location and Orientation
This separation ran between 2 m and 3.1 m west of the outer east palisade, approximately parallel to and 40 cm south of another inner separation (F.21). Its western end abutted the northeast corner of a late period building. Its eastern end was approximately 80 cm northwest of a gallery support post (F.29).
Shape and Dimensions
This separation was linear in form and 1.1 m long. Its original height is unknown.

Associated Structural Features
One trench and row of longitudinally sectioned posts were associated with this feature.

Trench. This trench was approximately 1.1 m long and had an average width of 18 cm.

Posts. The longitudinally sectioned posts within the trench averaged 23.5 cm wide and 4.8 cm thick.

Artifact Associations
No artifacts were recovered from this feature.

Discussion
This short separation may have served to close off the gap between the northeast corner of the building and the gallery. It may have been built after the separation to the north had been dismantled.

Feature 40
This feature (Figs. 9 and 63) was associated with the early period fort.

Location and Orientation
This separation ran west from a point on the early period east palisade 18.1 m north of the southeast corner of the fort. It ran at least to the limit of excavation, 1.6 m west of the east palisade. It may have spanned
the entire width of the fort and appeared to be continuous with the remains of an inner separation (F.82) on the west side.

Shape and Dimensions
That portion of the separation exposed was linear in form. Its original length and height are unknown.

Associated Structural Features
One trench, one row of longitudinally sectioned posts, and one round post were associated with this feature.
Trench. The upper levels of this trench averaged 66 cm wide. That portion of the trench exposed was 1.6 m long.
Posts. The longitudinally sectioned posts within this trench averaged 14 cm wide and 4.6 cm thick. One round post had a diameter of 11 cm.

Artifact Associations
Artifacts recovered from the fill of this inner fort separation trench include 1 iron rove, 3 plain clay pipe stem fragments, 2 plain clay pipe bowl fragments, 1 glass bead, 1 button of C7SBT1Va, 6 hand-wrought nails, 42 nail fragments, 1 copper alloy wire fragment, 1 light green round bottle fragment and 2 pieces of window glass.

Discussion
This feature is situated directly opposite and appears to be a continuation of an inner separation (F.82) trench on the west side of the early period fort. Together, these features may have formed a major east to west fort separation.
Feature 64
This feature (Fig. 9) was associated with the early period fort.

Location and Orientation
This separation ran north from a point on the early period south palisade 7.7 m east of its west end.

Shape and Dimensions
That portion of the separation exposed was linear in form. Its original length and height are unknown.

Associated Structural Features
This feature consisted of a trench. No posts were exposed.
Trench. This trench averaged 20 cm wide and had a maximum depth of approximately 57 cm below the estimated occupation level. That portion of the trench exposed was 1.8 m long. One horizontal board, 50 cm long, 10 cm wide and 10 cm thick had been placed on the bottom of the trench. It was probably debris used as fill material.

Artifact Associations
No artifacts were recovered from this feature.

Discussion
This feature was in line and may have been continuous with a north-south inner separation (F.83) which had been dug into an east-west separation trench (F.82). Together, these features may have formed an enclosure
measuring approximately 18 m (N-S) by 9.4 m (E-W) at the southwest corner of the fort.

Feature 82
This feature (Fig. 9) was associated with the early period fort.

Location and Orientation
This separation ran east from a point on the early period west palisade 16 m north of its south end. It extended at least 9.6 m to the east and probably was a continuation of the inner separation (F.40) on the opposite side of the fort.

Shape and Dimensions
The portions of the separation exposed were linear in form. Its original length and height are unknown.

Associated Structural Features
This feature consisted of a trench. No posts were exposed.
Trench. The average width of the upper portions of this trench was 65 cm. At approximately 35 cm from the bottom of the trench, it narrowed suddenly to a width of 35 cm. The cross-section of this trench was similar to that of the early period east and west palisade trenches. This trench had a depth of approximately 85 cm below the estimated occupation level.

Artifact Associations
Artifacts recovered from the fill of this inner fort separation trench
include 11 plain clay pipe stem fragments, 1 plain clay pipe bowl fragment, 4 clay pipe bowl fragments with ribbed or frond-like decoration, 3 clay pipe fragments marked IF on the spur, 1 clay pipe fragment marked TB on the spur, 1 hand-wrought nail, 3 nail fragments and 1 piece of window glass.

Discussion
(See Inner Fort Separations, F.40)

Feature 83
This feature (Fig. 9) was probably associated with the early period fort.

Location and Orientation
This separation was oriented in a north-south direction. It was dug into an east-west separation trench (F.82) at a point 9.4 m east of the west palisade. It ran south from this point for 1.1 m to the limit of excavation. It was in line and may have been continuous with another north-south separation feature (F.64) to the south.

Shape and Dimensions
That portion of the separation exposed was linear in form. Its original length and height are unknown.

Associated Structural Features
One trench and row of longitudinally sectioned posts, and two small round posts were associated with this feature.
Trench. This trench had an average width of 52 cm. The portion of the
trench exposed was 1.2 m in length.
Posts. The longitudinally sectioned posts within the trench averaged 15 cm wide and 2.5 cm thick.

Artifact Associations
No artifacts were recovered from this feature.

Discussion
(See Inner Fort Separations, F.64)

Feature 85
This feature (Figs. 9 and 64) was associated with the late period fort.

Location and Orientation
This separation ran east from a point on the late period west palisade 18.2 m north of its south end.

Shape and Dimensions
This separation was linear in form and measured 1.9 m long. Its original height is unknown.
Associated Structural Features
One trench and row of longitudinally sectioned posts were associated with this feature.

Trench. This trench had an average width of approximately 30 cm and was 2.2 m long.

Posts. The longitudinally sectioned posts within this trench averaged 16 cm wide and 6 cm thick.

Artifact Associations
Artifacts recovered from the fill of this inner fort separation trench include 2 plain clay pipe stem fragments and 2 nail fragments.

Discussion
This separation probably would have spanned a gap between the palisade and a building.

Feature 90
This feature (Fig. 9) was associated with the early period fort.

Location and Orientation
This feature extended 1.3 m east of the early period west palisade from a point 23 m north of the south end of that palisade.

Shape and Dimensions
This separation was linear in form and probably was approximately 1.3 m long. Its original height is unknown.
**Associated Structural Features**

This feature consisted of a trench, one square post and one longitudinally sectioned post.

**Trench.** The trench was 1.3 m long and had a width of 42 cm. Since it was not completely excavated, its depth is unknown.

**Posts.** A 12 cm square post was situated near the early period west palisade trench. A longitudinally sectioned post, 14 cm wide and 2 cm thick, was exposed 15 cm to the east of the square post.

**Artifact Associations**

No artifacts were recovered from this feature.

**Discussion**

This separation probably ran between the early period west palisade and an early period structure which may have been associated with the cellar depression (F.86) directly to the east.

**Feature 97**

This feature (Fig. 9) was associated with the early period fort.

**Location and Orientation**

This separation ran east from a point on the early period west palisade 50 cm north of the north gate-post. It ran at least to the limit of excavation, 4.6 m east of the west palisade.
Shape and Dimensions
That portion of the separation exposed was linear in form. Its original length and height are unknown.

Associated Structural Features
A builder's trench, one large square post and two small round posts were associated with this separation.
Trench. This trench had an average width of 32 cm. The exposed portion of the trench was 4.6 m long. Horizontal pieces of wood appeared in the trench fill.
Posts. The single squared post was 3 m east of the west palisade. The two round posts were 1.2 m and 1.3 m east of the west palisade. The square post was 20 cm wide and 14 cm thick, while the two round posts were approximately 6 cm in diameter.

Artifact Associations
Artifacts recovered from the fill of this inner fort separation trench include 1 plain clay pipe stem fragment, 1 pipe bowl fragment with ribbed decoration, 3 glass beads, 1 nail fragment, one ceramic sherd of variety SCT2Vdd and 1 piece of miscellaneous clear unidentified glass.

Discussion
This separation may have formed a major fort division. The large squared post may have been associated with an inner passageway.

Feature 102
This feature (Fig. 9) was associated with the late period fort.
Location and Orientation
This separation ran east from a point on the late period west palisade 24.8 m south of the northwest corner of the fort. It runs to at least the limit of excavation, 2.9 m to the east. It is approximately in line and may have been continuous with a separation (F.15) on the east side of the fort.

Shape and Dimensions
The exposed portion of the separation was linear in form. Its original length and height are unknown.

Associated Structural Features
A trench, fourteen longitudinally sectioned posts and one round post were associated with this feature.
Trench. The upper portions of this trench averaged 55 cm wide. The exposed portion of the trench was 2.9 m in length. Horizontal pieces of wood occurred in the trench fill.
Posts. The longitudinally sectioned posts averaged 15.6 cm wide and 4.2 cm thick. One large round post was situated 1.1 m east of the west palisade and had a diameter of 22 cm.

Artifact Associations
Artifacts recovered from the fill of this inner fort separation include blue pigment, 1 plain clay pipe stem fragment, 1 plain clay pipe bowl fragment, 1 clay pipe fragment with asterisks on the spur, 3 nail fragments, 1 light green angular bottle fragment and 1 miscellaneous piece of light green glass.
Discussion
This feature may be associated with a separation (F.15) on the east side of the fort. (See Inner Fort Separations, F.15). The function of the large round post is unknown.

Structure I: Building  (See Figs. 9, 27-39)
This building was associated with the late period fort.

Location and Orientation
The building was oriented in an east-west direction and set against the late period east palisade. It was located midway between the two east gates.

Shape and Dimensions
The building was not completely exposed. The partial remains of the east end of the building were nearly completely exposed, while what probably was the centre of the building was partially exposed. A number of features are represented by these structural remains.

The building appears to have been rectangular in shape and was divided into two or more rooms. What probably was a double-hearth fireplace (F.24) was situated between the easternmost room and the next room to the west. What may have been a lean-to or small shed was attached to the south wall. Two possible entranceways and three stoops or steps may have been present. A small cellar (F.26) was situated beneath the floor of the east room. A fireplace or oven was situated just outside the southeast corner of the building, and an ash dumping pit (F.31) was along the east wall of the structure.

The main section of the building was 6.24 m wide and the maximum length exposed was 8.08 m. The length of the east room was 6.32 m. Assuming that the west room had identical dimensions to the east room, and
that the structure consisted of only two rooms, the building would have had a total length of 12.64 m.

What may have been a lean-to or shed attached to the south side of the building would have been 1.3 m wide. The remains of the shim which would have served to support the south wall of the lean-to was 2.7 m long (incomplete). It extended west from approximately 55 cm north of the outside fireplace. The original length of the lean-to is unknown.

A stoop, supported at its south edge by a runner, may have extended 75 cm to the south of the south wall of the lean-to. The original length of the stoop is unknown.

What may have been another stoop or step, supported on its east side by a runner, extended 25 cm east of the north-south running shim of the lean-to. The stoop/step probably would have spanned the inner width of the lean-to, 1.08 m. It may have been associated with a doorway to the lean-to.

Another runner represented what may have been a third stoop or step extending east from a probable doorway in the east side of the building. This doorway would have been located from 1.9 m to 3.1 m north of the southeast corner of the building. The stoop/step would have been approximately 1.2 m long and 25 cm wide.

A somewhat oval-shaped cellar depression (F.26) was situated beneath the floor of the east room of the structure. This cellar consisted of a large and a small depression. These were separated by a ridge of undisturbed sandy clay, the top of which was approximately 15 cm wide (N-S) and 45 cm above the base of the larger depression.

The upper levels of the larger depression were 1.9 (N-S) by 1.3 m (E-W). The depression was U-shaped in cross-section and extended to a depth of 86 cm below the estimated occupation level. Five boards, probably collapsed floorboards, were present in the cellar fill.

The smaller depression was 55 cm wide (N-S) and between 44 cm and 94 cm long (E-W). It had a depth of approximately 81 cm below the estimated occupation level.

The base of the double hearth fireplace (F.24) located within the building was 1.75 m wide (E-W). Since the north end of this fireplace was not exposed, its total length is not known. However, if it had been placed midway between the walls of the building, its length would have been
approximately 3.8 m.

The fireplace or oven (F.38) located just outside the southeast corner of the building was semi-circular in shape, opening to the south-southwest. The base had a width of 1.5 m. A 40 cm deep firepit was within the base and extended 60 cm out from the mouth of the hearth.

The irregularly-shaped ash dumping pit (F.31) was situated along the length of the east wall of the structure, and extended 1.5 m to the east of the east wall shims. The pit had a depth of approximately 41 cm below the estimated occupation level. The pit fill consisted of white ash flecked with charcoal over a layer of light brown sandy clay. Bones and various artifacts of 19th century origin were recovered from the fill.

Associated Structural Features
Structural features associated with this building include shims, runners, floorboards, fireplaces (F.24 and F.38), a cellar and a crawlspace.

Shims (Figs. 27-31, 37)
Three types of shims were associated with this building. One type consisted of short planks which ran perpendicular to the walls of the building. A second type consisted of longer planks running parallel to the building walls. The third type consisted of short planks set diagonally at the northeast and southeast corners of the building.

The short and long shims had been placed alternately along each of the three walls exposed. The short shims that were set perpendicular to the wall ranged in length from 48 cm to 80 cm. They averaged 17 cm wide and 3 cm thick. The long shims that were set parallel to the wall ranged from 80 cm to 1.4 m long and had an average width of 19 cm. Most of these were 3 cm thick, but one at the east end of the south wall was 9 cm thick. The short diagonal shims at the corners were an average of 25 cm wide and 80 cm long. The one in the southeast corner was 9 cm thick, while that in the northeast corner was 3 cm thick.

Originally, the long shims probably would have spanned the distance
between the short shims. This distance was 1.4 m except at the east
doorway, at the east end of the south wall, at the north end of the east
wall and at the east end of the north wall. These latter distances varied
between 0.5 m and 1.2 m.

Short and long shims also ran along at least the south edge of the
fireplace. While the shims along the outside of the structure probably
would have supported wall sills, those along the fireplace probably would
have supported the floorboards or floor joists.

Runners (Figs. 27-29, 37)
Three runners were associated with this building, all of which may have
been associated with stoops or steps.

One runner was 1.6 m long (incomplete), 5 cm wide and 3 cm thick. It
extended west from a point approximately 55 cm southwest of the exterior
fireplace/oven. It was probably associated with a stoop extending south
from the south wall of the attached shed.

A second runner was 70 cm long (incomplete), 4 cm wide and 3 cm thick.
It extended in a north-south direction from a point 25 cm east of the
north-south running shim of the attached lean-to. It may have been
associated with a stoop extending east from that shim.

The third runner was 1.3 m long, 6 cm wide and 3 cm thick. It
paralleled the east wall of the building and was 25 cm east of the doorway.
It was probably associated with a stoop or step extending east from the
doorway.

Floorboards (Fig. 32)
Five collapsed floorboards, oriented in a north-south direction, were
within the cellar depression (F. 26). These averaged 14.3 cm wide and 2.5
cm thick. The average length of the two completely exposed planks was 1.9
m (incomplete). These planks extended south from midway between the north
and south walls.
Fireplaces

Interior. The base of an interior double-hearth fireplace (Fig. 24) was exposed (Fig. 34) at what may have been the centre of the building. The fireplace base rested on a pad of grey-brown clay. The base itself was composed of one course of smooth, oblong-shaped stones. The hearths would have been oriented to the east and west.

Exterior. The lower portion of the exterior fireplace or oven (Fig. 38) was composed of irregularly-shaped stones, many of which were fire-cracked or otherwise broken (Figs. 35-37, 39). Four courses of these stones, arranged in a semi-circular shape, were exposed. Also, a large flat stone was positioned diagonally down into the firepit on each side of the stone enclosure.

Cellar

The cellar was earthen and unlined. Entrance to the cellar was probably gained by means of a trap door in the floor of the building.

Crawlspace

A crawlspace probably existed between the floor and the cellar proper, and would have been continuous with the cellar depression (F.26).

A wooden box (F.131) that was exposed (Figs. 33, 37) between the south edge of the cellar and the south wall of the building had probably been stored in the crawlspace. The remains of this box consisted of the complete base, remnants of the sides, and machine-cut nails used for attaching the sides to the base. The box was rectangular, 61 cm long and 46 cm wide. Its original height is unknown. The box was identified as being made of spruce.

Artifact Associations

Artifacts recovered from the occupation level of Structure 1 include 13
gunflints, 5 flakes from gunflints, 18 pieces of lead shot, 2 small lead balls, 2 gunparts, 1 piece of worked limestone, 1 chert flake, 1 mudstone biface, 1 mudstone flake, 1 iron projectile point, 4 flat file fragments, 2 quarter round file fragments, 1 aze head fragment, 2 pieces of square iron stock, 1 bundling strap, 1 graphite crucible fragment, 1 drill bit, 1 gouge, 52 iron roves, 6 iron rivets, 2 saw blade fragments, 7 iron washers, 4 pieces of carved antler, a red rouge-like pigment, a blue pigment, 4 copper alloy wire fragments, 1 brass upholstery tack, 2 triangular-pointed needles, 3 needle-headed pins, 8 flat-headed pins, 3 iron kettle / pail side lugs, 6 iron barrel hoop fragments, 358 plain clay pipe stem fragments, 187 plain clay pipe bowl fragments, 38 clay pipe bowl fragments with ribbing and/or frond-like decoration, 13 clay pipe fragments marked IF on the spur, 2 clay pipe fragments marked TB on the spur, 1 clay pipe stem fragment with a portion of the BURNS CUTTY trademark, 4 clay "president" pipe bowl fragments, 2 steel pen nibs, 427 glass beads, 1 Dentalium shell bead, 29 shell disc beads, 2 silver finger rings, 1 buckle of variety T1Va, 3 buttons of variety C1SAT1Va, 1 of C1SAT1Vb, 1 of C1SAT2Vb, 3 of C1SBT1Vb, 4 of C2SAT1Va, 1 of C2SAT3Va, 1 of C2SAT3Vb, 1 of C7SAT1Vb, 4 of C7SBT1Va, 2 of C7SBT1Vb, 3 of C7CST1Va, 3 of C7 Category, 1 of C8SA, 19 of C8SB and 1 button eye (Category 1), 1 piece of fabric, strands of wool, 1 antler stopper, 217 hand-wrought nails, 28 machine-cut nails, 823 nail fragments, 5 brass nails, 4 iron tacks, 1 bolt head fragment, 3 miscellaneous hooks and eyes, 1 iron ring, 2 screws, 2 round staples, 1 strap hinge, 4 miscellaneous copper alloy objects and 4 miscellaneous ferrous objects. Ceramics include 1 sherd of variety SCT1Vb, 4 of SCT2Mg, 5 of SCT2Vo, 1 of SCT2Vu, 1 of SCT2Vw, 2 of SCT2Vvb, 2 of SCT2Vdd, 3 of SCT2Vkk, 1 of SCT2Vnn, 1 of SCT2Voo, 2 of SCT2Vgg, 3 of SCT2Vtt, 2 of Category A, 13 of Category B and 39 of Category C. Glass includes 12 olive green round bottle fragments, 3 light green round bottle fragments, 1 clear lead round bottle fragment, 1 clear lead fiddle-shaped bottle fragment, 2 light green angular bottle glass fragments, 5 pieces of miscellaneous clear lead glass, 1 piece of miscellaneous light green glass and 30 pieces of window glass.

Artifacts found within the fill of the cellar (F.26) include 5 gunflints, 2 pieces of lead shot, 1 lead ball, 1 copper projectile point, 1 chisel, 1 drill bit, 4 copper alloy roves, a red rouge-like pigment, 1
furniture lock, 1 flat-headed pin, 49 plain clay pipe stem fragments, 23 plain clay pipe bowl fragments, 7 clay pipe fragments with ribbing and/or frond-like decoration, 3 clay pipe fragments marked IF, 1 jews' harp, 1 small box lid, 221 glass beads, 1 button of variety C1SAT1Va, 1 button of C2SAT1Va, 1 button of C7SBT1Va, 1 button of C7SCT1Va, 3 buttons of C8SB, 20 hand-wrought nails and 84 nail fragments. Ceramics include 1 sherd of variety SCT2Vg, 2 of SCT2Vu, 1 of SCT2Vkk, 2 of SCT2Vrr, 2 of Category A and 3 of Category B. Glass includes 2 olive green round bottle fragments, 1 light green angular bottle fragment, 1 piece of miscellaneous clear lead glass and 4 pieces of window glass.

Artifacts found in the pit of the exterior fireplace (F.38) and at the occupation level near this feature include 2 pieces of lead shot, 1 awl, 1 round file fragment, 1 reinforcing strap, 2 iron rivets, 1 iron rove, 2 copper alloy roves, 4 copper alloy wire fragments, 2 round pointed needles, 3 triangular-pointed needles, 1 needle fragment, 3 flat-headed pins, 2 iron kettle/pail side lugs, 1 pot hook, 1 pot leg, 1 strike-a-light, 2 iron barrel hoop fragments, 51 plain clay pipe stem fragments, 29 plain clay pipe bowl fragments, 7 clay pipe bowl fragments with ribbing or frond-like decoration, 5 clay pipe fragments marked IF on the spur, 2 clay pipe fragments marked TB on the spur, 1 "president" pipe fragment, 28 glass beads, 5 shell disc beads, 1 button of variety C1SBT1Vb, 1 button of C2SAT1Va, 1 button of C7SBT1Va, 1 button of C7SCT1Va, 2 buttons of C7 Category 1, 1 button of C8SB, 29 hand-wrought nails, 2 machine-cut nails, 142 nail fragments, 1 round staple and 1 miscellaneous iron eye. Glass includes 1 light green round bottle fragment, 1 clear soda round bottle fragment, 1 light green angular bottle fragment, 1 piece of miscellaneous unidentified glass and 10 pieces of mirror glass.

Discussion
This structure probably was of a variation of post-on-sill construction. The shims that were exposed probably supported sills upon which vertical posts and inner filler logs rested. Additional shims and/or joists supporting a floor probably ran in an east-west direction.

Building remains similar to those exposed at site 15R were exposed at
Site 1R (Rocky Mountain House 1865-75). At site 1R, the main house, northern barracks and smithy's house all appeared to have rested on a series of long shims running parallel to the walls of the structure alternating with shorter shims running perpendicular to the walls of the structure. However, some of the shims which ran parallel to the walls at site 1R appeared to have overlain the short perpendicular shims; this did not occur at site 15R. It is unclear as to whether or not these structural elements actually served as shims. They may have served as sills into which upright posts would have been tenoned.

The building remains at Rocky Mountain House sites 16R (1799-1821) and 13R (1799-1835) were, for the most part, dissimilar to those at site 15R. Most, if not all, of the buildings at both sites were of post-in-ground construction. There is some evidence, however, to suggest that at least part of one building at site 13R may have been of post-on-sill construction.

The similarity of the site 15R remains to those at site 1R, and their dissimilarity to the building remains at sites 16R and 13R suggests that the 15R building was of a relatively late construction style.

The interior fireplace (F.24) probably had two hearths which would have fed into a central flue. Although the fireplace base was constructed of stone, the chimney may have been constructed of mud plastered to a frame consisting of four corner poles and attached cross-sticks, similar to a standing fireplace which was associated with Fort Reliance (Smyth 1976: Fig. 21). There was no conclusive archaeological evidence for such. However, this technique is referred to in the 1836-37 Company journal which mentions "mudding and making chimneys" (Smyth 1976: 95). Although this referred to the early period fort, the same construction technique most likely continued into the late period.

The exterior fireplace or oven had a single hearth. Although the lower portions of the fireplace were constructed of stone, the upper portions may also have been constructed of mud over a wooden frame. The deep (40 cm) firepit associated with this fireplace suggests that it may have been used as an oven. This fireplace could have been partially sheltered by the gallery, and would have been enclosed on its east and west sides by the palisade and building.

Stratigraphic evidence suggests that the building had been burned.
Many of the shims had been charred and a layer of red oxidized charcoal-flecked soil laid over most of the structure. A layer of fill overlaid the collapsed floorboards within the cellar but underlaid the burn layer within the cellar depression, suggesting that at least the floor had collapsed previous to the structure being burned.

**Miscellaneous Pits**
A large number of pits of various shapes and sizes were exposed both within and outside the palisade (See Table 4). Some of these probably had been dug in order to fulfill a certain purpose. That is, they would have been used as cellars or storage pits. Others may have been dug in order to obtain material for construction purposes: clay for chinking, whitewash or fireplace construction or soil for levelling off certain areas. These pits had been refilled in various ways. They may have been gradually refilled with refuse, quickly refilled with soil so that the area could be used for other purposes, allowed to fill in naturally through slumpage, or any combination of these methods.

**Interior Fort Pits**

**Feature 1**

**Location.** This pit (Figs. 9, 65, 67) was located 14.84 m to 15.80 m south of the late period west palisade. It was set against the late period north palisade and partially intruded into the palisade trench.

**Shape and Dimensions.** This feature was roughly rectangular-shaped. It measured 104 cm (N-S) by 96 cm (E-W), and extended to a depth of approximately 78 cm below the estimated occupation level. The portion of the depression excavated had vertical sides and a flat base.

**Stratigraphy.** The fill within the pit (Fig.67) consisted of layers of ash, loam, clay, silty clay, silty sand and a woody material. Ash and loam were
the major fill materials of the upper half of the pit, while a fibrous woody material was the major component of the lower pit fill. One short horizontal squared log occurred in the upper trench fill.

**Artifact Associations.** Artifacts found in the fill of this pit include 3 gunflints, 1 gunflint flake, 16 lead shot, 1 folding knife, 1 brass projectile point, 1 iron projectile point, 1 copper wire fragment, 1 brass upholstery tack, 1 needle fragment, 14 flat-headed pins, 1 pair of scissors, 28 plain clay pipe stem fragments, 39 plain clay pipe bowl fragments, 3 clay pipe bowl fragments with ribbing or frond-like decoration, 2 clay pipe fragments marked IF on the spur, 1 clay pipe fragment marked TB on the spur, 1 stone pipe bowl fragment, 1 slate pencil fragment, 68 glass beads, 1 silver cross-pin, 1 button of variety C1SAT1Va, 1 button of variety C1SAT1Vb, 1 button of variety C7SBT1Va, 1 button of series C8SB, 10 leather buttons, 6 hand-wrought nails, 9 machine-cut nails, 43 nail fragments, 1 copper alloy nail, 131 cm of window putty and 1 unidentified ferrous object. Ceramics include 4 sherds of variety SCT2Va, 9 of SCT2Ve, 3 of SCT2Vg, 2 of SCT2V1, 5 of SCT2Vh, 1 of SCT2Vp, 1 of SCT2Vee and 2 of Category A. Glass includes 51 olive green round bottle fragments, 5 light green round bottle fragments, 1 clear lead round bottle fragment, 1 clear soda round bottle fragment, 1 light green angular bottle fragment, 2 clear lead stemmed tableware fragments, 53 clear lead tumbler fragments, 1 clear lead stopper, 8 pieces of miscellaneous clear lead glass, 10 pieces of miscellaneous light green glass, 1 piece of mirror glass and 1337 pieces of window glass.

**Discussion.** This feature may have served as a wood-lined storage pit or as a refuse pit, and probably was associated with the late period fort.

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**Feature 2**

**Location.** This pit (Fig. 9) was located 17.3 m east of the early period west palisade and 90 cm south of the early period north palisade.

**Shape and Dimensions.** Only a portion of this feature was exposed. That portion measured 45 cm (E-W) by 30 cm (N-S), and extended to a depth of approximately 19 cm below the estimated occupation level. That portion of the depression exposed suggests that it had vertical sides and a flat base.
Stratigraphy. The fill within this pit consisted of medium brown silty-clay loam containing small concentrations of ash and scattered wood chips. Some horizontal wood, which may have been barrel staves, were included in the pit fill.

Artifact Associations. One plain clay pipe bowl fragment and 2 ceramic sherds of variety SCT2Wq were found in the fill of this pit.

Discussion. This feature may have served as a gallery support posthole for the early period fort. The shallowness of it, however, suggests that it may have served a different function. It could have been associated with either the early or late period fort.

Feature 7
Location. This pit (Fig. 9) was located 8.4 m west of the early period east palisade trench and 2.5 m south of the early period north palisade trench.

Shape and Dimensions. Only a portion of this feature was exposed. That portion measured 65 cm (N-S) by 55 cm (E-W). It sloped gradually to a depth of approximately 48 cm below the estimated occupation level.

Stratigraphy. The fill within this pit consisted of layers of various loams and clays.

Artifact Associations. Artifacts recovered from the fill of this pit include 1 gunflint, 1 lead shot, 1 needle fragment, 1 plain clay pipe stem fragment, 43 glass beads, 2 hand-wrought nails, 3 nail fragments and 1 piece of window glass.

Discussion. This feature may have served as a cellar, storage pit or refuse pit. The relatively gradual slope of its sides suggests that it was not a posthole. This pit may have been associated with either the early or late period fort.

Feature 8
Location. This pit (Figs. 9, 66) was located 5.6 m to 9 m west of the north end of the late period east palisade, and 1.2 m to 4.16 m south of
the late period north palisade. It had been dug through a portion of the early period north palisade trench.

**Shape and Dimensions.** This large pit was irregularly-shaped. Its maximum dimensions were 2.96 m (N-S) by 3.4 m (E-W). The sides of the pit sloped sharply to a nearly flat bottom, depressed somewhat more near the centre of the pit. The pit had a depth of approximately 1.07 m below the estimated occupation level.

**Stratigraphy.** The pit fill (Fig. 68) consisted of various layers: loam, silty to sandy clays mottled with charcoal, chinking, wood and ash; ash mottled with charcoal and chinking; and gravel mixed with sandy loam. Also, four horizontal planks and two upright posts were present within the pit. The planks were set near the base of the pit, and consisted of two pairs of parallel planks set perpendicular to each other. The two upright posts were set 80 cm apart, near the west edge of the pit. The more northerly of these posts was 23 cm in diameter, while the other was 18 cm wide by 14 cm thick.

**Artifact Associations.** Artifacts recovered from the fill of this pit include 11 lead shot, 1 folding knife with the trademark WARRAN, 1 ferrous tool point, 8 plain clay pipe stem fragments, 4 plain clay pipe bowl fragments, 2 pipe fragments marked IF on the spur, 1 pipe bowl fragment with a frond-like design, 58 glass beads, 34 hand-wrought nails and 44 nail fragments. Glass includes 6 olive green round bottle fragments, 2 light green round bottle fragments, 14 clear lead round bottle fragments, 1 clear soda round bottle, 4 light green angular bottle fragments, 1 clear lead stopper, 1 piece of miscellaneous clear lead glass, 1 piece of miscellaneous clear unidentified glass and 3 pieces of window glass.

**Discussion.** This feature may have served as a cellar for a late period building. However, no structural remains of an overlying building were exposed. The planks within the pit may have served as flooring for the cellar, and the posts as supports for the floor of the building.

**Feature 11**

**Location.** This pit (Fig. 9) was located 3 m west of the north end of the late period east palisade and 1.10 m south of the late period north
palisade.

**Shape and Dimensions.** This feature was rectangular-shaped, and measured 49 cm (E-W) by 46 cm (N-S). It had a depth of approximately 51 cm below the estimated occupation level.

**Stratigraphy.** The pit fill consisted of medium brown silty clay loam mottled with charcoal and chinking. A lens of ash, which contained most of the artifacts recovered from the pit, occurred within the pit fill.

**Artifact Associations.** Artifacts recovered in the fill of this pit include 2 plain clay pipe stem fragments, 1 nail fragment, 1 ceramic sherd of variety of SCT2Vm and 1 ceramic sherd of SCT2Vp. Glass includes 18 olive green bottle fragments and 16 clear lead bottle fragments.

**Discussion.** This feature was probably associated with the late period fort. Its original function is unknown.

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**Feature 19**

**Location.** The portion of this pit (Fig. 9) that was exposed was located 6.16 m to 8.32 m west of the late period east palisade, and 18 m to 20.8 m south of the north end of the late period east palisade. It had been dug through a portion of the early period east palisade trench.

**Shape and Dimensions.** Only a portion of this feature was exposed. That portion measured 2.8 m (N-S) by 2.16 m (E-W). It appeared to have been either three or four sided. The pit extended more than 55 cm below the estimated occupation level.

**Stratigraphy.** The fill that was excavated from this feature consisted mostly of dark brown silty loam containing a large number of rocks.

**Artifact Associations.** Artifacts found within the fill of this pit include 1 iron rivet, 4 plain clay pipe stem fragments, 1 plain clay pipe bowl fragment, 1 glass bead, 2 nail fragments and 1 piece of window glass.

**Discussion.** At least a portion of this pit appears to have been filled in during the 20th century. It may or may not have been a 19th century depression. No related structural elements were exposed. The original function of this pit is unknown.
Feature 20

Location. The portion of this pit (Figs. 9, 69) that was exposed was located 1.9 m to 4 m west of the early period east palisade trench, and 23.4 m to 24.5 m south of the early period north palisade. It was set beneath the late period building exposed along the east side of the fort.

Shape and Dimensions. Only a portion of this feature was exposed. That portion measured 2.10 m (E-W) by 1.10 m (N-S), and had a depth of approximately 80 cm below the estimated occupation level. It appeared that the feature as a whole would have been circular or oblong in shape. The sides of the feature were nearly vertical and the bottom was flat.

Stratigraphy. The pit fill (Fig. 71) consisted of light to medium brown silty clay mottled with ash, wood, black silt and light brown sandy clay over medium to dark brown sandy clay mottled with black silt and wood. A concentration of orange and white ash containing charcoal fragments occurred within the former layer. These fill layers were overlain by a silty loam containing a large amount of chinking and charcoal.

Artifact Associations. Artifacts found in the fill of this pit include 1 gunpart, 1 trap pan, 1 quarter-round file fragment, 1 circular file fragment, 1 iron rove, 1 spur fragment, vermilion, a green pigment, 1 bail handle, 1 iron barrel hoop, 18 plain clay pipe stem fragments, 2 plain clay pipe bowl fragments, 7 glass beads, 2 Dentalium shell beads, 1 button of C7SBT1Va, 1 button of C7SBT1Vb, 12 hand-wrought nails, 23 nail fragments, 1 round staple and 1 ferrous pipe fragment. Ceramics include 5 sherds of variety SCT2Wkk and 1 sherd of Category A.

Discussion. This pit appeared to have predated the late period structure, since rubble associated with this structure overlaid the pit fill. This feature may have been an early period cellar pit.

Feature 23

Location. This pit (Fig. 9) was located 25.1 m south of the early period north palisade trench and adjacent to the early period east palisade trench.

Shape and Dimensions. This feature was rectangular shaped and measured 70 cm (E-W) by 62 cm (N-S). The base of this shallow depression was
approximately 25 cm below the estimated occupation level.

Stratigraphy. The pit fill consisted of light brown sandy clay mottled with white ash. This fill is similar to that of the adjacent early period east palisade.

Artifact Associations. One ceramic sherd of Category C was found in the fill of this pit.

Discussion. This pit is an early period feature associated with the early period east palisade. Its original function is unknown.

Feature 30

Location. This feature (Fig. 9) was located just outside the east wall of the late period building, and extended beneath the north shim associated with what may have been the east doorway of the structure.

Shape and Dimensions. This feature was not completely exposed, but appeared to be oval-shaped. That portion that was exposed measured 77 cm (N-S) by 53 cm (E-W), and had a depth of approximately 28 cm below the estimated occupation level.

Stratigraphy. The fill of this feature was light brown sandy clay mixed with pebbles and cobbles. It was underlain by a prehistoric occupation lens and overlaid by a burnt sod lens and late period occupation layer. An ash pit (F.31) associated with the late period building, overlaid this feature.

Artifact Associations. Five quartzite flakes were found in the fill of this pit.

Discussion. The artifacts contained in this fill consisted of bone fragments and quartzite flakes. This feature appears to have been related to the prehistoric layer which underlies it.

Feature 32

Location. This pit (Fig. 9) was located just outside the east wall of the late period building, and extended north from the south shim associated with the east doorway of the structure.
Shape and Dimensions. Only a portion of this feature was exposed. That portion measured 88 cm (E-W) by 60 cm (N-S). It would not have extended more than 50 cm more to the north. The pit had a depth of approximately 34 cm below the estimated occupation level. The feature appeared to be approximately oval-shaped.

Stratigraphy. The fill of this pit consisted of medium brown loam. It was overlain by a burnt sod lens and by the occupation lens associated with the late period structure.

Artifact Associations. Artifacts found within the fill of this pit include a grindstone fragment, 1 clay pipe bowl fragment with ribbed decoration, 1 hand-wrought nail, 7 nail fragments, and 1 piece of window glass.

Discussion. The pit predates the late period building, and may be associated with the early period fort. The original purpose served by this feature is unknown.

Feature 33

Location. This pit (Fig. 9) was located beneath the southernmost shim of the east wall of the late period building.

Shape and Dimensions. Only a portion of this feature was exposed. The pit appeared to have been oblong-shaped. The portion exposed measured 40 cm (N-S) by 12 cm (E-W). It extended beneath the shims of the late period building and may have measured as much as 37 cm (E-W). The pit had a depth of approximately 33 cm below the estimated occupation level.

Stratigraphy. The fill of this pit was black silt mottled with charcoal and wood. It was overlain by the shim of the late period building, and a late period gallery support post was dug through a section of the pit.

Artifact Associations. Artifacts found within the fill of this pit include 1 iron rove, 1 bead, 1 hand-wrought nail, 1 cut nail and 7 nail fragments.

Discussion. This feature predated the late period building and gallery, but was situated outside the confines of the early period palisade. It may have been a late period feature used before the building and gallery were constructed, or may have been an early period pit exterior to the fort. The original function of this feature is unknown.
Feature 36

Location. This pit (Fig. 9) was located just outside and beneath the north edge of the exterior hearth (F.38) associated with the late period building.

Shape and Dimensions. This small oval to circular pit was not completely exposed. That portion exposed measured 70 cm (E-W) by 36 cm (N-S). The pit extended beneath the hearth stones to the south and may have been cut into by the firepit of the hearth.

Stratigraphy. The pit fill consisted of black silty loam containing large pieces of charcoal. It was overlain by soil associated with the late period east palisade trench and by the north edge of the late period exterior fireplace (F.38).

Artifact Associations. No artifacts were recovered from this feature.

Discussion. This pit predates the late period east palisade and exterior fireplace (F.38). It may have been associated with either the early period fort or a prehistoric component. The original purpose served by this feature is unknown.

Feature 37

Location. This pit (Fig. 9) extended south from the easternmost shim of the south wall of the late period structure.

Shape and Dimensions. This pit was rectangular-shaped, with vertical sides and a flat base. It measured 115 cm (N-S) by 90 cm (E-W), and had a depth of approximately 36 cm below the estimated occupation level.

Stratigraphy. The pit fill consisted of grey and white ash, and charcoal flecked with wood and bone fragments. The pit was capped by a lens of wood which was overlain by the occupation layer associated with the late period fort.

Artifact Associations. Artifacts found within the fill of this pit include 1 gunflint, 2 iron rivets, 1 large tinned iron lid, 4 plain clay pipe stem fragments, 2 plain clay pipe bowl fragments, 12 hand-wrought nails, 1 machine-cut nail, 69 nail fragments and 1 ferrous pipe fragment.

Discussion. This pit predated the late period building but was situated outside the perimeter of the early period fort. It may have been a late
period feature used before the building was constructed, or may have been an early period pit exterior to the fort. It served as a refuse pit and may have originally been used as a storage pit.

Feature 39
Location. This pit (Fig. 9) was located 13 cm north of an early period partition trench (F.40) and 33 cm west of the early period east palisade trench.
Shape and Dimensions. The sides of this oval-shaped pit tapered gradually to create a funnel-like depression. This depression measured 62 cm (N-S) by 48 cm (E-W), and extended to a depth of approximately 59 cm below the estimated occupation level.
Stratigraphy. The fill of this pit consisted of three layers. The lowest was a medium brown silty clay containing many wood fragments. The middle layer consisted of cinders, charcoal and burnt bone. The uppermost layer was white ash. The pit was overlain by the occupation level and building rubble associated with the late period fort.
Artifact Associations. Artifacts found within the fill of this pit include 2 plain clay pipe stem fragments, 2 nail fragments, 1 round staple and 1 threaded shank.
Discussion. This pit was probably an early period feature, and had been used as a refuse pit.

Feature 46
Location. This pit (Fig. 9) was located adjacent to the west edge of the early period east palisade, 2.6 m north of the southeast corner bastion.
Shape and Dimensions. This feature was 50 cm square and had a depth of approximately 38 cm below the estimated occupation level. Its sides were vertical and its base was flat.
Stratigraphy. The pit fill consisted of light brown sandy clay similar to the light brown silty clay used as fill for the early period east palisade trench.
Artifact Associations. Two nail fragments were found in the fill of this pit.

Discussion. The lack of distinction between the fill of the pit and that of the early period east palisade trench prevented an accurate determination of their relative chronology. It is probable, however, that the pit was contemporaneous with or dug subsequent to the early period east palisade. The original function served by this feature is unknown.

Feature 63
Location. This pit (Fig. 9) was dug into an early period partition trench (F.64) which extended north from the early period south palisade. The pit was located 1.2 m north of the early period south palisade.

Shape and Dimensions. This oval-shaped pit measured 64 cm (N-S) by 41 cm (E-W). It had a depth of approximately 30 cm below the estimated occupation level.

Stratigraphy. The pit fill consisted of medium brown silty loam. One large tin lid (15R7L5-1), punched with a number of holes, was recovered from the fill.

Artifact Associations. One plain clay pipe stem fragment was found in the fill of this pit.

Discussion. This pit post-dated the early period partition trench (F.64) and probably was associated with the late period fort. The function served by this feature is unknown, but may relate in some manner to the tin lid which was recovered from the pit fill. The tin lid was probably used as a sieve.

Feature 65
Location. This pit (Fig. 9) was located along the south edge of the late period south palisade, approximately 2.3 m east of its west end.

Shape and Dimensions. This feature was rectangular-shaped. It measured 48 cm (N-S) by 60 cm (E-W), and extended to a depth of approximately 30 cm below the estimated occupation level.
Stratigraphy. The fill within this pit consisted of wood and charcoal.
Artifact Association. No artifacts were recovered from this feature.
Discussion. The late period south palisade cut through this feature, indicating that this pit was an early period feature. The purpose for which this pit was originally intended is unknown.

Feature 68
Location. This pit (Figs. 9, 72) was located 2.6 m north of the early period south palisade and 1.8 m east of the early period west palisade.
Shape and Dimensions. This pit was roughly rectangular-shaped and measured approximately 90 cm (E-W) by 85 cm (N-S). It had a depth of approximately 38 cm below the estimated occupation level. The pit had vertical sides and a flat base.
Stratigraphy. The lower layers of pit fill consisted of dark brown silty loam mottled with black silt, pieces of wood, charcoal and ash. This was overlain by light grey-brown clay with a lens of white clay which contained a large number of shells. The uppermost layer of fill was light brown silt, ash and charcoal. A wood lining occurred along at least one edge of the pit, and two large pieces of wood occurred in the pit fill. One of these pieces was 21.5 cm long, 7.5 cm wide and 1.5 cm thick. The other measured 28 cm long, 7 cm wide and 0.5 cm thick.
Artifact Associations. Artifacts found within the pit fill include 3 glass beads, 1 nail fragment, 1 olive green round bottle fragment, 1 clear lead round bottle fragment and 1 clear soda round bottle fragment.
Discussion. This pit may have been either an early or late period feature. Originally, it may have been lined with wood, and may have served a variety of purposes. The white clay containing shells may be related to the making of whitewash, chinking or chimney "mud".

Feature 70
Location. This pit (Figs. 9, 73) had been dug into the early period west palisade, 70 cm from its south end.
Shape and Dimensions. This feature was rectangular-shaped and measured 1.0 m (E-W) by 88 cm (N-S). It had a depth of approximately 52 cm below the estimated occupation level. Three sides of the pit were vertical, while the west side was set at a 45° angle. The base of the pit was set at a slight angle.

Stratigraphy. The pit fill (Fig. 74) consisted of five layers of ash and various soils mixed with ash, charcoal, black silt and wood. The pit fill was underlain by undisturbed soil and the fill of the early period west palisade trench.

Artifact Associations. Artifacts found within the pit fill include 1 bale seal, 1 quarter-round file fragment, 1 unidentified tool, 2 copper alloy wire fragments, 11 plain clay pipe stem fragments, 4 plain clay pipe bowl fragments, 1 clay pipe fragment marked IF on the spur, 1 glass bead, 1 hand-wrought nail and 10 nail fragments. Ceramics include 1 sherd of SCTZwDd and 1 of Category A. Glass consists of 1 fragment of a round olive green bottle.

Discussion. This feature was associated with the late period fort and appeared to have functioned as a refuse pit. Wood from within the pit was identified as spruce.

Feature 77

Location. This pit (Fig. 9) was located 10.5 m to 14.0 m north of the early period south palisade and 2.0 m to at least 2.4 m east of the early period west palisade.

Shape and Dimensions. This feature was not completely exposed. The section exposed was roughly semi-circular in shape and measured 3.5 m (N-S) by 1.4 m (E-W). Its depth was approximately 50 cm below the estimated occupation level.

Stratigraphy. This pit was uniformly filled with dark brown loam containing large amounts of white, grey and orange ash, and black silt.

Artifact Associations. Artifacts recovered from the fill of this pit include 1 gunflint, 1 coin, 1 piece of worked antler, 3 plain clay pipe stem fragments, 2 plain clay pipe bowl fragments, 1 clay pipe fragment marked IF on the spur, 3 glass beads, 5 hand-wrought nails, 12 nail
fragments, 1 ceramic sherd of Category C, 2 clear lead fiddle-shaped bottle fragments and 1 miscellaneous piece of light green glass.

Discussion. This pit could have been associated with either the early or late period fort. The lack of layering of the pit fill suggests that it is the result of a single deposit.

Feature 86

Location. This feature (Fig. 9) was located 1.2 m to at least 4 m east of the early period west palisade and 20 m to 26.3 m north of the early period south palisade.

Shape and Dimensions. This feature was not completely exposed. Only a small portion of what was exposed was excavated to undisturbed soils. It appeared, however, that the depression as a whole was roughly pear-shaped, and consisted of a large round depression at the south end, and a smaller round depression at the north end. The feature measured 6.25 m (N-S) by more than 2.8 m (E-W). The depth of the southern depression was approximately 2.02 m below the estimated occupation level, while the depth of the smaller depression was approximately 81 cm below the estimated occupation level. The sides of the larger depression angled sharply toward the bottom. The base itself was flat.

At the base of the larger depression, three boards extended north from the southern limit of excavation. These were joined to two boards extending east to the eastern limit of excavation. These boards were set one above the other and formed part of two walls. The boards were an average of 20.7 cm wide and 4 cm thick. A large round post, measuring 18 cm in diameter, had been set just inside the juncture of the two sets of boards, and apparently supported them. A second large post was set just inside the north to south running boards at their juncture with the southern limit of excavation. This post was rectangular, measuring at least 15 cm wide by 11 cm thick. Both of these posts were set deeper than the wall boards.

Stratigraphy. The pit fill (Fig. 75) consisted of four layers. The bottom layer was medium brown silty sand with patches of black silt and ash. Some chinking occurred in this layer. The upper three layers consisted of silty
clay loam. The lower of these three layers contained lenses of black silt, chinking and some pebbles. The middle layer contained charcoal and numerous large rocks. The uppermost layer contained chinking, charcoal and small concentrations of ash.

Artifact Associations. Artifacts found within the fill of this pit include 1 lead shot, 2 gunparts, 1 possible awl fragment, 1 thumb bolt, 1 piece of carved antler, 13 plain clay pipe stem fragments, 2 plain clay pipe bowl fragments, 2 clay pipe bowl fragments with ribbed or frond-like decoration, 1 "president" pipe fragment, 2 glass beads, 1 bracelet fragment, 1 button of C7SBT1Va, 1 button of C8SB, 27 hand-wrought nails, 109 nail fragments, 1 nail with a tapered head and 1 miscellaneous ferrous object. Ceramics include 1 sherd of SCT2Vd, 3 of SCT2Vt, 2 of SCT2Vu, 1 of SCT2Vkk, 1 of SCT2Vuu, 8 of Category A and 11 of Category B. Glass includes 1 olive green round bottle fragment, 1 light green round bottle fragment, 1 clear soda round bottle fragment, 4 light green angular bottle fragments, 1 light blue angular bottle fragment, 5 miscellaneous pieces of olive green glass and 9 pieces of window glass.

Discussion. This feature may have been associated with either the early or late period fort. Its intended function probably was as a cellar or storage pit for an overlying building. However, no other structural remains of this building were exposed. The boards and posts within the cellar probably represented the remains of cribbing which would have formed the walls of the cellar. These boards were charred on their inner surfaces, suggesting that the building may have been destroyed by fire. One of these boards was identified as spruce.

Feature 98

Location. This pit (Figs. 9, 76) was located 55 cm to 2.05 m east of the early period west palisade, and 25 cm to 1.55 m north of an interior partition trench (F.97).

Shape and Dimensions. This feature measured 1.5 m (E-W) by 1.3 m (N-S) and had a depth of approximately 68 cm below the estimated occupation level. The sides of the pit varied from sloping steeply inwards to being undercut. The base of the pit was flat.
Stratigraphy. The pit fill (Fig. 80) consisted of various layers and lenses of sand, sandy clay, clayey sand, clay, silty clay, ash and charcoal. Many of these layers were mottled with charcoal, ash, chinking, stones, black silt, bones and pieces of wood.

Artifact Associations. Artifacts found in the fill of this pit include 1 gunpart, 1 needle fragment, 26 plain clay pipe stem fragments, 21 plain clay pipe bowl fragments, 8 clay pipe fragments marked IF on the spur, 2 glass beads, 7 hand-wrought nails, 2 machine-cut nails and 26 nail fragments. Ceramics include 2 sherds of variety SCT2Vs, 1 of SCT2Vt, 4 of SCT2Vdd and 2 of SCT2Vw. Glass includes 1 clear lead fiddle-shaped bottle fragment and 6 pieces of miscellaneous clear lead glass.

Discussion. This feature may have been associated with either the early or late period fort. It was used as a refuse pit.

Feature 110

Location. This feature (Fig. 9) was located 2.2 m to at least 2.6 m east of the early period west palisade, and 3.7 m to 5.45 m south of the early period north palisade.

Shape and Dimensions. Only a portion of this feature was exposed. That portion measured 1.75 m (N-S) by 40 cm (E-W), and had a depth of approximately 99 cm below the estimated occupation level. The sides of the pit were vertical and its base was flat.

Stratigraphy. The pit fill (Fig. 81) consisted of various layers of silty clay loam, and an uppermost layer of sand and gravel. Lenses of ash, wood and clayey silt occurred in the upper levels of the trench fill. A layer of decayed wood, 3 cm thick, extended across the entire feature, approximately 15 cm above the base of the pit.

Artifact Associations. Artifacts found in the fill of this pit include 1 plain clay pipe stem fragment, 1 clay pipe stem fragment with frond-like decoration, 4 fragments of three clay pipes marked with asterisks on the spur, 3 nail fragments and 1 ceramic sherd of variety SCT2Vp.

Discussion. This feature could have been associated with either the early or late period fort. It may have originally served as a cellar, and later as a refuse pit.
Feature 113

Location. This pit (Figs. 9, 77, 78, 82) was located 1 m to 3 m east of the early period west palisade. The feature overlapped the early period north palisade and extended 2.8 m south of it.

Shape and Dimensions. This feature measured 2 m (E-W) by 1.8 m (N-S) (3.4 m, including the shallow trench at the north end), and had a depth of approximately 1.67 m below the estimated occupation level. The pit was oval in shape and had vertical sides and a flat base. Eleven parallel boards which ran in a southeast to northwest direction rested on the base of the pit. These averaged 113 cm long, 15 cm wide and 3 cm thick. The boards were longitudinally sectioned and had their flat sides facing downwards. They probably represented floorboards. A number of other boards were lying at various angles within the pit fill, and may have been the remains of a cellar wall.

A shallow 72 cm wide depression ran for approximately 1.6 m north of the north edge of the pit, and overlapped the early period north palisade. Stratigraphy. The pit fill consisted mostly of a thick gravel layer (60 cm) and a thick layer of brown and white ash (80 cm). The floorboards rested at the base of the gravel layer, while other boards set at various angles were at the base of the ash layer. The gravel layer contained wood chips and charcoal, while the ash layer contained burnt wood chips, chinking and pebbles. These two major fill layers were overlain by thinner layers of ash, silty clay and silty loam. The latter layers extended beyond the northern edge of the pit and were also deposited over the early period north palisade trench fill. This shallow extension of the pit had been dug into the palisade trench, and some of the palisade posts apparently were removed to accommodate it.

Artifact Associations. Artifacts found in the fill of this pit include 1 gunflint flake, 1 iron projectile point, 1 trap spring, 1 ferrous tool point, 2 flat-headed pins, 1 antler utensil handle, 1 iron barrel hoop, 17 plain clay pipe stem fragments, 27 plain clay pipe bowl fragments, 3 clay pipe bowl fragments with ribbed decoration, 11 clay pipe fragments marked IF on the spur, 14 glass beads, 1 shell disc bead, 1 button of variety
C7SBT1Va, 1 button of series C8SA, 13 hand-wrought nails, 1 machine-cut nail, 21 nail fragments and 1 miscellaneous ferrous object. Ceramics include 1 sherd of variety SBT2Vaa, 1 of SCT2Vb, 1 of SCT2Vcc, 4 of SCT2Vdd, 1 of SCT2Vee, 1 of SCT2Vkk, 1 of Category A and 4 of Category B. Glass includes 18 olive green round bottle fragments, 1 light green round bottle fragment, 2 clear lead tumbler fragments, 2 pieces of miscellaneous clear lead glass and 7 pieces of window glass.

Discussion. This feature, excluding the northward extension of the upper fill layers, could have been associated with either the early or late period fort. Since the pit was located approximately equidistant from the west and north early period palisades, it is likely to have been associated with the early period fort. Since the northward extension of the upper fill layers overlaid the early period north palisade, the extension itself may have been associated with the late period fort. Whether or not this extension was originally part of the pit is unknown. The pit itself probably served as a cellar, although no remains of an overlying building were exposed. The intended function of the extension is unknown, but it may have served as a refuse repository after the cellar proper had been abandoned and filled.

One of the floorboards was identified as spruce.

Feature 117

Location. This pit (Fig. 9) was located 1.0 m east and 70 cm north of the northwest corner of the early period palisade.

Shape and Dimensions. This feature was not completely exposed, but appeared to have been round in shape, with a diameter of 41 cm. It had a depth of approximately 15 cm below the estimated occupation level.

Stratigraphy. The fill of this pit was dark brown silty loam intermixed with a large quantity of charcoal.

Artifact Associations. No artifacts were recovered from this feature.

Discussion. This pit may have been associated with either the early or late period fort. The purpose for which it was originally intended is unknown.
Feature 118

Location. This pit (Fig. 9) was located 5.7 m south of the late period north palisade. It partially overlapped the late period west palisade.

Shape and Dimensions. This feature was not completely exposed. The portion exposed was irregularly-shaped and measured 83 cm (N-S) by 54 cm (E-W). It had a depth of approximately 43 cm below the estimated occupation level.

Stratigraphy. The pit fill consisted of three layers. The lowest layer consisted of medium to dark brown silty loam. This was covered by a board which was 22 cm wide and 5 cm thick. The board extended 45 cm west from the eastern limit of excavation. It was overlain by a layer of white ash.

Artifact Associations. Artifacts found in the fill of this pit include 1 iron washer, 3 plain clay pipe stem fragments, 2 plain clay pipe bowl fragments, 1 glass bead, 4 hand-wrought nails, 1 machine-cut nail, 9 nail fragments, 2 ceramic sherds of variety SCT2Vh, 2 ceramics sherds of Category B, 1 light green angular bottle fragment, 1 clear lead glass tumbler fragment and 3 pieces of window glass.

Discussion. This feature was probably associated with the late period fort. The function for which it was intended is unknown.

Exterior Fort Pits

Feature 48

Location. This pit (Fig. 9) was located 1.6 m east of the late period east palisade and approximately 2.1 m north of its south end.

Shape and Dimensions. This irregularly-shaped pit measured 60 cm (N-S) by 40 cm (E-W), and had a depth of approximately 38 cm below the estimated level of occupation.

Stratigraphy. The pit fill consisted of grey-brown silty clay which contained pieces of wood, charcoal and black silt.

Artifact Associations. Artifacts recovered from the fill of this pit include 5 plain clay pipe stem fragments, 1 plain clay pipe bowl fragment, 3 clay
pipe bowl fragments with ribbed or frond-like decoration, 1 shell disc bead, 2 hand-wrought nails and 2 nail fragments. Ceramics recovered include 1 sherd of SCT2Vf, 1 of SCT2Vbb, 1 of SCT2Vqq, 1 of SCT2Vss and 9 of SCT2Vtt.

Discussion. This feature was associated with the late period fort, and probably had been used as a refuse pit.

Feature 127

Location. This pit (Figs. 4, 79) was located approximately 48 m west of the late period west palisade.

Shape and Dimensions. This feature was somewhat oval-shaped. It measured 1.8 m (E-W) by 1.35 m (N-S) and had a maximum depth of approximately 18 cm below the estimated occupation level.

Stratigraphy. The pit fill consisted of three layers. The bottom layer consisted of wood chips and other small pieces of wood, some of which were charred on their upper surface. The middle layer was grey-to grey-brown ash and black silt. The uppermost layer consisted of grey-brown clay mottled with black silt, bones and ash.

Artifact Associations. Artifacts found in the fill of this pit include 1 piece of lead shot, 1 iron projectile point, 6 plain clay pipe stem fragments, 7 plain clay pipe bowl fragments, 1 stone pipe bowl, 2 glass beads, 1 bone pendant, 1 button of variety CISAT1Va, 1 button of series C8SB, 1 hand-wrought nail, 2 nail fragments, 1 hook and eye, 1 ceramic sherd of Category A and 1 ceramic sherd of Category B. Glass includes 2 olive green round bottle glass fragments, 1 piece of miscellaneous clear lead glass, 1 piece of miscellaneous clear unidentified glass and 5 pieces of window glass.

Discussion. This feature may have been associated with either the early or late period fort. It served as a refuse pit but may have originally been used as a storage pit.
Feature 128

Location. This pit (Fig. 4) was located approximately 28 m west of the late period west palisade.

Shape and Dimensions. This feature was not completely exposed. The portion exposed was irregularly-shaped, and measured 5.6 m (E-W) by 4 m (N-S). It extended to a depth of approximately 44 cm below the estimated occupation level.

Stratigraphy. The pit fill consisted of three layers. A layer of black silt was overlain by a layer of wood chips. The wood chips were covered by grey clay which contained lenses of black silt and ash, pieces of wood, stones, and charcoal.

Artifact Associations. Artifacts found within the fill of this pit include 1 gunflint, 5 pieces of lead shot, 2 gunparts (sear and side screw), 1 flint flake, 1 quarter-round file fragment, 1 round file fragment, 1 gimlet, vermilion, 1 copper alloy wire fragment, 1 triangular-tipped needle, 1 iron barrel hoop fragment, 52 plain clay pipe stem fragments, 37 plain clay pipe bowl fragments, 1 clay pipe bowl fragment with ribbing, 2 clay pipe stem fragments with ivy-like decoration, 7 clay pipe fragments marked with IF, 1 clay pipe fragment with a plain spur, 67 glass beads, 1 dentalium shell bead, 1 shell disc bead, 1 button of variety C1SAT1Va, 1 of C3SBT1Va button, 1 C7SBT1Va button, 1 C7SBT1Vb button, 1 C8SA button, 6 hand-wrought nails, 1 machine-cut nail, 26 nail fragments and 1 round staple. Ceramics include 1 sherd of variety SAT2Vg, 2 of SCT2Ve, 2 of SCT2Vg, 1 of SCT2V1, 1 of SCT2V1, 4 of SCT2Vdd, 1 of SCT2Vee, 2 of SCT2Vff, 5 of Category A and 5 of Category B. Glass includes 1 olive green round bottle fragment, 4 clear lead round bottle fragments, 6 pieces of miscellaneous clear lead glass and 31 pieces of window glass.

Discussion. This feature may have been associated with either the early or late period fort. It served as a refuse pit, but may have originally been used as a storage pit.

Feature 129

Location. This feature (Figs. 4, 83) was located approximately 42 m west of the late period west palisade.
Shape and Dimensions. This feature was irregularly shaped. It measured 3 m (N-S) by 2.5 m (E-W), and extended to a depth of approximately 20 cm below the estimated level of occupation.

Stratigraphy. The pit fill consisted of a 2 to 8 cm thick layer of wood and wood chips overlain by various lenses of white to grey ash, black silt, and burnt black soil containing grey ash, bones, stones, wood chips and charcoal.

Artifact Associations. Artifacts found within the fill of this pit include 3 pieces of lead shot, vermilion, 2 flat-headed pins, 9 plain clay pipe stem fragments, 7 plain clay pipe bowl fragments, 12 glass beads, 1 tinkle cone dangler, 1 button of variety C3SET1Va, 2 hand-wrought nails, 3 machine-cut nails and 22 nail fragments. Ceramics include 13 sherds of variety SAT2Va, 5 of SAT2Vb, 2 of SET2Va, 8 of SCT2Vd, 3 of Category A and 2 of Category B. Glass consists of 1 olive green round bottle fragment, 6 light green round bottle fragments, 3 clear soda round bottle fragments, 1 light green angular bottle fragment, 2 pieces of miscellaneous clear lead glass, 1 piece of miscellaneous clear unidentified glass and 4 pieces of window glass.

Discussion. This feature may have been associated with either the early or late period fort. It served as a refuse pit but may have originally been used as a storage pit.

Feature 130

Location. This pit (Figs. 4, 84) was located approximately 26 m west of the late period west palisade.

Shape and Dimensions. This somewhat oval shaped pit had nearly vertical sides and a somewhat flat base. It measured 2.8 m (E-W) by 2 m (N-S), and extended to a depth of approximately 45 cm below the estimated occupation level.

Stratigraphy. The pit fill consisted of various lenses of white, black and grey ash, black silt, clay, silty clay and cinders. Many of these lenses contained charcoal, wood chips, stones and chinking. A layer of wood chips lined the bottom of the pit.

Artifact Associations. Artifacts found within the fill of this pit include
2 gunflints, 1 gunflint fragment, 3 flat file fragments, 1 axe head bit fragment, 1 axe head poll, 1 piece of carved antler, 1 copper alloy wire fragment, 1 round-pointed needle, 3 iron barrel hoop fragments, 32 plain clay pipe stem fragments, 13 plain clay pipe bowl fragments, 9 clay pipe fragments marked with IF, 2 clay pipe bowl fragments with ribbing and/or frond-like decoration, 2 clay pipe stem fragments with an ivy-like design, 1 steel pen nib, 86 glass beads, 1 tubular brass dangler, 1 hawk bell, 1 button of variety ClSAT1Vb, 1 button of variety C7SB1Vb, 8 hand-wrought nails and 26 nail fragments. Ceramics include 1 sherd of variety SAT2Ve, 3 of SCT2Ve, 1 of SCT2V1, 1 of SCT2Vs, 8 of SCT2Vaa, 1 of SCT2Vcc, 5 of SCT2Vdd, 5 of SCT2Vmm, 2 of SCT2Vnn, 5 of Category A, 4 of Category B and 1 of Category C. Glass includes 48 olive green round bottle fragments, 1 light green round bottle fragment, 14 clear lead round bottle fragments, 1 light green angular bottle fragment, 13 clear lead tumbler fragments, 1 piece of miscellaneous clear lead glass, 3 pieces of miscellaneous clear unidentified glass and 18 pieces of window glass.

Discussion. This pit may have been associated with either the early or late period fort. It served as a refuse pit, but may have originally been used for storage.

Miscellaneous Posts and Postholes (See Table 5)

Feature 25

Location
This feature (Fig. 9) was located 40 cm west of the early period east palisade and 2.7 m north of an early period interior separation (F.40).
Shape and Dimensions
The posthole was rectangular-shaped. It measured 52 cm (N-S) by 40 cm (E-W) and extended to a depth of approximately 58 cm below the estimated occupation level. The post itself was squared and was 12 cm wide and 10 cm thick.

Stratigraphy
The fill of the posthole was a medium brown silty clay which contained chinking, charcoal, black silt and ash. This was overlain by the occupation layer associated with the late period structure.

Artifact Associations
Two glass beads were recovered from the fill of this posthole.

Discussion
This post and posthole predated the late period building and was probably associated with the early period fort. The post may have served as a support for a gallery along the early period east palisade.

Feature 28

Location
This feature (Figs. 9, 85) was located just east of the northeast corner of the late period structure.
Shape and Dimensions
This feature consisted of an oval-shaped posthole, an upright longitudinally sectioned post, and short horizontal boards. The posthole measured 1.1 m (N-S) by 30 cm (E-W) and extended to a depth of approximately 48 cm below the estimated occupation level. The upright post was set 30 degrees to the east of vertical. It was 17 cm wide and 4 cm thick. One horizontal board abutted the south side of the upright post. This board was 40 cm long, 9 cm wide and 3 cm thick. Two smaller horizontal pieces of wood were in the fill to the north of the upright post.

Stratigraphy
The fill of this posthole consisted of grey ash overlying a medium brown sandy silt.

Artifact Associations
Three quartzite flakes, 1 plain clay pipe bowl fragment, 4 hand-wrought nails and 5 nail fragments were recovered from this posthole.

Discussion
This feature was probably associated with the late period fort. The horizontal boards would have served as braces for the upright post, while the upright post may have served as a brace for the gallery support post (F.29) located directly to the east.
Feature 42

Location
This feature (Figs. 9, 86) was located 1.1 m west of the early period east palisade and 10.6 m north of the early period south palisade.

Shape and Dimensions
This feature was not completely exposed but appeared to consist of two rectangular-shaped postholes, one of which was set within the other. One upright post and six horizontal supports were present within these postholes.

The portion of the outer posthole that was exposed measured 120 cm (N-S) by 90 cm (E-W), while that of the inner posthole measured 1 m (N-S) by 65 cm (E-W). These extended to a depth of approximately 76 cm below the estimated occupation level.

The vertical post appeared to have been a longitudinally sectioned post associated with the inner posthole. It was 30 cm wide and 15 cm thick.

Six planks of various sizes were set within the postholes at depths of between 35 cm and 65 cm below the estimated occupation level. They ranged in size from 10 cm long and 5 cm wide to 93 cm long and 24 cm wide. These boards varied in thickness from 3 to 6 cm. One of the larger boards had an 11 cm by 18 cm notch along one side, which may have held the post which would have been associated with the larger posthole.

Stratigraphy
The fill within the postholes consisted of light to medium grey-brown silty clay mottled with black silt and charcoal. The fill of the outer posthole was slightly less mottled and slightly lighter in color than that of the inner posthole.
Artifact Associations
Artifacts found in the fill of this posthole include 1 piece of square iron stock, 1 iron rove, 44 glass beads, 6 hand-wrought nails, 1 machine-cut nail, 25 nail fragments and 2 pieces of window glass.

Discussion
This feature predated the late period structure and was probably associated with the early period fort. The purpose actually served by these posts is unknown but they may have functioned as supports for a gallery along the early period east palisade. The inner posthole and post probably served to replace the outer posthole and the post which would have been associated with it.

Feature 69

Location
This feature (Fig. 9) was located 2.5 m east of the early period west palisade and 4.5 m north of the early period south palisade.

Shape and Dimensions
Although this feature was not completely exposed, it appeared to have been rectangular-shaped and consisted of both a post and posthole. That portion of the posthole exposed measured approximately 80 cm (N-S) by 40 cm (E-W). The post itself was only partially exposed.
Stratigraphy
This feature was only partially excavated, the upper fill layers having been grey clay and small cobbles.

Artifact Associations
No artifacts were recovered from this feature.

Discussion
This feature may have been associated with either the early or late period fort. The function for which it was intended is unknown.

Feature 115

Location
This feature (Fig. 9) was located 1.5 m south of the early period north palisade and 4.5 m east of the early period west palisade.

Shape and Dimensions
This feature consisted of a posthole, post and two horizontal boards. Although the feature was not completely exposed, it appeared to have been rectangular in shape. The portion that was exposed measured 60 cm (N-S) by 50 cm (E-W) and extended to a depth of approximately 58 cm below the estimated occupation level. The upright post was squared and measured 28 cm by 26 cm. Two horizontal planks had been set directly west of the post, approximately 37 cm above the base of the posthole. Both of these extended from the southern limit of excavation to near the north edge of the
posthole. One board was 18 cm wide and 2 cm thick. The other board was beneath the first. It was 11 cm wide and 2 cm thick.

Stratigraphy
The fill of the posthole consisted of medium brown sandy loam mottled with black silt.

Artifact Associations
Five plain clay pipe stem fragments, 1 plain clay pipe bowl fragment, 1 nail fragment and 2 pieces of miscellaneous clear lead glass were recovered from the fill of this posthole.

Discussion
This feature may have been associated with either the early or late period fort. It may have served as a support for the gallery along the early period north palisade.

Miscellaneous Trenches (See Table 6)

Feature 5

Location and Orientation
This feature (Figs. 9, 87) was situated exterior to the early period fort. It extended 1.5 m north from the early period north palisade at a point 11.2 m west of the east end of that palisade.
Shape and Dimensions
This trench had a total length of approximately 1.5 m and a width of 70 cm. It extended to approximately 70 cm below the estimated occupation level.

Stratigraphy
The trench fill consisted of light to medium grey-brown sandy to silty clay mottled with gravel and clay. The fill also contained chinking and pieces of wood.

Two large round posts, one small round post, and one horizontal plank were present in the trench. The two large posts were situated near either end of the trench and were 85 cm apart. They had diameters of 23 cm and 24 cm. The small post was situated along the west wall of the trench where it intersected the palisade trench. It had a diameter of 10 cm. The section of horizontal plank exposed was central to the two large posts and situated near the base of the trench.

Artifact Associations
No artifacts were recovered from this feature.

Discussion
This trench was associated with the early period fort, but its function is unknown. The posts could have served as supports for a large superstructure while the horizontal board was probably used as trench fill. Further excavation in the area could possibly clarify the purpose served by this feature.
Feature 67

Location and Orientation
This trench (Fig. 9) ran in an east to west direction from 1 m to at least 2.7 m east of the south end of the early period west palisade. It was dug through the east-west builder's trench (F.76).

Shape and Dimensions
This trench extended 1.6 m west of the eastern limit of excavation. It extended less than 50 cm more to the east. The trench had an average width of 20 cm and a depth of approximately 22 cm below the estimated occupation level.

Stratigraphy
The trench fill consisted of medium to dark brown silty clay loam mottled with black silt, ash, white clay and small pieces of wood.

Artifact Associates
Two plain clay pipe stem fragments and 1 light green angular bottle fragment were recovered from this trench.

Discussion
This feature was probably associated with the late period fort. Although this trench is very shallow, it may have served as an interior separation between the southwest bastion and a late period structure.
Feature 76

Location and Orientation
This trench (Figs. 9, 88) ran north from the west end of either the early or late period south palisade to a point 13.5 m north of the early period south palisade. It paralleled the early and late period west palisades.

Shape and Dimensions
This trench varied in width from 35 cm to 90 cm and had a maximum depth of approximately 88 cm below the estimated occupation level.

Stratigraphy
The trench fill consisted of medium grey-brown silty clay mottled with black silt, ash and stones. A soil change divided the trench lengthwise into two halves, of which the west half was more mottled with black silt.

The trench contained three upright posts, two diagonally set round logs and numerous horizontal planks. One round post, 15 cm in diameter, was 2.4 m north of the early period south palisade. A longitudinally sectioned post, 20 cm wide and 10 cm thick, was 5.2 m north of the early period south palisade. Another longitudinally sectioned post, 13 cm wide and 7 cm thick, was set 11 m from the early period south palisade. The two diagonally set round logs were at a 25 degree angle from horizontal. One end of both logs had been sawn to a point. One was 70 cm long and 15 cm in diameter while the other was 100 cm long and 18 cm in diameter. The dimensions of the horizontal planks varied greatly. The diagonal logs and horizontal planks occurred in the section of trench just to the south of the middle upright post.
Artifact Associations
One chalcedony flake, 1 plain clay pipe bowl fragment, 3 nail fragments and 1 piece of window glass were found in the fill of this trench.

Discussion
It is uncertain whether this trench was associated with the early or late period fort. The function served by this feature is also uncertain. It may have been a builder's oversight or may have served as an interior fort separation.

The trench may originally have contained a series of posts, whose removal from the west side of the trench may have caused the variation in soils between the west and east half of the trench. The horizontal planks and diagonal logs within the trench probably served as fill or as support for upright posts.

Other Miscellaneous Features

Twenty-five features (Fig. 9) were exposed which were neither pits, postholes nor trenches. These features were shallow deposits of one or more of the following materials: ash, charcoal, wood, chinking, stones, humus, clay, silt and loam. The major components of the deposits usually consisted of ash, charcoal or wood rather than soil. They varied in size from 35 cm by 30 cm to greater than 5.9 m by 2.6 m. These features were not confined to a specific area, and occurred both within and outside of the palisade. Although a few could be identified as being associated with either the early or late period fort, most could have been associated with either phase. The deposits varied considerably with regard to the amount of bone and number of artifacts recovered.

Two of these features differed from the rest with respect to size or fill characteristics. One (F.72) was spread over a large area and
contained a relatively large amount of bone and artifacts of 19th century origin. The other (F.123) was capped with stones and may have been the remains of a fireplace base.

The former deposit (F.72) was not completely exposed, the exposed portion having measured 5.9 m (N-S) by 2.6 m (E-W). It extended to a depth of approximately 21 cm below the estimated occupation level. It was cut through by the late period west palisade trench and was apparently associated with the early period fort. The deposit consisted mostly of ash and loam, but also contained charcoal, stones, a concentration of wood, and a large number of bone fragments and artifacts. The deposit was probably refuse from the early period fort.

The latter deposit (F.123) measured 76 cm (N-S) by 40 cm (E-W) and was somewhat rectangular in shape. The feature was not completely excavated but appeared to consist of grey silty clay mottled with white ash, and covered with rounded stones varying in diameter from 4 cm to 20 cm. This feature may have been associated with either the early or late period fort, although it was located outside the early period enclosure.

Descriptions of these and other miscellaneous features are summarized in chart form (See Table 7).

Artifacts

A wide range of artifact types is present in the site 15R collection. The artifacts are primarily of metal, stone, ceramic, glass, bone and antler. They include weaponry, tools, trade goods, household and personal effects and structural materials. They are primarily of British, European, American, local or native origin.

The artifacts are arranged by context of utilization: Craft or Activity; Household; Personal; Structural, and Miscellaneous. Admittedly, some artifacts do not readily fit into any of the contexts provided, while
others could have been put under either of two or more contexts.

Our method of describing the site 15R artifacts is based partly on a methodology or analytical approach developed by Stone in regards to Fort Michilimackinac (Stone 1974). We have attempted to use his formal classification where appropriate. Stone describes formal classification as follows:

This approach . . . is called, for convenience, formal classification, which is defined as the hierarchical ranking of formal properties on the basis of their relative importance. Formal properties are the physical attributes of artifacts which result from different methods or techniques of manufacture or use, such as form, shape, color, material, and so on. Relative attribute importance . . . refers to ranked differences in attribute significance as distinguished during manufacture or use (Stone 1974: 19).

As with Stone, the terms Class, Series, Type and Variety are used in descending order of importance. The term Category is used to distinguish those artifacts which are incomplete and/or do not exhibit all physical properties necessary for formal classification. These terms are abbreviated in this report as in the following example: CISATIVa, Cat. 1. This example represents the first class, series, type, variety and category of a group of artifacts.

Many artifacts are described non-formally. These non-formal descriptions are applied to groups of artifacts with few individual specimens, and to those which have little or no significant variations between specimens. In the case of glass beads, a classification system developed by Kidd and Kidd (1970) and used by other material culture researchers was adopted.

A total of 18,835 artifacts were found at site 15R. This total does not include chinking, pigments, clinkers, sealing wax or window putty. Of this total, 6.48 per cent were included in the craft or activity context of utilization, 12.6 per cent in the household context of utilization, 35.71 per cent in the personal context of utilization (14.54 per cent were glass beads), 44.86 per cent in the structural context of utilization, and 0.35 per cent in miscellaneous or unidentified contexts of utilization.
Craft or Activity Context of Utilization
Subdivisions within The Craft or Activity Context of Utilization include
the Acquisition of Subsistence Resources, Commercial, Measuring, Skills or
Crafts, Transportation and Miscellaneous.

Acquisition of Subsistence Resources

Gunflints
A total of 88 gunflints were represented in the site 15R artifact
collection. Forty-eight of these were identifiable as to type and variety.
Most of these showed evidence of relatively heavy use and many were burnt.

Gunflints are generally described by the following terms: the bed,
the bottom face; the face, the top face; the edge or front bevel, the
tapered end which strikes the frizzen; the back or heel, the end opposite
the front bevel. Some gunflints are bevelled at both ends and are said to
have both front and back bevels. The gunflints recovered from site 15R are
categorized as follows.

Type 1. Blade gunflints - English type. Type 1 is characterized by a
transverse flake scar or scars on the upper surface of the gunflint. The
bed is nearly flat.

Variety a. Bevelled edge and back; flat face; squared heel (Fig.
90a,b). There are 15 specimens of this variety. Variety a has three
transverse flake scars on the upper surface. The centre scar, or face, is
parallel to the bed. The other two flake scars form front and back bevels.
The size of these flake scars relative to each other varies considerably.

The site 15R specimens of this variety range in colour from grey and
mottled grey to black. Dimensions of the more complete specimens of this
variety are: length, 21 mm to 31.1 mm, average 27.6 mm; width, 19.3 mm to
27.2 mm, average 22.9 mm; thickness, 5.7 mm to 10.7 mm, average 8.2 mm.

Variety b. Bevelled edge; flat face; no back flake; squared heel
(Figs. 90 c-g). There are 32 specimens of this variety. They have two
transverse flake scars on the upper surface. The face flake scar is
normally parallel to the bed. The second flake scar forms the front bevel.

The gunflints of this variety range in colour from light grey to black. The dimensions of the more complete specimens are: length, 16.6 mm to 29.3 mm, average 24 mm; width, 13.5 mm to 23.4 mm, average 19.2 mm; thickness, 4.5 mm to 9 mm, average 6.9 mm.

Variety c. Bevelled edge and back; no face; squared heel (Fig. 90h). There is one specimen of this variety. It has two transverse flake scars on the upper surface which form a front and a back bevel. This dark grey specimen is complete and measures 20.3 mm long, 19.2 mm wide and 5.6 mm thick.

Gunflints. Category 1. This category includes gunflints which cannot be identified as to variety and/or type. Most of the 40 specimens represented, however, appear to be fragments of blade gunflints. No spall type gunflints were identified. The colouring of these specimens ranged from grey to black.

Discussion. The source of gunflints recovered from the site is probably England. Black flint, worked into blade type gunflints with squared heels, has generally been associated with the English industry. All specimens from site 15R match this description, except that the colour of the flint varies from black to medium grey. Noel Hume (1972) states that English gunflints became the exclusive types sold by American and British western traders in the first half of the nineteenth century. The type of gunflint recovered from site 15R, then, supports the historically derived dates of occupation, 1835-1861.

Gunflints were recovered from most of the areas excavated, although approximately 30 per cent were from suboperations which included a portion of Structure 1.

Lead Ammunition.

Lead Ammunition forms a single series made up of two types: balls and shot.

Type 1. Balls, diameter greater than 10 mm (0.40 in.) (Figs. 91 d-f). Seven balls were recovered from site 15R. Two relatively small balls are slightly oblong in shape and have maximum diameters of 10.2 mm. One ball
has a diameter of 13.5 mm (0.53 in.) while three range in diameter from 14.4 mm to 14.7 mm (0.57 in. to 0.58 in.). Another ball is spent.

Type 2. Shot, diameter of 10 mm (0.40 in) or less (Figs. 91 a-c). One hundred and five pieces of shot were recovered from site 15R. Ninety-eight of these range in diameter from 3.4 mm to 5.6 mm (0.13 in. to 0.22 in.). Five specimens range in diameter from 2.6 mm to 3 mm (0.10 in. to 0.12 in.) and one has a diameter of 6.5 mm (0.26 in.).

Discussion. Lead ammunition was scattered throughout most of the excavated areas but was concentrated in three locations. Thirty percent were recovered from a late period pit, feature 8. Twenty-three percent were recovered from contexts associated with Structure 1. Fourteen percent were recovered from a fibrous wood layer of a late period pit, feature 1.

Non-Formal Descriptions

Cap Square Key. One cap square key (Fig. 92a), used to lock the cap square onto a cannon carriage, was recovered. A cap square is a curved strap which fits over a cannon trunnion. When locked in place with a key, the cap square serves to hold the cannon on the carriage. The cap square key that was recovered is a flat iron P-shaped object which has an incomplete length of 6.46 cm. The shank portion averages 1.4 cm wide while the rounded end is 2.36 cm wide. The object has an average thickness of 4 mm. A chain is attached to the key by means of a hole in the key's rounded end. Each of four links are forged into a figure 8-shape and average 3.8 cm in length. The cap square key was recovered from a disturbed context in the southwest corner of the fort.

Cartridge Case. One 12 gauge brass cartridge case (Fig. 91h) of pinfire type was recovered. It is 21 mm in diameter and has a depth of 5.7 mm. A single hole along the edge would have held the firing pin. The pinfire cartridge was invented in 1836 by M. LeFaucheux of Paris. It was "probably the first self-exploding cartridge to enjoy general use. His first cartridge was a cardboard and brass combination, not unlike the modern shotgun shell" (Logan 1959: 4). The head of the cartridge case is stamped, 'E2', referring to the gauge and maker, probably the Eley brothers of London. The cartridge case was recovered from disturbed contexts near the
west gates of the forts.

**Gun Parts.** Fourteen gunparts were recovered from site 15R. These consist mostly of lock components but also include a probable pistol butt plate and ramrod guide. Some of the lock pieces are components of flintlocks, while others may have originated from either flintlocks or percussion type firearms.

Butt Plate. One thin round brass plate (Fig. 92b), 3.3 cm in diameter, is probably the butt plate of a pistol. The edges of the plate are crimped under. The centre portion of the plate is missing.

Cock. One gooseneck-shaped iron cock (Fig. 92c) from a flintlock gun was recovered. It has a flat base and a comb with a plano-convex cross-section. It has a length of 6.9 cm.

Jaw. One iron top jaw (Fig. 92d) from a flintlock pistol is 19.9 mm long, 15.2 mm wide and 4.5 mm thick.

Ramrod guide. One brass tang fragment (Fig. 92e) of a ramrod guide has an incomplete length of 36.9 mm and width of 13.5 mm.

Mainsprings. Four iron mainsprings (Fig. 92f,g) were recovered, only one of which is complete. The complete specimen has a length of 8.2 cm and a width of 1.2 cm. The end of the long arm is semi-circular in outline, while the end of the short arm has a solid projection extending perpendicularly from it. Two other specimens appear to have been similar in form, except that the projection on the end of the smaller arm contains a hole. The fourth mainspring is a fragment consisting only of the juncture area of the two arms.

Sears. The lengths of the two arms of these iron sears (Fig. 92h) are as follows; the length of the arm containing the screw hole is given first: 23.8 mm and 22 mm; 27 mm and 23.6 mm; 30 mm and 32.3 mm.

Side Screw. One incomplete side screw (Fig. 92i) has a length of 45 mm, a shank diameter of 4.5 mm and a head diameter of 9 mm. The head is slotted.

Trigger Plate. One fragment of an iron trigger plate (Fig. 92j) was recovered. One end contains a screw hole. The opposite end is broken. The trigger plate has an incomplete length of 4.05 cm and a width of 13.5 mm.

Tumbler. One iron tumbler (Fig. 92k) is 26.4 mm long and 18.2 mm wide. The axle projects only on one side of the tumbler.
Discussion. While at least some of the gun parts recovered are from
flintlock guns, none can definitely be ascribed to percussion weapons.
Flintlocks were nearly obsolete by 1850, although they continued to be
manufactured until at least 1870 (Gooding 1951: 31). Their period of use
probably extended somewhat later at frontier posts such as Rocky Mountain
House.

These gun parts were recovered from both early and late period
contexts. Closed contexts from which they were recovered include an early
period pit (F.20), two early or late period pits (F.86 and F.98), an
exterior pit (F.128) and the occupation level of Structure 1.

Knives, Folding. Six folding knives and fragments of folding knives were
recovered from site 15R.

One nearly complete knife has a composite handle of brass and shell
(Fig. 93a). Four brass bolsters and a shell covering are riveted to brass
bolster linings. The blade and spring are of ferrous metal. The back of
the blade is flat, while the tip appears to be sheepfoot-shaped. The
bolsters are decorated with raised bands running the width of the handle,
dividing the bolster into panels. The panels nearest the ends of the
handle are decorated with incised lines diverging from a central point.
The complete length of the handle is 4.92 cm. This specimen was recovered
from a fibrous wood layer of a late period pit, feature 1.

Two other knives appear to be complete except for coverings which
would have been riveted to the handles (Fig. 93b). The knives are identical
except that one is slightly shorter than the other. The portions of the
knives that remain are of ferrous metal. Each specimen has two bolster
linings, one blade, one spring, two bolsters and eight rivets. The
bolsters are at the pivoting ends of the handles. The tips of the blades
appear to be spear-shaped and their backs appear to be flat. The lengths
of the handles are 10.13 cm and 10.5 cm. The blade of each knife contains
the trademark WARRAN. These were recovered from a late period pit (F.8)
and from the fill of the early period west palisade trench. The portion of
trench from which the latter was recovered had been disturbed during the
late period. That is, the palisade posts of this section had been pulled
out of the trench.

A fourth folding knife consists of a ferrous spring, bolster, portions
of two bolster linings and a blade (Fig. 93c). At least three rivets on
each bolster lining would have served to attach a covering on each side of the handle. Bolsters were attached only to the pivoting end of the handle. The single bolster which remains has a raised ridge on its inner side. The complete length of the handle is 7.85 cm. This specimen was recovered from a disturbed context near Structure 1.

A fifth folding knife fragment consists only of a ferrous blade having a spear-shaped point, straight edge, and straight back (Fig. 93d). It has an incomplete length of 7.88 cm. This was recovered from an ash deposit (F.31) associated with Structure 1.

The remaining folding knife fragment is a heavily corroded ferrous blade. It appears to have had a spear-shaped point, straight edge and straight back. It has an incomplete length of 6.37 cm and was recovered from a disturbed context near Structure 1.

Lithic Tools. Sixty-two lithic tools and lithic tool fragments were recovered. They include three chipped stone tools, one core, 50 raw or unretouched flakes, one retouched flake, two unchipped tools and four unchipped pieces of detritus.

Chipped Stone Tools.

Gravers. Two gravers were recovered. These tools are defined as flakes with naturally sharp or modified projections or corners which could have served various functions such as incising-engraving, cutting or perforating.

Specimen 1 (15R15W16-1) — Retouched flake graver (Fig. 94a).
Material: Black chert
Form and Modifications: This specimen is a flake with the distal end unifacially retouched to produce a pointed bit.
Dimensions: Length - 20.4 mm
Width - 15.5 mm
Thickness - 6.6 mm
Context: Possible prehistoric occupation layer situated directly above undisturbed soil in sub-operation 15R15W.

Specimen 2 (15R23F1-10) — Retouched flake graver (Fig. 94b).
Material: Brown and orange banded chalcedony.
Form and Modification: This flake has been bifacially retouched to produce a pointed bit.
Dimensions: Length - 18 mm  
Width - 14.6 mm  
Thickness - 4.1 mm  

Context: Disturbed cultivation layer along the late period west palisade, just outside the northwest corner of the early period fort.  

Biface. A single biface was recovered.  
Specimen 1 (15R14V3-40) Biface (Fig. 94c).  
Material: Black mudstone.  
Form and Modification: The sides of this specimen are straight and ovate. Its base is straight.  
Dimensions: Length - 25.8 mm  
Width - 22.3 mm  
Thickness - 6.7 mm  

Context: Structure 1.  
Core. One pink quartzite core (Fig. 94e) is triangular in cross-section and flaked along one side. It is 11.76 cm long, 4.58 cm wide and 4.15 cm thick. It was recovered from an ash deposit (F.31) associated with Structure 1.  

Raw Flakes. Fifty raw or unretouched flakes were recovered. The material includes pink, green-grey and medium grey quartzite, white, light brown and black chert, dark grey and black mudstone, brown and orange-banded chalcedony and grey limestone. Flakes recovered from closed contexts were mostly associated with a possible prehistoric occupation layer is sub-operation 15R15W. They were also recovered from an ash deposit (F.31) associated with Structure 1, the occupation of Structure 1, one early or late period feature (F.123), an early or late period interior separation (F.76) and an exterior pit (F.128).  

Retouched Flake. One retouched flake of red jasper was recovered. It was recovered from a disturbed context along the west palisades.  

Unchipped Stone Tools. This group includes stone objects which have been cut, ground or polished. Most of these appear to be detritus. One may have served as a tool sharpener and one as an abrader.  
Specimen 1 (15R25F1-17) Tool sharpener (Fig. 94d).  
Form and Modification: This fragment of grey limestone has been cut flat on one surface. This surface is incised with
numerous grooves caused by the pointing or repointing of perforating tools such as iron and bone awls.

Dimensions: Length - 37 mm  
Width - 29.7 mm  
Thickness - 19 mm

Context: Disturbed context at the northwest corner of the late period fort.

Specimen 2 (15R100A1-22) Abrader (Fig. 94f).

Form and Modification: This disk-shaped abrader of brown-grey, fine grained sandstone has been ground flat on both sides.

Dimensions: Diameter - 7.2 cm  
Thickness - 1.63 cm

Context: Disturbed 15R context.

Detritus or Tool Fragments. Four pieces of detritus or undiagnostic fragments of tools consist of green or grey limestone which has been cut on one or more surfaces. One specimen was recovered from a context associated with Structure 1.

Metal Projectile Points. Nineteen ferrous, one copper and one brass projectile points (Fig. 95) were recovered. All but one are triangular in form, shouldered and stemmed.

Thirteen complete stemmed triangular points (12 ferrous and one brass) have lengths varying from 2.4 to 5.3 times their widths. These range from 4.5 cm to 8.95 cm long and from 1.5 cm to 2.57 cm wide. Twelve ferrous specimens average 6.54 cm long and 2.01 cm wide. The stems of these points have an average maximum width of 9.1 mm. The angles formed by the stems and shoulders of these points generally approximate right angles, although the angles are obtuse on some specimens. The stems are generally tapered toward the point although some have parallel sides or a single deeply cut notch on each side. Many of the stems, whether tapered or parallel-sided, have one or more shallow notches cut into their sides. One of these ferrous points has excursive sides and a stem that tapers gradually from and is continuous with the sides of the point. This specimen is 4.88 cm long and 1.47 cm wide. The narrowest portion of the stem is 7.1 mm wide.
The single brass point is 5.35 cm long, 2.21 cm wide and has a stem width of 9.3 mm. The shoulders are obtuse and the stem is tapered and notched. The metal projectile points were recovered from widely scattered contexts. Percussion caps. Two copper percussion caps (Fig. 91g) were recovered. Guns fired by percussion caps were developed in 1816, but probably were not immediately adopted by western traders (Russell 1962: 242). Both of the caps recovered were associated with Structure 1.

Trap parts. Two trap pieces were recovered: a trap pan and a spring fragment (See also section Bolts, Thumb (iron trap jaw posts) p.122 and Fig. 98i).

Pan. The iron pan (Fig. 93e) is complete and consists of the pan itself and an arm which served to attach the pan to the pan post. The pan is rectangular, measuring 7.2 cm by 6.3 cm. The arm is 5 cm long and has a hole near one end through which the rivet of the pan post would have passed. A notch on one edge of the arm would have served to accept the dog when the trap was set. The trap pan was recovered from an early period pit, F.20.

Spring. One iron trap spring fragment (Fig. 93f) consists of a ring which would have held the jaws and a small portion of the spring shank. The ring is broken and bent but would have had a diameter of approximately 5 cm. The fragment has an incomplete length of 7 cm and was recovered from a possible early period pit, feature 113.

Commercial

Non-formal Descriptions

Bale Seal. One bale seal (Fig. 91i) consisting of two circular lead disks joined by a narrow band of lead was recovered. The two disks are further joined by means of a knob on one disk passing through a hole on the other disk; the knob was spread after passing through the hole. Lettering stamped on the perforated disk appears to read [ ] CKER* [ ] O [ ] NOT* ALS. The numbers 54/183 are crudely incised on the opposite disk. The disks have a diameter of approximately 28 mm. The bale seal was recovered
from a late period pit, feature 70.

Coin. One heavily worn copper coin (Fig. 91j) was recovered. Obverse and reverse designs are faint. No date is visible. The reverse design appears to be Britannia seated and the obverse may be the bust of George III. The coin has a diameter of 28.7 mm, and is probably a half penny of a type minted in 1806 and 1807 (See Craig 1966: 235). The coin was recovered from an early or late period pit, feature 77.

Measuring

Non-formal Descriptions

Weighing Stone (Fig. 96). One somewhat oval-shaped boulder, of green-grey medium-grained granite inscribed with the Roman numerals XXIII, was recovered. The numerals apparently refer to the weight of the stone, which is 10.3 kilograms or 22.8 pounds. A similar artifact, marked XI and weighing 11 pounds 2 ounces, was recovered from Pine Fort (Tottle 1976). They probably functioned as weighing stones. The stone recovered from site 15R was included as fill in the late period west gateway/palisade trench (F.93).

Skills or Crafts

Awls.

Eleven awls or awl fragments were recovered. All are ferrous. They are divided into two varieties according to the means by which the awl may be secured to a handle.

Variety a. Offset attachment (Fig. 98a,b). Six awls are of this variety. These are square to rectangular in cross-section with an offset centred
along the shaft. The awl tapers from the centre to a point at either end. One nearly complete awl has a length of 10.6 cm while another has a length of 7.6 cm. One probably had a length of approximately 8.5 cm. Three other incomplete awls probably had lengths approximating that of the larger specimen.

Variety b. Centre shaft attachment (Figs. 98c,d). These five awls are square in cross-section and taper to two points from a point of maximum thickness at the centre of the awl. On one 16 cm long specimen, one point has been flattened and folded over. These have lengths of 8.5 cm, 9.1 cm (incomplete), 12.4 cm (incomplete), 16 cm and 16.3 cm (incomplete).

Discussion. While most of the awls were recovered from disturbed contexts, all but one were recovered from either near the west gates or from the Structure 1 area. Of two awls from closed contexts, one offset awl was associated with the occupation of Structure 1, and one centre-shaft awl was associated with the fireplace (F.38) outside Structure 1.

Files
Thirty-one files or fragments of broken and/or reworked files were identified. These are divided into series based on cross-section. Teeth configuration and coarseness and overall file shape were often not identifiable due to breakage and corrosion.

Series A. Flat cross-section (Figs. 97a-e). Fifteen of 16 specimens of this series are fragments. Six have a single pointed tang and many have tapering sides. Fragments including heels have widths ranging from 12 mm to 19 mm. Another fragment has a maximum width of 24 mm. Most file faces appear to be single cut, while at least two fragments are double cut. The coarseness of most specimens is either second cut or bastard. Trademarks occur on the tang and heel sections of five specimens. Four appear to have been impressed with an identical trademark. This mark consists of the letters TL reading perpendicular to the long axis of the file at the heel-tang juncture. These letters are surmounted by a rose-like design. Reading parallel to the long axis of the file, just below the previously mentioned marks, are the letters LONLEY. One of these four specimens has the word CASTSTEEL impressed on the opposite side of the heel-tang and
reads parallel to the long axis of the file. A fifth specimen is also marked with the word CASTSTEEL. The opposite side of the heel-tang of this specimen is too corroded to determine if a trademark existed. Although most of the fragments recovered appear to have been broken from complete files, at least three fragments appear to have been cut or reshaped by hammering. This may indicate that some of the files were being reworked into other forms. The single complete specimen (Fig. 97e) is a double-tanged file with rounded heels. It is 13.2 cm long and has a maximum width of 9.3 mm. Teeth configuration and coarseness are not identifiable due to corrosion.

Series B. Flat cross-section with two rounded edges (Figs. 97f,g). Two file fragments of this series were recovered. The cross-section of these may originally have been quarter-round, but what would have been the rounded surface has been hammered flat. This flattening occurred after the teeth were formed. One fragment has parallel sides while the other has tapered sides. The parallel-sided fragment is 12.7 mm wide, while the other has a maximum width of 12.3 mm. The teeth of both specimens are single cut. The coarseness of the parallel-sided fragment is probably second cut, while that of the other specimen appears to be bastard on its sides and upper surface and second cut on its flat lower surface. Both fragments were apparently broken rather than cut.

Series C. Flat cross-section with swaged edges (Fig. 97h). The single specimen of this series has a single pointed tang and edges bevelled toward the upper surface. The upper surface and edges appear to have single cut teeth of smooth coarseness. The opposite surface is not cut. The fragment is 8.1 cm long (incomplete) and has a maximum width of 8.7 mm.

Series D. Quarter-round cross-section (Fig. 97i). The six files of this series are fragments. Five fragments have a single pointed tang and all have parallel sides. The maximum width of these fragments vary from 10 mm to 11.5 mm. The longest specimen has an incomplete length of 17.2 cm. All teeth are single cut and appear to be of second cut coarseness. One fragment has the word CASTSTEEL impressed lengthwise on the upper surface of the tang. Two other fragments have unreadable trademarks. Five specimens appear to have been broken from complete files while one appears to have been cut. The latter specimen has also been flattened on its sides and convex upper surface.
Series E. Half-round cross-section (Figs. 97j, l). One complete file and one fragment of a file of this series was recovered. The complete file has a single pointed tang and its sides are tapered. It is 24.6 cm long and 1.9 cm wide. The teeth are double cut and of bastard coarseness. The file fragment has a maximum width of 2.4 cm. Its teeth are single cut and of smooth coarseness. Both sides of one end of this fragment have been hammered inward and downward so that it has a slightly U-shaped cross-section.

Series F. Round cross-section (Figs. 97K, m). Four files of this series are represented. Two fragments include a single pointed tang. Three fragments appear to taper slightly. The fragments which include a tang have a maximum diameter of 5.7 mm and 11.2 mm. The larger specimen has a nearly complete length of 25.5 cm. The teeth of all specimens are single cut and appear to be of bastard coarseness. Three specimens appear to have been broken from complete files, while one appears to have been cut and slightly flattened at one end.

Discussion. Most of the files recovered from closed contexts were from Structure 1 or exterior pits (F. 128 and F.130). Files of series A were recovered from Structure 1 (5 specimens), an exterior pit (F.130, 3 specimens), and disturbed or mixed contexts (8 specimens).

Files of series B, C and E were recovered from disturbed contexts.

Files of series D were recovered from Structure 1 (2 specimens), a late period pit (F.70, one specimen), an exterior pit (F.128, one specimen), and the fill of the early period west palisade trench.

Files of series F were recovered from the exterior hearth (F.38) associated with Structure 1 (one specimen), an early period pit (F.20, one specimen), an exterior pit (F.128, one specimen), and from a disturbed context (one specimen).

Non-formal Descriptions

Axes. Three fragments of ferrous axe heads and one axe head wedge (Figs. 98e-h) were recovered. One head fragment consists of a poll welded to the strap which would have formed the sides and blade of the axe. Only a small portion of this strap remains. The poll is 7 cm long and 3 cm wide. A
second fragment is a riveted poll measuring 6.7 cm long, 3.9 cm wide and 1.4 cm thick. The third head fragment is a portion of the bit. The sides taper evenly from the curved edge of the bit. The axe head wedge is 4.2 cm long. It has a maximum width of 2.1 cm and a maximum thickness of 0.6 cm. It would have been driven into the end of an axe handle, serving to secure the handle in the eye of an axe head. The poll was recovered from Structure 1, the bit from an exterior pit (F.130) and the wedge from a disturbed context.

Blacksmith's Stock, Iron. Fifty-four pieces of square iron stock and eight pieces of round iron stock were recovered (Figs. 99a,b). The square iron stock consists of fragments of iron rods having square to slightly rectangular cross-sections. These rods range in size from 6.5 mm wide by 5.5 mm thick to 13.6 mm wide by 13.2 mm thick, averaging 9.5 mm square. The round iron stock consists of fragments of iron rods having round cross-sections. These range in diameter from 5 mm to 17 mm, and average 10.25 mm. Iron stock was recovered from most areas of the fort that were excavated. Approximately 25 percent of the fragments recovered, however, were from disturbed contexts near the west gates.

Bolts, Thumb. Two "butterfly" thumb bolts were recovered. One consists of a large tapered heart-shaped head and a short threaded shank (Fig. 98i). The other is incomplete and consists of the head portion only. The complete specimen has a maximum head width of 27.8 mm and depth of 23.4 mm. The shank may or may not be complete. It has a length of 8 mm and a diameter of 8 mm. The incomplete specimen has similar head dimensions. The single specimen from a closed context was recovered from an early or late period pit (F.86). These are likely jaw posts from traps.

Bundling Straps. Two "bundling straps", one of flat iron strapping (Fig. 99d) and one of square iron stock (Fig. 99e), were recovered. The ends of the former have been welded together to form an oval-shaped strap having a maximum dimension of 10.2 cm. The ends of the latter have been hooked together to form an oval-shaped strap having a maximum diameter of 10 cm. The former may have been meant to hold flat pieces of blacksmith's metal stock, while the latter may have held round or square pieces of stock. The specimen composed of flat iron strapping was recovered from Structure 1. The other specimen was recovered from a disturbed context near Structure 1.

Chain Link. One incomplete iron chain link (Fig. 98j) would have had a
total length of approximately 45 mm and a width of 31.5 mm. It was recovered from a disturbed context along the west palisades.

Chisels. Two chisels were recovered. One is a large mortice chisel while the other is a small wood-carving chisel. The mortice chisel (Fig. 100e) consists of a tapered tang with a square cross-section, a square bolster tapering to a blade having a rectangular cross-section, and a straight cutting edge. It has a complete length of 19.2 cm, the bolster-blade portion being 12.1 cm long. The blade averages 8.5 mm wide and 6.5 mm thick, the cutting edge being 6.6 mm wide. The small wood-carving chisel (Fig. 100c) is 2.95 cm long and has a square cross-section. It consists of a tapered tang-blade section and a straight cutting edge. The edge is bevelled on both sides and is 3.5 mm wide. Both chisels would have been hafted to wooden handles. The large chisel was recovered from the cellar (F.26) of Structure 1, while the smaller one was recovered from the fill of a late period gallery support post (F.112) along the west palisade.

Crucible. One crucible fragment (Fig. 99c), probably used to hold molten metals, appears to be made from a mixture of clay and graphite. Graphite crucibles were first made in the early part of the 17th century by the Dutch. In 1827, Mr. Joseph Dixon began to make crucibles of graphite from New Hampshire and, beginning in 1828, he used imported graphite from Ceylon (Knight 1877: 652). The crucible fragment was recovered from a context relating to the occupation of Structure 1.

Drill Bits. Six drill bits were found. These consist of four boring bits, one turnscrew bit and one bit which has been refashioned to a chisel-like form. All have tapered square shanks with a single notch.

The four boring bits are straight bits with hollowed half-round bodies. The edge of one complete specimen (Fig. 100f) is slightly convex, 7.5 mm wide, and may have had a single notch at one end. The complete bit is 16.4 cm long and has a maximum shank width of 10 mm. The shanks of the other boring bits have maximum widths of 7.5 mm, 8.6 mm and 10.5 mm.

The turnscrew bit (Fig. 100g) has a complete length of 15 cm. Its shank has a maximum width of 10 mm. The body tapers from a maximum width of 9.9 mm to a minimum width of 7.7 mm.

The single bit which has been refashioned to a chisel-like form (Fig. 100d) is 10.1 cm long. Its shank has a maximum width of 9.5 mm. The chisel-like end has a width of 7.4 mm, and the opposite end appears to have
been flattened by means of hammer blows.

Of the drill bits recovered from closed contexts, three were associated with Structure 1. These included two boring bits and the turn-screw drill bit. The latter specimen was recovered from the cellar (F.26) of Structure 1.

Gimlets. One complete gimlet shank and two gimlet shank fragments were recovered. These ferrous shanks would have been attached to perpendicular wooden handles. Each shank has a round cross-section, screw-like spiral at the tip and gouge-like hollowing directly behind the spiral tip. The complete shank tapers sharply at the end opposite the spiral tip and is capped with a flat round brass head (Fig. 100a). The complete specimen is 7.1 cm long and has a diameter of 3.7 mm. The shank fragments have diameters of 3.5 mm and 4.2 mm. The more complete specimen has a length of 7 cm. The single gimlet recovered from a closed context is from an exterior pit (F.128).

Gouge. One gouge, (Fig. 100b) apparently fashioned from a round file, was recovered. The shank's cross-section is a somewhat rounded, four-to eight-sided polygon. The working end has been flattened on two opposite sides, and the tip is semi-circular in shape. The shank end has been slightly flattened perpendicular to the long axis of the object. The gouge has a total length of 8 cm. Its cutting edge is 5 mm wide. It was recovered from a context relating to the occupation of Structure 1.

Grindstone (Fig. 101). One-half of a grindstone of light brown sandstone was recovered. It has a maximum thickness of 9.5 cm and would have had a maximum diameter of approximately 23 cm. The grinding surface is slightly concave and slopes somewhat from one side to the other. The narrower side thus formed has shallow grooves running concentric to the grinding surface. Both sides have short linear grooves set at various angles. The grindstone was recovered from the fill of the late period west palisade trench, at the west gate (F.93).

Nut, Stationary. One ferrous stationary nut (Fig. 100i) was recovered. It consists of a square central section with a round threaded hole and two flanges, each with two non-threaded fastening holes. These flanges are set at an angle to the central section so that, when the nut is fastened to an object, the central section is set above the object to which it is fastened. This nut, in conjunction with a threaded rod, can serve to exert
a pulling force on whatever is attached to the opposite end of the rod. The nut is 7.21 cm long and 2.42 cm wide. The inner diameter of the threaded hole is 7.3 mm. The nut was recovered from a disturbed context near the west gate(s) of the fort(s).

Reinforcing Strap. One possible reinforcing strap (?) (Fig. 100h) for a tool, possibly a hammer, was recovered. It would have served to strengthen the attachment of the tool head to the handle. The strap recovered is incomplete. One end is broken while the other is rounded to a finished form. One side of the strap is flat, while the other is convex. A single screw or nail hole is present near the rounded end of the strap. The object is 18.5 mm wide and has an incomplete length of 9.8 cm. This strap was recovered from a context related to Structure 1.

Roves and Rivets. Ferrous and copper alloy rivets and roves (Figs. 102a-1) were recovered in the following quantities: 80 ferrous and 14 copper alloy roves; seven ferrous and one copper alloy rivet; ten ferrous rivets attached to ferrous roves; five ferrous rivets attached to copper alloy roves, and two copper alloy rivets attached to copper alloy roves. In addition to these, lesser numbers of ferrous and copper alloy washers and/or round roves were recovered (See Washers).

The roves treated here are all rectangular to diamond-shaped in outline, and contain a central perforation. These perforations are usually rectangular in shape, although some are round. It appears that, in most cases, the perforation was punched through the centre of the rove. In the case of some of the larger specimens, however, the hole appears to have been cut prior to use.

The ferrous rivets differ considerably from the copper alloy rivets. All ferrous rivets have square cross-sections while the copper alloy rivets have round cross-sections. All ferrous rivets have rose heads while two copper alloy rivets have flat round heads and one copper alloy rivet has a multifaceted round head.

The distance between the rivet head and rove is approximately 2 cm for five specimens, 2.8 cm for one specimen and 6.5 cm for one specimen. On at least three other specimens, the rove is attached near the head of the rivet, and may have functioned as a washer. Two of the latter three rivets are complete, but have not had the ends opposite the heads spread.

The vast majority of the roves and rivets recovered were from the
southeast portion of the fort, particularly in the area of Structure 1. Approximately 60 percent of all roves and rivets recovered were from suboperations which included portions of Structure 1. (Also See Strapping and Wire, Copper Alloy).

Saw Blades. Six saw blade fragments were recovered. All are ferrous. One appears to be the tip portion of a keyhole or compass saw blade and has a single row of teeth. It has a maximum width of 8 mm and a thickness of 1.3 mm. Another saw blade fragment (Fig. 103b) has two rows of teeth set on a 3 mm thick, 9 mm wide blade. Four other blade fragments share similar tooth patterns (Fig. 103c); each has a single row of large gullet teeth which alternate with respect to the side on which they are sharpened. All four fragments are also similar in that they have been cut along their untoothed edge, indicating that metal was being salvaged from the blades to be put to other uses. These fragments range from 1.8 mm to 2.5 mm thick. Of the saws recovered from closed contexts, two were associated with the occupation of Structure 1, the keyhole blade fragment was from the fill of an early period gallery support posthole (F.103) and one with gullet teeth was recovered from the overflow of the late period west palisade trench.

Saw Set. One ferrous saw set (Fig. 103d) was recovered. A saw set is a tool used for bending the teeth of a saw. Alternate saw teeth are bent in opposing directions so that wood does not clog the gaps between the teeth. The set recovered is a blade-shaped device containing four notches, one of which has been broken. The end of the handle is bent to form a loop at the end. Saw teeth inserted into a notch would have been bent by pressing on the handle of the tool. This saw set is 19.1 cm long and 3.8 cm wide. The tool handle has a maximum width of 8 mm. The saw set was recovered from a disturbed context near Structure 1.

Soldering Points (Figs. 103e-f). Two soldering points were recovered. They are identical, each consisting of a thick tapered square head and a relatively thin tapered square tang. The points of the head ends are rounded, probably as a result of use. The tangs probably would have been hafted to wooden handles. The points have lengths of 6.8 cm and 6.9 cm. Both points were recovered from disturbed contexts.

Tool Points, Miscellaneous (Figs. 103g-i). Three points, possibly used as soldering points or as points for use with a lathe, were recovered. They are similar in form, having square cross-sections and tapered to both ends
from a point of maximum thickness near one end. This tapering forms a relatively long tang and a short working end. The points vary considerably in size, having lengths of 30.2 mm, 61.4 mm and 79 mm. The two smaller specimens have sharp points and may have served as woodworking tools, possibly for use with a lathe. The largest specimen is relatively thick, has a rounded point, and may have served as a soldering point. Two specimens were recovered from closed contexts. The smaller specimen was recovered from a probably early period pit (F.113), while the 61.4 mm long specimen was recovered from a late period pit (F.8).

Tools and Building Hardware, Miscellaneous. A variety of miscellaneous tools or building hardware were not identifiable because of either their fragmentary condition, corrosion, or a lack of information regarding 19th century tools and building hardware. The items recovered are briefly described below and, in some cases, are tentatively identified. All objects are ferrous.

1) One possible awl fragment of centre-shaft attachment type (Fig. 104a).
2) Two possible awls consisting of a single sharp point and a flattened end (Figs. 104 b,c).
3) One possible awl consisting of a single sharp point and an expanded "tang" (Fig. 104d).
4) One miscellaneous object formed from a file consists of a long tapered pointed end opposite a somewhat oval-shaped end (Fig. 104e).
5) One miscellaneous object was formed from round iron stock. One end has been squared and tapered. The opposite end is flattened perpendicular to the long axis of the object. It may be a hand-wrought nail (Fig. 104f).
6) One possible reworked file consists of a single pointed tang and a blade with a rectangular cross-section, the end of which appears to have been somewhat flattened perpendicular to the long axis of the object (Fig. 104g).
7) One half of this object has a round cross-section while the other half has a square cross-section. Its ends appear to have been cut or broken (Fig. 104h).
8) One object consists of a long pointed tang or shank and a rectangular-shaped "head" containing a rectangular slot passing through its thickness (Fig. 104i).
9) One miscellaneous object is a ferrous rod, broken at one end and tapered at the opposite end to form a somewhat blunt chisel edge (Fig. 104j).

Washers and/or Round Roves. Twelve washers and/or round roves (Figs. 102m-q) were recovered. Six are copper alloy and six are ferrous. All vary from 13.5 mm to 20.8 mm in diameter. Two are fragmentary. Of the copper alloy specimens, five have a punched or cut round central perforation, and one has a cut square central perforation. Two of those with cut round perforations also have one edge of the perforation bevelled. Of the ferrous specimens, five have a punched or cut round central perforation, while one has a punched square central perforation. Seven of these washers or round roves were recovered from suboperations associated with Structure 1, and one from a late period pit (F.118).

Transportation

Non-formal Descriptions

Bridle Bit. One ferrous bridle bit (Fig. 105b) consists of a ring attached to the centre of a bar. The bit has a length of 14.4 cm and a width of 4.35 cm. It was recovered from a disturbed context near Structure 1.

Spur. One band of an iron spur was recovered (Fig. 105a). The band has a width of 1.4 cm and an incomplete length of 12 cm. There is a single perforation at one end. The spur fragment was recovered from an early period pit (F.20).
Non-formal Descriptions

Carved Antler. This category includes discard elements from antler cutting and carving activities, as well as artifacts which could not be identified as to function. Included in the former are two antler tine tips (Figs. 106h,i), two antler tine fragments and one slab from the base of an antler. The latter includes seven artifacts which are described below.

Specimen 1 (Fig. 106a)
Form and Modification: This incomplete object has been carved, incised, drilled and polished, and appears to represent a horse's head and neck. It may have functioned as a tool handle. Three holes are drilled through the neck portion of the object. Two are nearly parallel to each other, one near the head-neck juncture and one at the base of the neck. The third hole, also situated near the base of the neck, is perpendicular to these. The latter two holes are fitted with iron rivets, and the base of the neck has been worked so that there is a ridge around the circumference of the object at the point where the lower rivet passes through. This may have been done so that a metal ferrule or socketed tang could be fit on the object. While the two rivets may have helped to secure the tang of a metal tool, the hole at the head-neck juncture may have served as an attachment point for a thong from which the article may have been suspended.

Dimensions: The object is 10.54 cm long and has a maximum diameter of 21.8 mm.
Context: Early period west palisade Trench Fill.

Specimen 2 (Fig. 106b)
Form and Modification: This object appears to be a less elaborate and/or unfinished form of the previously described specimen. It is more crudely carved, less
polished, and contains fewer incised decorations. It is incomplete and contains only one drilled hole, situated at the head-neck juncture. One end appears to have been broken and subsequently cut.

Dimensions: The object is 15.5 cm long and has a maximum diameter of 21 mm.

Context: Exterior pit (F.130).

Specimen 3 (Fig. 106c)

Form and Modification: This section of antler tine has been cut flat on both ends. One conical hole has been drilled through one-third of the object's length. The surface of the object has been polished and decorated with small drilled holes, incised circles and incised lines running its circumference. The object is cracked along one side. The design appears to be incomplete, suggesting that the artifact may have been part of a larger object.

Dimensions: This specimen is 38.5 mm long and has a diameter of 25.8 mm.

Context: Structure 1 occupation.

Specimen 4 (Fig. 106d)

Form and Modification: One end of this burnt antler object is broken. The remainder is flat and triangular in shape. It has a sharp chisel-shaped point. Three shallow holes are drilled on one surface.

Dimensions: This specimen is 3.4 mm thick and has an incomplete length of 27 mm and width of 9 mm.

Context: Early or late period pit (F.86).

Specimen 5 (Fig. 106e)

Form and Modification: This cylindrically-shaped object is slightly tapered toward each end. Each end has also been cut at a sharp angle to produce a chisel-like point.

Dimensions: This object is 31.5 mm long and has a maximum diameter of 3.6 mm.
Context: Late period west palisade trench fill.

Specimen 6 (Fig. 106f)
Form and Modifications: This specimen is cylindrical in form and hollow. The hole passing through the object is wide except at one end, where it narrows abruptly. This object may have been used as a pendant, being hung by means of a knotted string.

Dimensions: This object is 16.5 mm long and has a maximum diameter of 12 mm.

Context: Occupation level in northeast corner of fort(s).

Specimen 7 (Fig. 106g)
Form and Modification: This specimen is cone-shaped. A hole passing through its centre tapers similarly. This object is similar to specimen 4 in that it may have been used as a pendant, being hung by means of a knotted string.

Dimensions: The artifact is 35 mm long. It has a maximum diameter of 17.5 mm, tapering to a least diameter of 10 mm at the opposite end.

Context: Disturbed context near west gate(s) of fort(s).

Carved Bone. One irregularly-shaped piece of carved bone was recovered (Fig. 106j). Three sides are broken and two are cut flat. One of the flat sides is decorated with a shallow drilled hole and portions of two incised concentric circles. The object has a maximum dimension of 15 mm. It was recovered from the fill of the late period west palisade trench.

Carved Stone. One piece of carved stone, not representing a tool, was recovered.

Specimen 1 (15R15W2-9) Bead or pipe-stem blank (not illustrated)
Form and Modification: This grey steatite cylindrical-shaped artifact appears to have been ground and polished. A shallow hole is drilled in the centre of one end.

Dimensions: Length - 23 mm
Diameter - 13.5 mm

Context: Ash pit (F.31) associated with Structure 1.
Clinkers. A number of clinkers, waste resulting from forging activities, were recovered. Most of these were from contexts related to the occupation of Structure 1. Others were recovered from the miscellaneous early period pit F.37, the trench fill of the late period west palisade, the upper levels of fill in the south palisade(s), and disturbed contexts along the south and west palisades and near an exterior pit (F.130). No clinkers were collected from the north half of the forts.

Lids and Modified Lids. Two tinned iron lids, one of which has been converted into a possible sieve, and two possible iron sieve fragments were recovered. One complete lid consists of four separate pieces: cover, rim, handle and handle attachment device (Fig. 107). The cover is round and has a diameter of 30.5 cm. The cover was cut radially and the two edges thereby formed were later crimped together. A 2.2 cm wide rim was similarly crimped to the bottom of the cover at its outer edge. An oval-shaped handle, 8 cm long and 4 cm wide is attached to the centre of the top of the lid. This handle is attached by means of a thin sheet of metal which was folded around one side of the handle and passed through a slit in the centre of the cover. The free ends of the sheet were then bent at right angles. The lid was recovered from an early or late period pit (F.37).

The second lid (Fig. 108) is similar in form to the one described above except that the cover is composed of two separate pieces crimped together, and that it has been modified by means of punching rectangular to oval-shaped holes through the cover. The cover has a diameter of 35 cm and the rim is 2.7 cm wide. The handle is 8 cm long and 4.1 cm wide. The handle attachment device appears to be tin. The lid was recovered from a probably late period pit (F.63).

The two possible sieve fragments recovered consist of thin iron sheets perforated with rectangular to oval-shaped holes. One fragment has a crimped edge. Both were found in disturbed contexts near the southeast bastion.

Metal Scrap. A total of 561 pieces of scrap metal were recovered from site 15R. Of this number, 76.29 percent were iron, 2.85 percent were tin- or zinc-plated iron, 16.58 percent were copper or copper alloy and 4.28 percent were lead.

Iron. Four-hundred and twenty-eight pieces of scrap iron were
recovered. Of these, 37.38 percent were from suboperations including a portion of Structure 1. Twenty-five (5.84 percent) fragments were from a single suboperation containing a miscellaneous pit, feature 1.

Copper or Copper Alloy. Ninety-three pieces of copper or copper alloy scrap were recovered. Of these, 36.56 percent were from suboperations including a portion of Structure 1. Five fragments (5.38 percent) were from a miscellaneous pit, feature 1.

Lead. Twenty-four pieces of lead scrap were recovered. Eight fragments (33.33 percent) were from suboperations including a portion of Structure 1.

Iron, Tin or Zinc-Plated. Sixteen tin- or zinc-plated iron fragments were recovered. Thirteen fragments were from suboperations including a portion of Structure 1.

Pigments. Miscellaneous lumps of coloured powdery, chaulky or greasy substances recovered from site 15R are classified as possible pigments. The following substances are included.

Vermillion, a known trade item, was used as a body paint and as a clothing dye. Large samples were recovered from a miscellaneous early period pit (F.20) and from the trench fill of the larger late period east gate (F.45).

One lump of a red rouge-like material was recovered from a context relating to the occupation of Structure 1, and two lumps were recovered from the Structure 1 cellar (F.26).

Small concentrations of a blue substance were recovered from a context relating to the occupation of Structure 1, a late period interior fort separation (F.102), and from the upper levels of the southeast bastion trench fill (early period).

A powdery bright green substance associated with a small piece of wood was recovered from a miscellaneous early period pit (F.20).

Swivel. One ferrous swivel (Fig. 106k) consists of a thin rod, the ends of which are bent parallel to each other. A perforated disk is attached to each end of the rod. The pin which would have passed through the holes of these disks are missing. The swivel is 3.9 cm long and 3 cm wide. It was recovered from a disturbed context just outside of the west gate(s).

Weight, Lead. One lead weight (Fig. 106l) is somewhat cone-shaped, but the tip of the cone has been flattened and is pierced by a single hole. The
weight has a maximum diameter of 30.5 mm and is 72.5 mm tall. It weighs 0.75 pounds (340 grams). The weight was recovered from a disturbed context along the south palisade(s).

**Wire.** Thirty-five pieces of copper alloy wire and eleven pieces of ferrous wire were recovered. The copper alloy wire fragments occur in five diameter sizes: 0.65 mm (13 specimens); 1.6 mm (11 specimens); 3.7 mm (2 specimens); 4.5 mm (3 specimens); and 5.6 mm (6 specimens). Four fragments having a diameter of 0.65 mm are coiled and may have been used as a finger ring. Specimens having diameters ranging from 3.7 mm to 5.6 mm may have been intended to be used as rivets since all but one were cut into short sections ranging in length from 1.6 cm to 4.25 cm. The eleven pieces of ferrous wire recovered range in diameter from 2.9 mm to 5.5 mm (average: 4.3 mm). Approximately 49 percent of the copper alloy wire recovered was from suboperations which included a portion of Structure 1.
Household Context of Utilization

Included in the Household Context of Utilization section are those artifacts associated with Furniture Hardware, Maintenance and Repair, the Preparation and Consumption of Food, and Storage.

Furniture Hardware

Non-Formal Descriptions

Bail Handles. Two bail handles were recovered. One consists of the handle proper with two attached staples (Fig. 109d). No backplate is present. The handle is oval-shaped with handle 'anchors' projecting perpendicular to it. It is 8.65 cm long and 4.55 cm wide. The staples have a length of approximately 3.8 cm. The second bail handle is not associated with either staples or a backplate (Fig. 109c). It is similar in form to that described above. It has a length of 8.8 cm and a width of approximately 4.2 cm. It differs somewhat from the former handle in that the handle 'anchors' are spaced more widely apart. In the former they are 1.7 cm apart, while they are 4.3 cm apart in the latter specimen. The handles probably would have been used with wooden chests. Staples attached to the handles would have passed through a back plate and the side of the chest, and would have been flattened on the inside of the chest in order to hold the handle in place. The handle 'anchors' would have served to keep the handle from lifting beyond a line perpendicular to the side of the chest. One handle was recovered from an early period pit (F.20), while the other was recovered from a disturbed context near the west gate(s).

Furniture Handle Plate. One round brass plate (Fig. 109b), probably for use with a bail-type handle, was recovered. It is round in outline, slightly domed and has a central rectangular perforation. Its face is decorated with a single circular groove. The object has a diameter of 3.04 cm. The plate probably would have been mounted with the furniture handle on the exterior of a drawer or small chest by means of a staple which would have passed through the central perforation of the plate. The plate thus served an ornamental as well as a reinforcing function. It was recovered
from a disturbed context outside of the palisade enclosures.

**Keys.** Two keys were found. One specimen has a total length of 5.85 cm (Fig. 109f). It has a hollow bow thickened on the side opposite the stem. The bow has a maximum dimension of 2.2 cm. The stem has parallel sides, and a circular cross-section. The bit (blade) end of the stem is hollow. There is a ring collar near the bow end of the stem, 20 mm from the bit. Three raised decorative rings are situated between the collar and the bow. The bit (blade) extends 10 cm from the stem and contains two wards (slots) opening toward the distal end of the key. Another key is relatively small, having a length of only 2.48 cm. (Fig. 109e). Its bow is also hollow and thickened on the side opposite the stem. The bow has a maximum dimension of 1.35 cm. The stem has parallel sides and a circular cross-section. The bit (blade) end of the stem is hollow. There is a ring collar near the middle of the stem, 3.5 mm from the bit. One raised ring is situated between the collar and the bow. The bit (blade) extends 3.5 mm from the stem and contains a single ward (slot) opening toward the distal end of the key. Both keys may have been used with furniture locks. The former key was recovered from an ash pit (F. 31) associated with Structure 1, while the other was found in a disturbed context just outside of the west gate(s).

**Lock.** One fragmentary furniture lock was recovered (Fig. 109g). The pieces consist of an iron main plate and top plate, a single-notch iron lock bolt, an iron pin or bolt which would have served to secure the cover plate, two semi-circular brass wards and a brass tumbler. An iron pin projecting from the main plate would have served to centre the key in the lock. The main plate and top plate were formed from a single piece of iron. The main plate measures more than 5 cm square while the top plate was at least 1.1 cm wide. The lock bolt consists of two pieces of iron: the bolt itself and a perpendicular piece serving as a stop. The lock bolt has a length of 5.3 cm and a width of 1.1 cm. Its perpendicular end piece is 3 cm long. The brass tumbler is incomplete. It consists of a rectangular plate with a perpendicular hollow cylindrical projection on one end and two flat projections, one of which is perpendicular to the rectangular plate, on the opposite end. The tumbler is 1.1 cm wide and was more than 2.5 cm long. The small size of this fastener suggests that it may
have served as a furniture lock. It was found in the cellar (F. 26) of Structure 1.

Upholstery - Tacks, Brass (Fig. 109a). Four brass tacks are represented in the site 15R collection. Only one is complete. It consists of a wide domed head soldered or welded to a thin sharp pointed shank. It has a length of 15 mm and a head diameter of 9.3 mm. The three other brass tacks are represented by domed heads ranging in diameter from 9.5 mm to 10.8 mm. Iron tacks were also represented in the site 15R collection (See Nails). The four tacks were recovered from a context associated with Structure 1, an early period ash deposit (F.72) the early period west palisade trench fill and a fibrous wood layer of a late period pit (F.1).

Maintenance and Repair

Needles

Twenty-nine needles were recovered. These needles are divided into two series based on the material of manufacture. Types are distinguished within series on the basis of needle form. Varieties are established within types according to needle shape (point cross-section).

Series A. Steel.

Type 1. Single pointed.

Variety a. Round point (Fig. 110a, b). Four specimens of this variety appeared. All have round-shaped eyes. The two complete needles of this variety have lengths of 36.7 mm and 47 mm.

Variety b. Triangular point (Fig. 110c, d). Nine specimens of this variety were recovered. All appear to have round-shaped eyes. The two complete needles of this variety have lengths of 40 mm and 44.5 mm.

Series A. Type 1. Category 1. There were six needle fragments recovered which consisted of the eye section only or of the eye and point, but with the point being unidentifiable because of corrosion. Five of these appear to have round-shaped eyes, while one has a slit-shaped eye.

Series A. Category 1. Nine shank, shank and point or other fragments
which could not be identified as to type because of corrosion were recovered. Three appear to have had at least one round point. One of these has an incomplete length of 58.8 mm.

Series B. Brass. One fragment (Fig. 110e) of what is probably a double pointed, centre-eyed 'snowshoe-netting' needle was recovered. The fragment consists of a single point and partial eye, which probably would have formed one-half of the needle. The fragment is 6.4 cm long, 6.5 mm wide and 3.5 mm thick.

Discussion. The varieties of needles recovered from Site 15R were also recovered from Rocky Mountain House sites 13R and 16R. Four round-pointed steel needles were recovered from site 13R, while one round-pointed, one triangular-pointed and three flattened triangular-pointed steel needles were found at Site 16R. Five centre-eyed 'snowshoe netting' needles as well as three end-eyed 'mat' needles and two notched end-eye 'mat' needles of bone were also recovered from site 16R.

Needles of SAT1Va recovered from site 15R were from contexts relating to the fireplace (F. 38) associated with Structure 1, the fill of the late period west palisade trench and the fill of the early period north palisade trench. Needles of SAT1Vb were also recovered from the fireplace (F.38) associated with Structure 1 (3 specimens). They were also associated directly with Structure 1 (2 specimens), with an ash deposit (F.31) related to Structure 1 (1 specimen), the overflow and fill of the early period west palisade trench (2 specimens), and an exterior pit (F.128, one specimen).

Pins
The forty-four pins from site 15R are brass. Many or all of these are silver-plated or tinned. Two types of pin are distinguished on the basis of the method used to form the head.

Type 1. Wire-wound head (Fig. 110f, g). The head of this type was formed from a piece of wire that was wrapped around the blunt end of the shank. The head was then anchored by means of a blow that spread the top of the shank (Noel Hume 1972: 254). Five specimens of this type were recovered. Three complete specimens had lengths of 26.7 mm, 30 mm and 34 mm (average - 30.2 mm).
Type 2. Stamped, solid head (Fig. 110h, i). The solid head of this type of pin was formed by stamping the blunt end of the shank (Noel Hume 1972: 254). Thirty-eight specimens of this type were represented. Thirty complete pins ranged in length from 27 mm to 34 mm (average = 29.9 mm).

Pins. Category 1. One brass pin shank fragment, not identifiable as to type, was recovered.

Discussion. Noel Hume (1972: 254) states that pins of type 1 continued to be made until the early 19th century, and that Lemuel W. Wright secured an English patent in 1824 to make pins of type 2. Thus at least 88 per cent of the pins recovered from site 15R post-date 1824. The pins recovered from Rocky Mountain House sites 16R and 13R differ considerably from those recovered from site 15R, in that the pins from the former sites were solely of type 1.

Of the pins recovered from closed contexts, three T1 pins were associated with Structure 1 and one was from the occupation level in the southwest corner of the fort. Pins of T2 were recovered from Structure 1 (9 specimens), the hearth (F.38) situated just outside Structure 1 (3 specimens), a late period pit (F.1) along the north palisade (14 specimens), a probable early period pit (F.113) at the northwest corner of the fort (2 specimens), the late period north and west palisade trench fills (2 specimens), the overflow of the early period west palisade trench (2 specimens), the occupation level in the northwest corner of the late period fort (1 specimen), and an exterior pit (F.129) to the west of the fort (2 specimens).

Non-Formal Descriptions

Scissors. One complete pair of ferrous metal scissors (Fig. 111b) was recovered. This pair has oval-shaped eyes, curved handle shafts and broad blades whose ends are cut at oblique angles. The rivet is set well below the point at which the handles branch. The scissors are 16.8 cm long. The blades have a maximum width of 1.9 cm, tapering to a width of 1.4 cm near the tip. The scissors were recovered from a late period pit (F.1).

Thimble. One brass thimble (Fig. 111a), with small round to oval-shaped impressions covering its upper half and four rouletted lines running the
circumference of its lower half, was recovered. The upper surface of the thimble is heavily worn, especially along one side. The thimble has tapered sides and a rounded top. It is 2.29 cm long. It was recovered from a disturbed context in the northeast corner of the late period fort.

Preparation and Consumption of Food

Bottle Glass and Tableglass
The glass sample from site 15R was limited since only a portion of the site has been excavated. The material is fragmentary. However, mending provided five partially complete bottles and two tumblers.

The bottle series is classified according to the form types of round-, square-, and polygon-sectioned; and fiddle-shaped. Varieties of bottle glass are determined by colour. Bottle finishes are described in a category.

The tableware series constitutes a smaller portion of the glass sample. The material is classified according to the form types of stemmed and unstemmed ware. The varieties are determined according to colour. The category, stoppers, is defined by function.

Miscellaneous bottle and tableglass form another group.

The colours included in the sample are olive green, light green, clear (lead or soda), amber, light blue and smoked. The colours are specified using the Munsell system.

The distribution of bottle glass and tableglass from undisturbed contexts is indicated on Table 9.

Series A: Bottles
Type 1: Round-Sectioned. Bottles of this type are characterized by a round cross-section.

Variety a. Dark olive green glass. Two hundred and ninety-one
fragments of this variety were recovered. Three relatively complete bottles (mended) were recovered from F.1. The first bottle (15R15L7-23) consists of 14 mended fragments (Fig. 112a). The following dimensions were recorded from this specimen: bottle height - 193 mm; bore diameter - 37.3 mm; lip height - minimum 8.6 mm, maximum 10.7 mm; lip diameter - 50.5 mm; neck diameter under finish - 42.5 mm; neck diameter at neck base - 48.5 mm; neck height including finish - 32 mm; body diameter at shoulder - 86.5 mm; body height - 133 mm; basal diameter - 85 mm; kick-up height - 36.5 mm; pontil mark diameter - 58 mm. The bottle is almost complete. It has a fairly wide mouth with a rounded lip which is uneven in height. Excess glass is present below the finish and the bore has been ground. The body is cylindrical, the shoulders rounded, and the neck cylindrical. The base has a rounded heel with some basal sag and a flat resting point. The kick-up is conical with a sand pontil mark. The second bottle (15R25L7-24) consists of 17 mended fragments (Fig. 112b). The following dimensions were recorded from this specimen: body height - 164 mm; basal diameter 79.3 mm; kick-up height - 33 mm; pontil mark diameter 52.1 mm. The finish, neck, and part of the shoulder and body are missing. The shoulder is rounded and the body cylindrical. The base has a rounded heel and the bottle is a rocker. The kick-up is of a rounded cone-shape with a sand pontil mark. The bottle shows wear at the body-shoulder juncture and around the heel and resting point. The bottle appears to be free blown. The third bottle (15R25L7-25) consists of 11 mended fragments (Fig. 112c). The following dimensions were recorded from this specimen: body height - 93 mm; basal diameter - 70 mm, kick-up height - 26 mm; pontil mark diameter - 46.1 mm. The finish, neck, and part of the shoulder and body are missing. The body is cylindrical and the shoulder rounded. The base has a rounded heel with basal sag and a continuous resting point. The bottle appears to be free-blown.

A mended portion of a bottle (15R22G8-2) from F.113 was recovered. The cross-mended sherds were from the sod/plough zone, inner north palisade trench fill and F.130. The following dimensions were recorded from this specimen: body height - 172 mm, basal diameter - 95.2 cm; kick-up height - 26 mm; pontil mark diameter - 63.2 mm. The glass of this bottle is thick, dark and almost a 'black glass'. Portions of the base, body and shoulder are present. The body is cylindrical with rounded shoulders. The base has
a rounded heel, continuous resting point and a parabolic kick-up with a sand pontil mark. There is a very slight basal sag. A horizontal mould mark is present. No vertical mould marks are visible.

A portion of the lower body of a bottle was recovered (15R24U4-1) from F.11 which cross-mends with sherds from F.8. The body diameter is 68 mm. The body is cylindrical. The base has a rounded heel with basal sag. The glass is slightly blistered.

A shoulder and upper body section recovered from F.11 may be associated with another bottle portion (15R24U4-1) from the same feature, although no mend was possible. This specimen had an estimated diameter of 70 mm. The body shape appears cylindrical and the shoulder is rounded. Seed bubbles appear in the glass.

Three other finish fragments were recovered. Two are probably from the same bottle. These finish fragments are slightly burned, giving them a fractured appearance (14R62B8-3). They have rounded lips and string rims formed by a lipping tool. Horizontal striations are visible on the finish. One (Fig. 113m) also shows a low ridge at the top of the lip around the bore. The total finish height for this specimen is 18.4 mm. A small amount of excess glass from finishing was present below the finish. The third specimen (15R19Y1-2) has a down-tooled lip and string rim. The finish has a small ridge around the bore at the top of the lip and a total finish height of 11 mm (Fig. 113n).

The remaining fragments included five base specimens and ten heel and/or resting point specimens.

The colours for this variety of glass are mainly 7.5Y 5/6 with some 10Y 4/4.

Olive green glass was found in features 1, 8-11, 15, 26, 31, 68, 70, 86, 113, 127-130; in the northeast and southeast corner areas of the fort; along the north portion of the east edge of the fort; above and from the occupation layer of Structure 1; the inner north, east, and west palisade trenches and the outer north and east palisade trenches.

Three of the partially mendable bottles (15R25L7-23, 24, 25) came from late period pit, F.1. Another (15R22G8-2) came from a late or early period pit, F.113 and another (15R24U4-1) from a late period pit F.11 which cross-mends with sherds from a late period pit, F.8. Features 9 (post/posthole), 15 (inner partition trench), 26 (cellar), 31 (dump), 70 (pit) are late
period features. Feature 10 (post/posthole) is an early period feature. Features 68, 86, 127, 128, 129 and 130 are pits which may be of the early or late period. The remainder were found in the disturbed cultivation layer.

Variety b. Light green glass. Ninety fragments were recovered from site 15R. There are no complete bottles. The fragments were recovered from features 1, 8, 38, 40, 86, 89, and 113; the southwest and northeast corner areas of the forts, rubble over Structure 1; and outer east and west palisade trench fills. Features 40 (and inner fort separation trench) and 89 (a gallery support post/posthole) date to the early period. Features 1 (pit), and 38 (fireplace) are late period features. Features 86 (pit) and 113 (pit) may be from the early and/or late period.

Variety c. Clear glass: lead. One hundred and six vial fragments are included in this variety. In the sample there are 14 finish fragments and 14 base fragments. Four partially complete vials allowed measurement of the diameters. The diameters were 2.54 mm to 2.58 mm, and 2.21 mm, 2.68 mm, and 2.29 mm to 2.35 mm. All vial bases showed rough pontil marks. The finishes had flat, flanged lips as shown in Fig. 113a (15R8W1-8). A minimum of 14 vials is represented (Fig. 113 b, c, d).

One slightly larger bottle base portion (15R25R2-4) was recovered. The base consists of 3 mended fragments with a resting point diameter of 34 mm. A pontil mark is present on the push-up. Seven other bottle fragments were recovered.

Glass of this variety was recovered from F.1, F.8, F.10, F.11, F.26, F.27, F.68, F.105, the northeast corner area of the fort, and the outer and inner north palisade trenches fill. Features 1 (pit), 8 (pit), 11 (pit), and 26 (cellar) are of the late period. Feature 10 (gallery support post/posthole) 27, (ash concentration), and 105 (posthole) are related to the early period. Feature 68 (pit) may be from the early or late period. The remainder was recovered from the cultivation layer.

Variety d. Clear glass: soda. Sixteen fragments of this variety were recovered. Four fragments are very thin and may be vial fragments. Nine fragments are from disturbed contexts. Fragments were recovered from features 1, 8, 68, 86, and 129; the southwest corner of the fort and along the northern portion of the east edge of the forts. Features 1 (pit) and 8
(pit) are from the late period of fort occupation. Features 68 (pit), 86 (pit), and 129 (pit) may be early and/or late period related.

Variety e. Amber glass. Thirty-nine fragments of amber glass were recovered. One sherd shows a mould seam. A few of the sherds show light petination. Thirty-seven of the fragments, 92.3 per cent of the sample, are from the disturbed plough zone. The majority of the sample was recovered from proveniences near the roadway ditch. However, it is difficult to determine how much of the material is recent. Two sherds were recovered from F.31 (a late period ash deposit east of Structure 1) and one sherd from the burned sod horizon. The colour of the fragments is an amber brown (2.5Y 7/10, 2.5 YR 4/6).

Variety f. Light blue glass. Twelve fragments of this variety were recovered. Eight were recovered from the disturbed cultivation layer and four from along the northern portion of the east edge of the fort. Several fragments are lightly petinated. The colour of the fragments is a light ice blue (2.5B 8/4).

Type 2. Square-Sectioned. Bottles of this type are characterized by a square cross-section.

Variety a. Clear glass: lead. Eight fragments of "Essence of Peppermint" bottles represent this variety. No complete specimens were recovered. Portions of the embossed words BY THE/KINGS PATENT/ESSENCE OF/PEPPERMINT are shown on the sherds. The fragments include one base and panel fragment and seven panel fragments. Three are slightly melted. The fragments are of lead glass suggesting they are of English manufacture (Griffenhagen and Young 1959: 168). Pirating of this bottle pattern and the medicine occurred widely in the United States especially after 1815. The medicine was produced from ca.1762, when it was patented, to the twentieth century.

One fragment recovered came from the inner west palisade trench fill and a second from along the west edge of the forts. The other six came from the cultivation layer.

Type 3. Fiddle-Shaped Bottles. Bottles of this type have a fiddle-shaped broadside outline.

Variety a. Clear glass: lead. Ten fragments of Robert Turlington's Balsam of Life bottles represent this variety. Five broadside panel fragments, one side panel fragment, and four base and broadside panel
fragments compose the sample. These show portions of the embossed lettering BY/THE/KINGS/ROYALL/PATENT/GRANTED/TO; ROBT./TURLI/NGTON/FOR HIS/INVENTED/BALSAM/OF/LIFF; JAN 26 1754; LONDON; on the front, back, and sides of the bottle. One specimen (1SR17G4-11) shows the single L spelling of ROYALL suggesting a copied specimen. The bottle design and medicine were widely pirated. The lead glass, however, does suggest the fragments were from English manufacturers. Six fragments were recovered from features 72, 77 and 98; the overflow of the outer west palisade trench fill; and from the occupation level of Structure 1. Four fragments were recovered from the cultivation zone.

Type 4. Polygon-Sectioned. This type consists of multi-faceted bottles. No complete or restorable specimens were recovered. Some corner angles are present measuring from 40 to 50 degrees. The cross-sectional shapes are not known. However, it is inferred that these have octagonal cross-sections.

Variety a. Light green glass. Ninety-six body and base fragments represent this variety. There were no neck or finish fragments associated with this material. However, some of the finish/neck fragments included in category 1 may belong to polygonal-sectioned bottles.

Fragments were recovered from features 8, 31, 67, 84, 86, 102, 103, 118 and 129; the rubble burn zone above Structure 1; the occupation layer of Structure 1; the northwest side of the hearth associated with Structure 1; the northeast corner of the fort; the inner west palisade trench fill; and the outer north, east and west palisade trench fills. Features 8 (pit), 31 (ash layer), 67 (miscellaneous trench), 84 (gallery support post/posthole), 102 (inner fort separation), and 118 (pit) are late period features. Feature 103 (gallery support post/posthole) dates to the fort's early period. Features 86 (pit) and 129 (refuse pit) may be early and/or late period features.

Variety b. Clear glass: lead. Two angular possible vial fragments were recovered from the cultivation zone.

Variety c. Clear glass: soda. Seven fragments of this variety were recovered. Five were from the disturbed cultivation layer. Fragments were also recovered from F.31 (ash layer) and from the southwest corner area of the fort. The glass is clear and transparent. Some fragments have a surface bloom.
Variety d. Light blue glass. One flat-faced fragment was recovered from along the northern segment of the east edge of the forts.

Variety e. Smoked glass: lead. One fragment of this variety was recovered. The fragment is from a corner with a 40 degree angle. The fragment came from F.86, a large early period pit.

Series A. Category 1. Finish Fragments. Nine light green glass finish fragments were recovered. These fragments cannot be identified as belonging to either round or polygonal sectioned bottles.

Two fragments from the northeast corner of the fort mend (15R23T2-19) to form part of the finish of a wide-necked bottle (Fig. 113e). The lip has a folded out form and is hand-tooled. The lip height is 8.86 - 12.15 mm, the orifice diameter is 49.94 mm, and the lip thickness is 5.03 - 5.52 mm. A shallow groove is present in the exterior lip crest. The glass is aqua green (7.5G 7/4) in colour and patinated. A small amount of extra glass shows below a portion of the flattened lip.

Another specimen (15R25L6-12) from F.1 has a folded out, hand-tooled lip (Fig. 113h). The lip height is 7.83 - 7.9 mm, and the lip thickness is 4.0 - 4.45 mm. The exterior lip crest has a shallow groove and the side is flattened. A small amount of extra glass shows below the finish. The glass is heavily patinated and is aqua green (5.0G 5/6). The lip is for a wide-necked bottle, but is not as large as the previously described specimen.

A third finish fragment (14R61B1-9) has a hand-tooled, flat, flanged lip (Fig. 113f). The fragment is from a relatively narrow-necked bottle with a bore diameter of 17.18 mm, lip diameter of 25.0 mm (max.) and lip height of 4.2 mm. Extra glass is present below the finish. Slight horizontal striations caused by the finishing tool are visible on the side of the finish. Spiralling striations are present on the shoulder and neck of the fragment. These may have been from the extension of the neck and/or the formation of the finish. The glass has a light bloom on the surface and is green (10GY 4/4) in colour.

A similar hand-tooled, flat, flanged lip finish fragment (15R24S4-20) from F.8 is present. This specimen (Fig. 113i) has horizontal striations on the lip and vertical striations on the neck. A small amount of extra glass is visible below the finish. The bore diameter is 17.
the lip diameter is 30.15 – 30.23 mm and the lip height is 5.7 – 6.2 mm. The colour is green (10GY 5/4).

The fifth finish fragment (15R8H6-1) from the inner west palisade trench fill is part of a wide mouthed bottle (Fig. 113g). The lip is flat and flanged in shape and was formed by bending out the lip to a horizontal position. The lip is 3.1 mm in height and 5.5 mm wide. The glass colour is green (10GY 4/4).

A portion of a bottle finish is formed by two mended fragments (Fig. 113j). The specimen (15R25L6-13) has a rounded lip and an adjacent rounded string rim. A narrow ridge 0.9 mm high, is present on the interior crest of the lip. The lip height is 6.8 mm. The total finish height is 13.45 mm. The lip shows horizontal striations from a finishing tool. The glass has bloom on the surface and is green in colour (10GY 5/4 - 6/4).

A portion of a finish fragment showing a rounded string rim and part of a rounded lip (15R24F1-11) was recovered. The glass is partly shattered. The string rim is 4 mm high. The finish may have been machine tooled for this narrow necked bottle. The glass is light green (10GY 6/4) in colour.

The ninth finish fragment has a rounded lip and a rounded string rim (15R23H1-14). The lip is 6.3 mm in height and the rim 5.45 mm for a total finish height of 11.75 mm. A small amount of excess glass is visible below the finish. A small ridge is present along the inner crest of the lip. The glass colour is light green (10GY 6/4). The glass is shattered.

Four of these fragments were recovered from F.1 (pit) and F.8 (pit) which are late period features. Two fragments were also recovered from the northeast corner of the forts. The remainder were from the cultivation layer.

Series B. Tableglass. This group consists of 123 fragments of clear lead glass.

Type 1. Stemware.

Variety a. Clear glass: lead. No stems or bowls were recovered. However, three fragments of plain feet were present. Two fragments are slightly melted.
Type 2. Unstemmed Ware.

Variety a. Tumbler. Two nearly complete tumblers were recovered from F.1. Twenty-six mended fragments form one tumbler (15R25L7-26) which is 8.95 cm in height, 6.7 cm in base diameter, 8.17 cm in exterior mouth diameter, and 7.78 cm in internal mouth diameter. The base is ground and polished. Also, the base is slightly concave with a flat resting point approximately 5 mm wide (Fig. 114a).

The second tumbler (15R25L7-27) is formed by 27 mended fragments. The height is 8.8 cm, the base diameter 6.85 cm, and the approximate exterior mouth diameter is 7.8 cm. The base is ground and polished creating a slightly concave surface with a flat resting point 4 mm to 6 mm wide (Fig. 114b). The glass of both tumblers has developed a slight bloom.

Seventy other tumbler fragments were recovered. These include 13 rim and three base fragments. Five fragments are slightly melted.

Seventy-eight fragments (63 per cent) of the total sample of 123 fragments came from F.1, a late period refuse pit. Fragments were also recovered from feature 118, a late period pit and from features 98, 113, 130 which may date to the early and/or late period of the fort. Fragments were also found in the outer north and west palisade trenches, the inner west palisade trench, and along the west edge of the forts.

Category 1. Stoppers. Two clear lead glass stoppers were recovered.

The first stopper (15R24S4-2) has a total height of 3.14 cm. The finial is 1.25 cm high, 1.55 cm wide, 0.8 cm thick and has a rounded rectangular broadside shape. The lower portion tapers from 1.4 cm to 1.3 cm in diameter and has a ground surface. The base has not been ground. A circular pontil mark is present on the base of the stopper (Fig. 115a).

The second stopper (15R24L7-28) is 3.6 cm in height. The finial is 1.5 cm high, 1.6 cm wide, 0.86 cm thick and has a rounded rectangular broadside outline with a slightly indented surface on one side. The lower portion has a ground surface and tapers from 1.56 cm to 1.37 cm in diameter. The base has been ground (Fig. 115b).

The stoppers may be from decanters or medicine bottles. Brown (1971: 125) indicates that prior to the mid-18th century decanter stoppers generally have pontil marks while later stoppers have been ground to remove the pontil mark.

The stoppers came from pit features 1 and 8. Both features date to
the late period fort. The presence of a possible pre-mid 18th century stopper (15R24S4-2) or the later form of stopper is consistent with the contexts represented.

Category 2. Miscellaneous Bottle Glass and Tableglass. This group includes those fragments which were not identifiable as to series.

Sixty-six thin, clear, lead glass fragments were recovered. These were too small to determine whether they were vial fragments or tableware. One fragment (15R23H4-4) shows a flat surface.

Twenty-nine fragments of bottle or tableware, clear, lead glass were recovered. These fragments were too small or non-diagnostic to clearly distinguish their function.

Ten other clear, lead glass fragments were found. These are possibly tumbler fragments or other tableware.

Three moulded, clear, lead glass fragments were present. The moulded pattern is a series of rounded, linear ridges. The fragments are probably from tableware.

One very small fragment of clear, lead glass having a small portion of an embossed letter was present. This may be a bottle fragment.

One small, light blue-green (5G 8/4), slightly melted fragment was present. It is possibly a bottle glass fragment and contains a small amount of lead. This is probably late-19th century glass.

Discussion. The site 15R glass sample has been described using shape and functional groups for the initial division of bottle and tableglass. Colour was used as a major subdivision.

Colours in glass are the result of material inclusions or intentional additions of material to colour or decolourize the glass. Iron produces greens and yellows, cobalt or copper - blues, carbon or nickel - browns, and chromium or copper - greens. Dark green bottles result from iron rich glass formed in a reducing atmosphere. Lighter greens and yellows can be produced in an oxidizing atmosphere.

The glass sample from site 15R shows few datable diagnostic features. However, some trends are known. Free blown bottles were produced into the first half of the 19th century. Moulds were reintroduced in the first quarter of the 18th century, becoming more common in the last half of the 19th century (Brown 1971: 103). Robert Turlington's Balsam of life bottles were originally produced using a hinged bottom mould circa 1762. Moulding
features were not visible on any of the site 15R specimens. It has been suggested that wide-mouthed bottles such as those represented in the site 15R sample may be apothecary bottles (Grimm 1970: 153) with an uncertain function, but the form suggests use for storage of solid or semi-solid items.

Folded foot rims on stemware became less popular about 1750-80. The site 15R specimens have a plain conical foot form. The tumblers show flat, ground, finished bases. These probably date to the 19th century.

Ceramics

A total of 1234 ceramics sherds was recovered. These included 43 stoneware, 13 porcelain, 1056 earthenware sherds and 77 burned sherds. Most of the sherds were recovered from disturbed contexts resulting from 20th century farming and road construction activities. The great majority of material was transfer-printed earthenware tableware objects. Three complete earthenware plates and one nearly complete plate were found. Any earthenware sherds not specifically referred to with respect to shape are tableware sherds too small or nonspecific to identify further.

The ceramics have been formally classified. Series groupings are established based upon ware type. Ware types are based upon differences in fabric, and varieties are divided by method of decoration. Each variety is mutually exclusive.

Many sherds are too small to allow determination of vessel shape, function, or pattern. Most of the miscellaneous plain sherds are probably associated with plain portions of patterned earthenwares. The unidentified plain earthenware sherds are too small to identify with certainty as to variety. Some earthenware sherds are burned too severely to be assigned to a variety and have been assigned a category. Unidentified plain and transfer-printed earthenware sherds are described in categories.
Series A. Stoneware. The 43 stoneware sherds recovered are all fine stoneware. The fabric is of two basic colours grey and buff the latter being the most prominent. Portions of two vessels of this type are mendable. When present, the glazes applied are salt-glazes with one exception - a buff sherd decorated with an off-white feldspathic glaze. The minimum number of vessels represented is 16.

Type 1. Fine stoneware: grey. Sherds of this type have a finely textured fabric medium grey in colour. They are salt-glazed, one having a slip.

Variety a. Brown salt-glazed (not illustrated). Only one sherd shows this glaze colour. It was applied to the exterior side. There is no glaze on the interior of this cylindrical container body sherd.

Variety b. Brown slip and salt-glazed (not illustrated). One sherd represents this variety. The slip and glaze were applied only to the exterior. The sherd is from the body of a cylindrical container.

Variety c. Light olive green salt-glazed and brown salt-glazed (not illustrated). Light olive green salt-glaze covers the exterior and a brown salt-glaze incompletely covers the interior. The two sherds representing this variety are from the body of a cylindrical container.

Variety d. Clear salt-glazed (not illustrated). This sherd is glazed only on the exterior side. It is a cylindrical container body sherd.

Variety e. Green-brown salt-glazed (not illustrated). This glaze was applied only to the exterior surface of the one sherd of this variety. There is no interior glaze. The sherd is from the body of a cylindrical container.

Type 2. Fine stoneware: buff. The generally buff colour of the fine fabric of this type varies slightly from cream to white-grey which has a speckled appearance from inclusions. The sherds are from cylindrical bodied vessels.

Variety a. Clear salt-glazed (not illustrated). This variety consists of 16 sherds, likely from one vessel. The clear salt-glaze has been applied to the exterior and interior of the vessel which had a cylindrical body 5.95 cm in diameter. The rim is rounded with the opening and neck diameters smaller than the body diameter. The neck is 0.6 cm high. The shoulder is rounded. A slight ridge marks the base of the neck.
and a shallow groove extends around the vessel 2.56 cm from the top. Portions of the rim, neck, shoulder, body and base were recovered.

Variety b. Clear salt-glazed with a brown glaze at the shoulder (not illustrated). The brown glaze fades to light pink on the body. The interior salt-glaze is clear. Eight sherds probably representing one vessel belong to this type. A slight ridge is present at the base of the neck and a shallow groove is located just below the shoulder. Portions of the shoulder and body were recovered.

Variety c. Thin clear salt-glazed exterior/off-white salt-glazed interior (not illustrated). The exterior glaze becomes light pink lower on the body. The fabric is cream-coloured. This variety is represented by one rim/shoulder sherd. The rim and shoulder are rounded.

Variety d. Very thin or no salt-glazed exterior/off-white salt-glazed interior (not illustrated). The fabric of this body sherd is cream-coloured.

Variety e. Light tan/grey salt-glazed exterior (not illustrated). The interior glaze is a thin light flesh pink. The fabric is a grey-white with black impurities. Two sherds from a cylindrical container represent this variety. One sherd is a base sherd. It shows a bevelled edge.

Variety f. Light tan salt-glazed exterior (not illustrated). The interior glaze is a thin light flesh pink. The fabric is a light buff colour. The variety is represented by 3 body sherds. One shows part of a bevel for the edge of the vessel base.

Variety g. Light tan salt-glazed exterior/white salt-glazed interior (not illustrated). The fabric is a light buff colour. One body sherd represents this variety.

Variety h. White salt-glazed exterior and interior (not illustrated). The fabric is a white-buff colour. The variety is represented by one jar rim sherd. The rim is squared with two grooves below the rim.

Variety i. Mottled light brown and grey salt-glazed exterior. The interior has a thin white salt-glace with possibly accidental pink additions. The fabric is a white buff colour. The variety is represented by three body sherds. One shows the beginning of a bevelled edge for a base.
Variety j. Buff-white glaze on exterior and interior. The fabric is a white buff colour. The variety is represented by one sherd. The body of this vessel meets a flat base at a right angle.

Series B: Porcelain. Porcelain types may be divided into hard-paste, soft-paste, bone china, and porcellaneous fabrics. All types except porcellaneous fabrics are represented in the collection of 13 sherds (not illustrated). The minimum number of vessels represented is 6.

Type 1. Hard paste. Sherds of this type are deep purple in colour under exposure to ultraviolet light. These porcelains generally consist of Chinese, European, Japanese or Oriental hard-paste. The site 15R material is probably European.

Variety a. Overglaze decoration. This variety is represented by two sherds having an unidentifiable blue and brown decoration. The exterior surface has moulded ridges. The sherds may be from a decorative object.

Variety b. Underglaze decoration. This variety is represented by one sherd. The decoration is a portion of a brown band.

Variety c. Plain. Two sherds represent this variety. One sherd is very thin.

Type 2. Soft-paste. Sherds of this type vary from light purple to ghost white and blue-pink when exposed to ultraviolet light. This type generally consists of British, Continental and Oriental soft-paste. The sherds recovered are probably British.

Variety a. Plain. Seven sherds compose this variety. Three sherds are thinner than the others and mend. One is a foot sherd and another a rim sherd. All appear to be tableware.

Type 3. Bone China. When exposed to ultraviolet light this material shows ghost-white to blue-white. The type is probably of British manufacture.

Variety a. Overglaze decoration. One sherd represents this variety. The decoration is a single gold band on the brim of what is possibly a plate. The pattern is called 'Sprig' (Sussman 1972).
Series C. Earthenware. Recovered sherds consist of fine earthenware of either buff or white fabric. Some of the material is plain but the great majority is transfer-printed. Twenty-five of the transfer-printed patterns are of 'Copeland' manufacture. Some of the patterns could not be recognized when an undiagnostic portion was visible or the sherd was burned. The presence or absence of a pattern could not always be determined on burned sherds. Arbitrary pattern numbers have been assigned to varieties without a known name.

Many of the plain and unidentified plain sherds probably represent undecorated portions of transfer-printed objects. The transfer-printed sherds are all from tableware. Ninety-one of these sherds are insufficiently burned to obscure the pattern.

The Spode/Copeland company was commissioned as a supplier to the Hudson's Bay Company for ceramic tableware and toiletware from late 1835-early 1836 to possibly the 20th century. Spode was the manufacturer from 1776 to 1833, Copeland and Garrett to 1847, W.T. Copeland to 1867, and W.T. Copeland and Sons into 20th century. Varieties f to dd and rr are Spode/Copeland patterns.

The distribution of earthenware is shown on Table 10. The minimum number of vessels represented is 57. For some varieties no vessel forms could be identified due to the fragmentary nature of the sherds.

Type 1. Fine earthenware: buff.

Variety a. Tooled pattern: gold-yellow glaze on interior (not illustrated). One sherd represents this variety. The common name for this fabric is 'yellow ware'. The interior of this specimen has a gold-yellow glaze. The exterior shows a series of parallel and perpendicular tooled linear grooves. The exterior surface is unglazed.

Variety b. Blue glazed (not illustrated). One sherd represents this variety. The fragment is a plain piece of a cup handle.

Type 2. Fine earthenware: white.

Variety a. Plain: clear/white glaze (not illustrated). Four sherds form a portion of the base of a cylindrical container. The footrim is 0.6 cm wide. The base diameter is 8.35 cm. A green mottling occurs in the interior glaze probably due to an accidental addition.

Variety b. Plain: clear glaze with pale yellow tint (Figs. 115, 120). Twenty-nine sherds were recovered. Twenty-five of these form a
complete plate (15R23G7-2) with a concave brim. The plate is 24.5 cm in diameter and 3.5 cm in height. The base/side juncture is distinct. The plate has a footrim. The trademark is impressed with COPELAND & GARRETT in a circle around LATE SPODE and the number 28 at the bottom.

Variety c. Plain: clear glaze with pale blue tint (not illustrated). Two sherds of this variety were recovered. One is a 'jar' rim sherd with a single groove just below the rim. The second is a base sherd from a cylindrical vessel with a flat foot.

Variety d. Plain: clear glaze with a grey tint (not illustrated). Three sherds of this variety were recovered. One is a rim sherd possibly from a plate which shows a decorative groove near the rim. These sherds appear to be vitrified earthenware 'ironstone'.

Variety e. Plain: clear glaze (Fig. 117). Nine sherds form a complete plate (15R25L7-22) 25.4 cm in diameter and 3.6 cm in height. The plate has a footrim.

Variety f. Transfer-printed: Alhambra (Fig. 123a). Twelve sherds were recovered of this W.T. Copeland pattern. It was registered June 30, 1848 and was manufactured until 1882. The pattern is printed in blue. Two sherds are slightly burned.

Variety g. Transfer-printed: B700 (Fig. 123b). No pattern name is available for this variety dated to circa 1838-67. Eighty sherds represent this variety which was manufactured by W.T. Copeland, and Copeland and Garrett. Portions of four trade marks are present all showing parts of marks reading 'Copeland' above 'Late Spode' printed in green. The pattern is in flow blue. Four sherds are slightly burned.

Variety h. Transfer-printed: B772 (Fig. 123d). No pattern name is associated with the variety. Two sherds represent this pattern. The manufacturers were Copeland and Garrett, and W.T. Copeland from circa 1839 to post-1882. The pattern is printed in blue.

Variety i. Transfer-printed: Botanical (Fig. 123e). Several different floral centres were used. The pattern dates from circa 1828 to post-1836 which includes part of the Spode period and part of the Copeland-Garrett period of manufacture. One sherd represents this pattern which is printed in blue.

Variety j. Transfer-printed: Bramble (Fig. 123f). The Copeland
pattern on the two sherds representing this variety dates to post-1847. The end date of manufacture is not known. The same centre is used in the pattern, Ivy. The pattern is printed in green.

Variety k. Transfer-printed: British Flowers (Fig. 123g). The dates for this Spode/Copeland pattern range from circa 1829 to the present. Twentieth century variation names are British Flowers, Bouquet, Marina, Mayflower and Royal Jasmine. A variety of floral centres were used. In the sample 37 sherds show this pattern in blue. At least two vessels, a mug and a plate, are represented.

Variety l. Transfer-printed: Broseley (Fig. 123h). This pattern dates from circa 1818 to post-1847. Fourteen sherds of this pattern were recovered. The pattern is printed in blue. This pattern was also produced by manufacturers other than Spode/Copeland and is similar to the Temple pattern which was produced by Spode/Copeland.

Variety m. Transfer-printed: Byron Groups or Byron Views (Fig. 123i). The same border design was used in both patterns. Byron Groups dates from circa 1833 to an unknown end date. It was introduced by Copeland and Garrett using the Warwick Groups centres. Byron Views dates from circa 1833 to 1868. This pattern was also introduced by Copeland and Garrett and manufactured also during the W.T. Copeland period. Three sherds of this variety were recovered with the pattern printed in green.

Variety n. Transfer-printed: Camilla (Figs. 118, 121). This pattern dates from circa 1833 to the present. It was introduced by Copeland and Garrett. Fourteen sherds were recovered. The pattern is printed in blue.

Five of these sherds form a complete dinner plate with the trademark COPELAND AND GAPJ3ETT/NEW BLANCHE printed in blue and a stamped impression reading the same. The plate (15R25L7-20) has a maximum diameter of 25.7 cm, base diameter of 13.9 cm, and height of 2.95 cm. The rim is slightly scalloped. The exterior side has two non-functional ridges outside the footring. The footring is similar to Sussman's (1972) type B - a ridge formed by indenting the base, variety IV - a single ridge formed by a flat depression, wedge-shaped.

Variety o. Transfer-printed: Chinese Gardens (Fig. 123j). This pattern has been recognized on five sherds and is printed in blue. It dates from circa 1834 to pre-1879 and was manufactured during the Copeland
period. The sherds mend and form part of a mug or bowl.

Variety p. Transfer-printed: Continental Views (Fig. 123k, l). Twenty-six sherds show this Copeland pattern. The registration date was October 21, 1845, however, the border was registered December 2, 1844 with the name Louis Quatorze. The pattern dates from 1845 to post-1882 and is printed in flow blue. Four sherds are slightly burned.

Variety q. Transfer-printed: Flower Vase (Fig. 123m). This pattern dates from circa 1828 to the 20th century. Two sherds show this pattern printed in flow blue.

Variety r. Transfer-printed: Fruit and Flowers (Fig. 123n). Three sherds represent this pattern. The pattern dates from circa 1826 to the 20th century and is printed in blue. The pattern was registered in 1882 and in 1884 with the name May.

Variety s. Transfer-printed: Geranium (Figs. 123o, p). Nine sherds of this pattern were recovered. It dates from circa 1818 to the 20th century and is printed in blue.

Variety t. Transfer-printed: Italian (Fig. 124a, b). This pattern dates from circa 1816 to the 20th century. Twenty-four sherds of this variety were recovered. The pattern is printed in blue.

Eighteen of the sherds are from a bowl or mug. The footring is similar to Sussman's (1972) type B, variety II. Part of a trademark is visible printed in blue CO[PELAND AND GARRE]TT+/[NEW B]LAN[CHE]. Four of the sherds are from a plate.

Variety u. Transfer-printed: Lily (Figs. 119, 212). The dates for this pattern are from circa 1837 to the 20th century. The border was registered in 1894 as part of a pattern named Chatsworth. Seventy-two sherds with this pattern were recovered printed in blue.

Four of these sherds form the major portion of a dinner plate (15R25L7-21) with a COPELAND AND GARRETT trademark printed in blue is present with the number 4 impressed in the centre of the plate. The rim of the plate is slightly scalloped. The plate measures 25.8 cm in diameter, 3.1 cm in height, and 14 cm in base diameter. The footring is similar to Sussman's (1972) type B, variety IV. The exterior side has two non-functional ridges outside the footring.

Variety v. Transfer-printed: Lotus (Fig. 124c). One sherd shows this pattern which is printed in red. The pattern was registered
December 20, 1850. The end date is not known. The sherd is slightly burned.

Variety w. Transfer-printed: Pagoda (Fig. 124d). This pattern dates from circa 1838 to post-1872. The same border was used on a pattern called Macaw. Twenty-seven sherds showing this pattern were recovered. The pattern is printed in blue or flow blue. Six sherds are slightly burned.

Variety x. Transfer-printed: Portland Vase (Fig. 124c). Two sherds show this pattern which dates from circa 1831 to post-1833. The pattern is printed in blue.

Variety y. Transfer-printed: Raphaellesque (Fig. 124f). This pattern was registered April 25, 1845 and was produced until at least 1872. The pattern may have been introduced as early as 1841 (Sussman 1979: 163). The pattern is printed in blue on the one sherd showing this pattern.

Variety z. Transfer-printed: Sardinia (Fig. 124g). Three sherds of this pattern were recovered. They are printed in blue or purple. The pattern was registered December 17, 1858. The end date is 1910.

Variety aa. Transfer-printed: Seasons (Fig. 124h). This pattern dates from circa 1835 to the 20th century. A large number of centre designs were used. One of the 17 sherds recovered shows a portion of the Italian Garden centre design or part of the Seasons Variation centre design. The pattern is printed in brown. A portion of a plate is represented which has footing similar to Sussman's (1972) a type B, variety II.

Variety bb. Transfer-printed: Shagreen (Fig. 124i, j, k). This pattern dates from circa 1834 to the 20th century. The 20th century name is Broth. Twenty-two sherds of this pattern printed in underglaze blue with hand-painted red, green, and yellow over-glaze designs (butterfly and floral) or printed in underglaze purple were recovered. Shagreen normally has only the circle design thus there is some question whether or not the blue design is true Shagreen.

Variety cc. Transfer-printed: Watteau (Fig. 124c). Fifteen sherds showing this pattern were recovered. It dates from pre-1847 to post 1861. The pattern is printed in blue. One sherd is slightly burned.

Variety dd. Transfer printed: Willow (Fig. 124m). This pattern is present on fifty-one sherds. It is printed in blue. The pattern dates
from the 1780s to the 20th century. Eight sherds are slightly burned. Other manufacturers produced variations of this pattern and Spode produced more than 12 Willow or Willow-type patterns. The pattern is also known to have been printed in brown (Collard 1962: 122).

Variety ee. Transfer-printed: Fibre (Fig. 125a). Twelve sherds showing this pattern were recovered. The print is in green. The manufacturer is unknown. Two sherds are slightly burned.

Variety ff. Transfer-printed: Foliage (Fig. 125b). Thirteen sherds show this pattern which is printed in blue. The sherds are from a mug or bowl. The manufacturer is unknown. One sherd is slightly burned.

Variety gg. Transfer-printed: Gem (Fig. 125c). This pattern is shown on one sherd and is printed in blue. It was manufactured by Sampson Bridgwood & Son of Longton Staffordshire. This pattern was also identified in the Lac La Loche material (Steer 1977).

Variety hh. Transfer-printed: Ionic (Fig. 125d). Five sherds show this pattern printed in blue. It was manufactured by Clementson and Young. This pattern was also identified in the Lower Fort Garry material (Sussman 1972).

Variety ii. Transfer-printed: Palmyra (Fig. 125e, f). Two sherds show this pattern. It is printed in blue. It was manufactured by Brownfield.

Variety jj. Transfer-printed: The Seasons (Fig. 125g, h). This pattern appeared on three sherds. It was manufactured by Sampson Bridgwood and Sons and is printed in blue. The pattern is found among the Lower Fort Garry material (Sussman 1972: 470, 157-58).

Variety kk. Transfer-printed: Swiss Cottage (Fig. 125i, j, k). Twenty-nine sherds of the variety were recovered. The pattern is printed in blue. The manufacturer is unknown.

Variety ll. Transfer-printed: Pattern 1 (Fig. 125 l) This unidentified pattern appears on one sherd. It is printed in green. The design is similar to Sussman's non-Copeland pattern 1. It has small flowers with dots between and scattered larger flowers which have an overglaze blue petals and yellow centres.

Variety mm. Transfer-printed: Pattern 2 (Fig. 125m). Eight sherds of this pattern were recovered. The pattern is printed in blue. A geometric star design is on the rim and inverted hearts circle the centre.
pattern. The pattern on the rim and centre is floral. The sherds appear to be from a bowl or deep saucer. The footring is similar to Sussman's (1972) type A - at right angles to the base, variety II - at the joint of the sides and base. Two wedge-shaped non-functional ridges are present on the exterior side.

Variety nn. Transfer-printed: Pattern 3 (Fig. 125n). Four sherds are probably part of a bowl. The pattern is floral and printed in blue. The footring is similar to Sussman's (1972) type A, variety II. Near the footring, on the base, the mark '2' is printed in blue. The exterior of the side is concave.

Variety oo. Transfer-printed: Pattern 4 (Fig. 126a, b). Five sherds with a pattern printed in light blue represent this variety. The pattern is a leaf and basket-work motif. The reverse side shows tree branches and part of a vase.

Variety pp. Transfer-printed: Pattern 5 (Fig. 126c). Six mug or cup sherds represent this variety. The pattern is floral near the rim. The reverse side shows trees and buildings. The pattern is printed in blue.

Variety qq. Transfer-printed: Pattern 6 (Fig. 126d, e). Thirty-three sherds show this pattern which is printed in blue. The pattern on the brim of several sherds shows a background of lines formed by stippling parallel to the rim. A plain vine curls around the brim with sprigs of flowers occurring occasionally along the vine. Five of the sherds are slightly burned. This pattern is very similar to F. Morley and Co. patterns showing Bartlett's view of the Chaudiene Bridge and Bartlett's Church at Point Levi (Collard 1967: 215, plates 28, 29).

Variety rr. Transfer-printed: Pattern 7 (Fig. 126f, g). Six sherds show this Spode/Copeland pattern. Along the rim a series of half circles is present. Around the centre pattern is a curvilinear design. The pattern on the brim appears to be a rural scene with fieldworkers, buildings and trees. The sherds appear to be from a plate. One sherd shows a hole drilled to allow repair to the plate. One sherd is slightly burned. This appears to be part of the Caramanian Series.

Variety ss. Transfer-printed: Pattern 8 (Fig. 126h, i). The eight sherds of this variety show a pattern in green-black which contributes a blue tint to the glaze. The solid portions of the pattern
are formed by cross hatching. The remainder of the pattern is a line design.

**Variety tt.** Transfer-printed: Pattern 9 (Fig. 126j, k, l). Thirty-two sherds of a large cup or small bowl 13 cm in diameter and a matching plate or saucer were recovered. Some sherds are burned. Two sherds have holes drilled through them indicating that mending of the plate or saucer was attempted. Part of a trademark of an unidentified manufacturer was present printed in black and reads [ ]J WA [ ]. The pattern is a vine and floral design. Ten sherds are slightly burned.

**Variety uu.** Transfer-printed: Pattern 10 (Fig. 126m). Ten sherds show a pattern printed in black which gives a purple tint to the glaze. The pattern has fine lines parallel to the rim with an interlocking vine design near the rim and flower groupings near the brink. The centre design is trees and buildings. A portion of a trademark printed in black is present on one sherd. This is very similar to F. Morley and Co.'s patterns showing Bartlett's view of the Chaudiene Bridge and Bartlett's Church at Point-Levi.

**Variety vv.** Transfer-printed: Pattern 11 (Fig. 126n, o, p). Fifteen sherds represent this variety. The pattern shows a geometric diamond design around the rim, an interlocking curled lines design around the centre which has a stylized floral design. A portion of a trademark was visible: [SEMI] CH[INA].

**Category A.** Fine earthenware: white. Plain unidentified. Two hundred and nine sherds were not identified as part of any other variety. Many may represent fragments from undecorated portions of transfer-printed vessels.

**Category B.** Transfer-printed: unidentified patterns. Two hundred and four sherds show small portions of transfer-printed designs which are insufficient to identify the pattern. The patterns are printed in blue. One of these sherds shows a portion of a trademark Opa[] printed in blue. Another sherd has the number 10 printed in blue. A third sherd has Rh[] printed in blue.

**Category C.** Fine earthenware: white, burned. Seventy-seven earthenware sherds had been burned sufficiently to obscure the presence of any design. Four sherds had a shiny black surface resulting from burning.

**Discussion.** Partial excavation of site 15R yielded a variety of ceramic
materials. In order of frequency they are transfer-printed earthenware, plain white earthenware, stoneware, porcelain and buff earthenware. Information with respect to the manufacturing dates, especially for transfer-printed earthenware, and cross-mends between lots provides additional data about specific features and occupation of the fort.

The Spode/Copeland transfer-printed earthenwares are the most datable. All dates from transfer-printed sherds fall within the 1835-61 occupation period of the fort for at least part of their period of manufacture. Several of the patterns are known to have been produced into the late 1880s and 20th century. Other manufacturers of transfer-printed ware recovered were Clementson and Young from Shelton, Hanley; Brownfield; and Sampson Bridgewood and Sons.

In comparison to Spode/Copeland transfer-printed, trademarked patterns from 20 other Hudson's Bay Company sites in Canada (Sussman 1972) those sites with similar dates of occupation have a similar range of patterns when compared with site 15R. Additional patterns would be expected upon complete excavation of the site.

Prior to Kane's visit in 1848 the fort had reached its final five-sided form which existed until 1861. This time span has been designated as the fort's late period of development. In order to supplement the dating of features from which ceramics were recovered the transfer-printed earthenware Spode/Copeland patterns recognized from site 15R are listed with their dates of manufacture, associated features, and period assignment (See Table 10). Conversely, for undated ceramics the feature associations indicate their period of use.

Those patterns not manufactured prior to 1848 were Alhambra, Lotus, and Gardinia. One feature, F.48, contained Alhambra patterned sherds which suggest that the pit is a late period feature. No other features could be more specifically assigned a date from their ceramic content.

Often the sherds were too small or non-diagnostic to determine vessel form. The stoneware sherds largely represent portions of cylindrical container vessels. The earthenware forms when identifiable were almost all tableware. Portions of plates, bowls or large cups, and mugs were identified most frequently.

Much of the site 15R material was recovered from the disturbed plough zone. Seven hundred and sixty-eight (61 per cent) of the 1234 sherds were from the disturbed cultivation layer.
Kettle and/or Pail Lugs

Seven kettle and/or pail lugs were found. Two are copper while six are iron. These have been classified into two types on the basis of lug structure. Varieties are defined by metal of manufacture and shape.

**Type 1. Rim lug.** Lugs of this type (Fig. 127a, b) consist of a single sheet of metal which has been doubled over at the middle. The sides of the folded sheet would have passed over the kettle or pail rim and have been riveted to its side. A hole punched through the centre of the top half of the lug would have received the bail end.

Variety a. Copper; rectangular. Two specimens represent this variety. Both are incomplete. One consists of the upper portion of the lug and includes the bail hole. The lug is 3 cm wide. The second specimen consists of the lower portion of one side of the lug. It contains two rivet holes. The lower corners are diagonally clipped. The lug is 5 cm wide.

**Type 2. Side lug.** Lugs of this type (Fig. 127c-h) consist of a single piece of metal riveted to the exterior of the kettle or pail directly below the rim. The upper portion of this type of lug contains a hole which receives the bail end.

Variety a. Iron; T-shaped. Specimens of this variety have their lower, wider portions attached to the top of the kettle or pail. The upper, narrower portions extend above the top of the kettle or pail.

Seven fragments of this variety were recovered. Three are from the lower portions of the lugs while four are from the upper portions. One of the lower lug fragments has squared corners and has a width of 5.4 cm. The others have rounded corners and widths of 3.8 cm and 5.4 cm. All have two rivet holes and two are curved to fit a round kettle or pail. The three upper lug fragments have rounded ends and sides, and range in width from 2.7 cm to 3.1 cm.

Discussion. Five lugs were recovered from closed contexts. These are all iron side lugs, and are associated with Structure 1 (3 specimens) or the fireplace (F.38) just outside the southeast corner of Structure 1 (2 specimens).
Non-Formal Descriptions

**Container, Metal.** One metal container fragment, possibly from a cast brass tumbler, was recovered from near the northwest corner of the late period fort. The complete object appears to have had incurvate sides with a minimum exterior diameter of approximately 3.7 cm. The fragment recovered has a maximum dimension of 21.7 mm and its thickness varies from 1.3 mm to 1.7 mm. One edge of the object exhibits a portion of a mould seam or decorative recess.

**Fork.** One composite fork (Fig. 128a) of ferrous metal and antler was recovered. The fork has three slightly curved prongs, one of which is broken. The shoulder is curved and has a ridge. The baluster-shaped stem has a round cross-section and includes a bolster. The handle consists of a full flat ferrous tang sandwiched between two pieces of antler which are riveted to the tang. The handle is decorated with cross-hatching and with incised lines running the length of the central portion of both sides of the handle. The end of the handle is capped with a piece of ferrous metal. The fork has a complete length of 20.6 cm. The width of the prong area is 1.9 cm. The fork was found in the fill of the early period north palisade trench.

**Leg, Pot or Stove.** One iron pot or stove leg (Fig. 129a) was recovered. It has a semi-circular cross-section and tapers from a maximum thickness of 31 mm to a minimum thickness of 17 mm. The thicker end appears to have been attached to the pot or stove, while the narrower end would have served as a resting surface. The leg is 8 cm long. The leg was associated with the hearth (F.38) located outside the southeast corner of Structure 1.

**Pot.** One probable iron pot fragment (Fig. 129b) is a portion of the rim and is from a pot that would have had an inner mouth diameter of approximately 30 cm. The metal has a thickness of 3.5 mm to 4.0 mm. The fragment was recovered from a miscellaneous exterior pit (F. 129).

**Pot Covers.** Two iron pot cover fragments (Figs. 129e, f) were recovered. Each fragment consists of a flat sheet of iron with a curved raised rim. One fragment is from a cover which would have had a diameter of approximately 38 cm. It averages 3 mm thick while its rim is 1.1 cm wide and 5 mm thick. The other fragment is from a cover which would have had a diameter of approximately 37 cm. It averages 4 mm thick while its rim is 1.2 cm wide and 5 mm thick. Both were recovered from disturbed contexts,
one being from near the west gate(s).

**Pot Handle.** One incomplete iron pot handle (Fig. 129c) was recovered. It has been bent from its original form, but consists of a round iron rod which would have curved gradually from one end to the other. One end has been bent upwards while the other end is broken. The rod is 6.7 mm in diameter and would have spanned the mouth of a pot that was at least 20 cm in diameter. The handle was recovered from a miscellaneous exterior pit (F. 129).

**Pot Hook.** One iron pot hook (Fig. 129d) consists of a rectangular iron rod bent into an S-shape. The rod had a maximum width of 9.3 mm. The hook is 14.5 cm long and each end forms a hook having an inner width of 3.2 cm. The hook was recovered from the hearth (F.38) located just outside the southeast corner of Structure 1.

**Spoons.** Two spoon fragments were recovered. One is an incomplete spatulate-shaped grey metal handle with a rounded, slightly downturned end (Fig 128c). The handle is not decorated, but has a trademark stamped on its reverse side. The mark consists of the work ASHBERRY surmounted by a crown. A Gothic letter appears on each side of the crown. The letter on the left is W while that on the right is R. The handle is 10.2 mm wide, 2.3 mm thick, and 51 mm long (incomplete). It was found in the later period west palisade trench fill.

This spoon was probably produced by the firm of Philip Ashberry of Sheffield. This firm produced Britannia-metal spoons from the 1820s until the 1860s (Snodin and Belden 1976). The letters on either side of the crown probably represent William IV, who reigned 1830-7.

The other spoon fragment is a shallow ovate-shaped bowl and a small portion of a handle (Fig. 128d). The bowl and handle appear to have been forged from a single piece of iron. The bowl is 85 mm long, 55 mm wide and approximately 2 mm thick. It was recovered from the occupation level along the north palisades.

**Strike-a-light.** One fragment of a bar and handle type of strike-a-light (Fig. 128b) was recovered. The fragment consists of a portion of the bar, which would have served as the striking surface, and one handle element. The bar is 8 mm thick and 6 mm wide, and tapers to a thin handle which curves around parallel to the striking edge. The end of the handle has been bent toward the outside of the strike-a-light. The object has an
incomplete length of 5.8 cm and a width of 2.96 cm. This specimen was manufactured from a file, as indicated by the parallel linear grooves on the inner surface of the bar. The strike-a-light was associated with the fireplace (F.38) located just outside the southeast corner of Structure 1.

Utensil Handles. Two fork or knife handles were found. One is of highly polished antler (Fig. 128e) and has a rounded butt. A round tang, one-third to one-half the length of the handle, would have fitted into the socket at one end. The opposite end of the handle tapers to a thickness of only 1.3 mm. The handle is 9.22 cm long and 1.54 cm wide. It was found in a probable early period pit (F.113).

Another specimen is a composite handle of ferrous metal and antler (Fig. 128f). The metallic portion consists of a full flat tang sandwiched between two separate ferrous plates. A thin slab of antler covers each of these plates. These pieces are riveted together at either end and at the centre of the handle. A small portion of the knife blade or fork shank extends from the handle, and appears to be continuous with the tang. The handle is 8 cm long, 1.34 cm wide and 7.8 mm thick. It was recovered from an early period ash deposit (F.72).

Storage

Non-Formal Descriptions

Barrel Hoop Fragments. Three pieces of copper alloy strapping (Fig. 130c, d) were recovered. One consists of two strap ends joined together with a short copper alloy rivet, the head of which is flat and round, and the opposite end of which has been spread. Another fragment contains a single rivet hole. The third fragment is plain. The ends of the former two specimens have been cut, while those of the latter have been broken. The dimensions of these pieces range from 2.5 cm wide by 2 mm thick to 3 cm wide by 3.5 mm thick.
Sixty-seven pieces of iron strapping (Fig. 130e, f) were recovered. Twenty-five of these contain one or two rivet holes or rivets. Some consist of two strap ends which have been joined together with a short iron rivet. Many appear to have been cut rather than broken. The strapping ranges in width from 15.4 mm to 38 mm (average: 27 mm), and in thickness from 0.75 mm to 4.5 mm. All but two, however, range in thickness from 1.2 to 3.4 mm (average: 2 mm). Strapping fragments were recovered from most areas excavated within and outside of the fort. Most fragments probably originate from barrel bands.

Bushing. Two brass bushings (Fig. 130a, b), possibly used for lining the bung holes of wooden casks were recovered. One has a diameter of 15.5 mm and is 12.5 mm long. The outer surface is roughly incised with a number of lines running the width of the object. One edge is beveled. The other bushing is threaded on its outer surface. It has a diameter of 25.5 mm and is 5.9 mm long. The former was recovered from the early period west palisade trench fill, while the latter is from a disturbed context exterior to the palisade enclosures.

Personal Context of Utilization
Included in this section are those artifact categories associated with Recreational and Writing Activities, Adornment, Clothing, Grooming and Miscellaneous.

Activities (Recreation)

Smoking Pipes
Clay, stone and bone smoking pipe fragments were recovered from the site. The clay pipes are mostly of English and Scottish origin, although some may have been made in France of the United States. One may have been made locally. The stone and bone pipe fragments are probably of native origin.
Clay Pipes. A total of 3679 clay pipe fragments were recovered from site 15R. These include 3303 unmarked or undecorated fragments and 376 that are marked, decorated and/or glazed. Marked and decorated specimens include those with makers' initials or other marks on the spur, bowl or stem and those decorated with frond motifs and/or ribbing on the bowl and/or ivy motifs on the stem. A minimum of 152 pipes were represented, based on the number of fragments containing spurs and the fabric type of other fragments.

The site 15R pipes are described formally with regard to maker's marks and decorative elements. Types are distinguished on the basis of makers' initials, name or mark as they appear on the pipe fragment or on other characteristics which suggest that the pipes included would have had a common maker. Varieties are distinguished on the basis of the location and form of the makers' marks or decorative elements. Categories are made up of those pipe fragments which may be associated with designated types but cannot be definitely assigned to them, or those fragments which may be of local manufacture. Certain other characteristics of these pipes are discussed following the formal descriptions. These characteristics include mouthpiece form, reworking, and bowl/stem ratio.

Type 1. Maker has or used initials IF. The maker of these pipes was probably John Ford of Stepney, England (See Discussion).

Variety a. Initials IF on spur; the bowl and stem, when present, are not marked or decorated (Fig. 131a, b). There are 113 specimens of this variety. Of these, ten have incomplete marks, one side of the spur being missing or unreadable. Eight have only the I present, while two have only the F present. All but one specimen has the F oriented toward the bottom of the spur; one has the F oriented towards the top. Most of these fragments have much of the bowl portion missing. The portions of bowls associated with spurs marked IF, however, were not decorated. It is probable that the bowls of some of these were marked, probably with the marks described as the following three varieties. However, since few other makers' marks were found on separate bowl fragments, it is assumed that most of the 113 specimens recovered would have had a plain bowl. Bowls of this variety appear to have been manufactured in at least two sizes (Fig. 131a, b). Both, however, are of similar form. Bowl shapes of this variety are similar to Atkinson's and Oswald's type 27 (1969), dated 1780-
1820, except that the rim of the bowl of the site 15R specimens is tilted forward from horizontal.

Variety b. "Insect" trademark of John Ford on back of bowl:  
(Fig. 131c). Only one specimen of this variety was identified. The fragment recovered consists of a small portion of the bowl. The mark is impressed. The complete trademark probably read FORD STEPNEY.

Variety c. "Plain" trademark of John Ford on bowl: FORD STEPNEY  
(Fig. 131d). Only one specimen of this variety was identified. The fragment consists of a small portion of the bowl only. The mark may have included other design elements that are not present because of breakage. The mark is impressed.

Variety d. Miscellaneous FORD STEPNEY trademark:  
(Fig. 131e). Only one specimen of this variety was identified. The fragment consists of a small portion of the bowl. The complete mark probably would have consisted of the words FORD STEPNEY enclosing a central figure, both enclosed within a circle. The mark is impressed.

Type 2. Maker has or used initials TB. The maker of these pipes is probably Thomas Balme of London (See Discussion).

Variety e. TB on spur; the bowl, if present, is decorated with fronds having opposite spikes and "cockles", along the mould seams of both the front and back; the sides of the bowl, if present, are decorated with raised vertical ribbing; the stem, if present, is not decorated (Fig. 131f, g). Twenty-three specimens of this variety were recovered. Of these, five have incomplete marks, one side of the spur being missing or unreadable. Two have only the T present, while three have only the B present. All of these fragments have much of the bowl portion missing. Bowl shape appears to have been similar to those of T1Va.

Type 3. Pipe has trademark of BURNS CUTTY, MURRAY. These pipes were probably made by William Murray and Company of Glasgow, Scotland (See Discussion).

Variety a. Trademark occurs on stem, BURNS CUTTY along one side and MURRAY along the opposite side (Fig. 131h, i). Five specimens of this variety were recovered. None are complete, two fragments containing only the letters BU. All lettering is impressed.

Type 4. Double five-pointed asterisk insignia. The maker of these pipes is unknown, although the decoration on the bowl of T4Va may be identical to
that on the bowls of T2Va, indicating that they may both have been produced by the same maker.

Variety a. A raised asterisk appears on each side of the spur; the bowl, if present, is decorated along the mould seams of both the front and back with fronds having opposite spikes and "cockles"; the sides of the bowl, if present, are decorated with raised vertical ribbing to within 7 mm of the rim of the bowl; the stem, if present, is decorated with an ivy-like motif (Fig. 131j, k). Five specimens of this variety were recovered. Bowl shape appears to be somewhat similar to that of T1Va specimens.

Type 5. Pipe has letter O and an anchor motif. The maker is unknown.

Variety a. Letter O occurs on left side of spur/bowl juncture; anchor motif (raised) occurs on the left side of the bowl (Fig. 131 l). The single specimen of this variety is a fragment consisting of the left side of the spur and a small portion of the adjacent side of the bowl. Only a small portion of what appears to be an anchor motif is present.

Type 6. "President" pipes. Three examples of what may be "president" pipes were recovered. These probably depict United States' presidential candidates and would have been used to promote these candidates. These may have been produced by Gambier of Paris (Richie 1978: pers. com.).

Variety a. Pipe probably depicts Winfield Scott (Richie 1978: pers. com.) (Fig. 131 m). The pipe is an unglazed fine buff earthenware. Only the lower half of the bowl is present, and depicts a man with a high collar, large oval chin and straight lips. Winfield Scott was an unsuccessful Whig candidate for president during the 1852 presidential campaign.

Variety b. Pipe probably depicts Franklin Pierce (Richie 1978: pers. com.) (Fig. 131 n). The single bowl fragment of this variety is a fine buff earthenware with a brown glaze on both the interior and exterior. The only feature occurring on this fragment is a representation of hair. Franklin was 14th president of the United States (1853-57).

Variety c. Pipe possibly depicts Millard Fillmore (Richie 1978: pers. com.) (Fig. 131o, p). This variety is represented by five bowl fragments from two pipes. Three fragments are fine red earthenware with a clear glaze; one of these has a wreath-like decoration near the rim. Two fragments are fine buff earthenware with a brown glaze; each contains a portion of a wreath-like decoration. The wreath of the latter pieces appears to be slightly narrower than that of the former, and possibly is
associated with the depiction of an individual other than Filmore. Millard Filmore was elected as Vice President in 1848 and became president at the death of Zachary Taylor in 1850. He ran unsuccessfully for the presidency in 1856.

Type 7. No maker's mark on spur; no makers' marks or decoration on bowl or stem, if present (Fig. 131c). Two pipe fragments of this type were recovered. Although no makers' marks occurred on the spur, they may have been present on portions of the bowls which are missing. No specific maker of these pipes is known, although they may have been the product of one of the makers suggested for the previous types of pipes. (See Discussion).

Category 1. Miscellaneous marks on bowl (Fig. 132a). A single mark not attributed to a specific maker was recovered. It is incomplete, but appears to have consisted of at least two letters underscored by a stylized 'spray' design, all enclosed within a double rouletted circle. The second letter appears to have been a D or B. It could possibly be attributed to Thomas Balme (See T2Va).

Category 2. Bowl fragments decorated with ribbing and/or frond-like designs (Fig. 132b, c). One hundred and ninety-two bowl fragments with these decorative elements were recovered. Approximately 50 percent of these contained ribbing only, 15 percent contained a frond design only and 35 percent contained both. These bowl fragments had probably been associated with pipes having spurs marked with TB (T2Va) or a double asterisk (T4Va).

Category 3. Stem fragments with ivy-like design (Fig. 132d). Seventeen pipe stem fragments having an ivy-like design were recovered. These probably had been associated with pipes having spurs marked with a double asterisk (T4).

Category 4. Brown clay bowl fragment (Fig. 132c). One bowl fragment of brown clay is decorated with a roughly cut groove which appears to have run the circumference of the bowl. Small circumferential striations are present on the inner surface of the lower part of the bowl. The fragment has a height of 3.5 cm. The pipe represented by this fragment was possibly locally made.

Category 5. Plain stem fragments. 2160 plain stem fragments were recovered.

Category 6. Plain bowl fragments. 1143 plain bowl fragments,
including bowl/stem junctures, were recovered.

Category 7. Glazed stem fragments (Fig. 132f). Seven stem fragments coated with a red glaze were recovered. The glaze may have served either a decorative function or to prevent the pipe from sticking to the user's lips. The stems may have been glazed on site.

Category 8. Glazed bowl fragment (Fig. 132g). One bowl fragment with a red glaze on its exterior surface was recovered. The glaze probably served a decorative function and may have been applied on site.

Mouthpieces. The mouthpieces that were recovered included original mouthpieces formed by the pipemaker and reworked mouthpieces probably formed by the user. The former consist of 126 mouthpieces formed in the mould and trimmed with a sharp knife (Fig. 132h), and two oval-shaped mouthpieces formed in a mould and having rounded lips (Fig. 132i, j). The reworked mouthpieces (Fig. 132k, n) appear to have been either cut flat and/or bevelled, or notched to form a lip on one or two sides of the stem. While 86 of these reworked mouthpieces were cut flat, 18 were bevelled at the bit end, and three were notched. This reworking was probably done on-site and for the purpose of making a pipe with a broken stem reusable. Some of the reworked mouthpieces have deep notches (Fig. 132n) caused by the users' teeth as they gripped the pipe. The large number of reworked mouthpieces recovered suggests that replacement pipes were not readily available.

Reworked Stem and Bowl/Stem Fragments. At least four pipe fragments show signs of reworking which may or may not be related to the forming of new mouthpieces. Two stem fragments exhibit scoring around the circumference of the pipe stem (Fig. 132o, p). One is scored at each end while the other is broken at one end and scored at the opposite end. It is suggested that this reworking may have been one step of forming a new mouthpiece, serving to make a clean break of the pipe stem.

Two bowl-stem juncture fragments have been reworked at the stem end, close to the bowl (Fig. 132q, r). The bowl portion of each has been cut flat near the juncture, while the short stem portions have been slightly bevelled and smoothed. It is suggested that these were reworked in order to accommodate a separate stem, possibly of wood.

Bowl/Stem Ratio. Bowl/stem ratios have been used to indicate smoking habits of populations and may indicate the relative transiency of smoking
populations. It is assumed that clay pipes are easily broken and that the stem is as likely or more likely to break than the bowl. It is also assumed that the bowl is functional as long as the bowl/stem juncture is present. Richie (1978: 135) reasons:

That where a pipe smoking population can travel away from its source of smoking supplies, there will be a low number of bowl fragments deposited at the source in relation to stem fragments. The bowl fragments, being part of the indispensible portion of a functional pipe, will be dispersed over as wide an area as the smoking population itself. If, however, a smoking population is restricted to a small area around its source of pipes, the number of bowl fragments in relation to stem fragments will be high because the bowls are being used and discarded there. This can be expressed as a ratio of bowl to stem fragments and is based on a theoretical number of these fragments per whole pipe ... For sites dating to historic periods after 1780, when pipe stems were from six to eight inches long, the ratio should not be less than one bowl fragment to every 1.5 to 2 stem fragments.

Recovered from site 15R were 2212 stem fragments and 1466 bowl fragments, excluding the possibly, locally made bowl fragment. The bowl/stem ratio is one bowl fragment for every 1.51 stem fragments. This is the "normal" ratio for the time period 1835-61, and suggests that most of the pipe bowls were being discarded at the fort rather than being carried to another location before being discarded. This indicates that the smoking population was somewhat restricted in its movements, suggesting that the occupants were either permanent or seasonal.

Discussion. All of the white clay pipes recovered appeared to have been moulded from a single piece of clay. All the bowls appear to have been similar in form and appropriate to a mid-19th century time period. A large amount of reworking is indicated, and some pipes may have been refitted with wooden stems. The "president" pipes differ considerably from the white clay pipes in that they were probably composite pipes consisting of a bowl/shank section and a separate stem.

The makers' marks on pipes recovered from site 15R indicate that three pipemakers supplied the majority of pipes to the fort. Most of these pipes were apparently supplied by John Ford of Stepney (London) England. Oswald
(1975) gives the dates of 1805-65 for this maker. He was a known exporter of pipes for the Hudson's Bay Company from 1830-75 (Sussman and Ross 1978). The second largest supplier of pipes to the 1835-61 fort appears to have been a maker with the initials TB. It is suggested that these refer to Thomas Balme of London, given dates of 1805-45 by Oswald (1975: 132). The decorative elements on the bowls of pipes marked TB appear to be identical to those pipes having the double asterisk mark, indicating that Thomas Balme may have been the maker of both types of pipe. The third largest supplier appears to have been William Murray and Company of Glasgow, Scotland, given dates of 1830-61 by Oswald (1975). Bowls with unmarked spurs may have been associated with stems having the Murray mark, since no spurless bowls or bowls marked on the spur with a Murray trademark were recovered.

Other makers probably also supplied the 1835-61 Fort. The "president" pipes may have been produced by Gambier of Paris (Richie 1978: pers. com.) or possibly by an American pipemaker, Barney Spring, who made pipes from the early 1850s to the 1890s (Painter 1969: 47). Another maker is probably responsible for the bowl fragment with an anchor motif.

A total of 77 marked pipe fragments or fragments with unmarked spurs were recovered from closed contexts. Only six of these were from probable early period contexts, while 48 were from probable late period contexts. Twenty-nine were from contexts which may have been associated with either the early or late period fort. Pipes from early period contexts were of T1Va and T2Va (See Table 11, 12).

Many of the types of pipes recovered from site 15R were also recovered from Fort Vancouver (Ross 1976). Site 15R types that are similar or identical to types recovered from the latter site are: T1Va, T1Vb, T1Vc, T1Vd, T2Va, T3 (similar only). T4, and T6Vc (similar only). Ninety-five percent of the pipes recovered from Fort Vancouver were Ford products (Ross 1976).

Series B. Stone Pipes. Six stone pipe fragments include four bowl fragments and two stem fragment.
Bowl Fragments.

Category 1 (Fig. 133a).
Form and Modification: One bowl fragment of red-brown siltstone has a polished surface and a carved bowl hole. All edges of the fragment are broken.
Measurements: Height (incomplete) - 39 mm
Width (incomplete) - 29.3 mm
Wall Thickness (max.) - 7.8 mm
Context: Disturbed context at southwest corner of fort.

Category 2 (Fig. 133b).
Form and Modification: One bowl fragment of dark grey mudstone has a drilled bowl hole. The outer surface is carved into a series of parallel grooves and squared ridges which probably ran around the entire circumference of the bowl. These ridges have been polished. All edges of the fragment are broken.
Measurements: Height (incomplete) - 29 mm
Width (incomplete) - 20.8 mm
Wall Thickness (max.) - 8.3 mm
Context: Structure 1

Category 3 (Fig. 133c).
Form and Modification: One bowl fragment of brown steatite is decorated on its outer surface with numerous shallow incised grooves which probably ran around the entire circumference of the bowl. This fragment includes a portion of the bowl rim.
Measurements: Height (incomplete) - 27.4 mm
Width (incomplete) - 9.7 mm
Wall Thickness (incomplete) - 5.8 mm
Context: Late period pit (F.1)

Category 4 (Fig. 133d).
Form and Modification: One bowl fragment of brown-grey fine-grained sandstone has a carved bowl hole and includes a portion of the bowl rim.
Measurements: Height - 65 mm
Width (incomplete) - 41.1 mm
Wall Thickness (max.) - 15.4 mm
Wall Thickness (min.) - 5.4 mm
Context: Exterior pit (F.127).
Stem fragment.

Category 5 (Fig. 133e).

Form and Modification: One stem fragment of black mudstone is slightly conical in form. The outer surface and bit end are highly polished. The end opposite the bit is broken.

Measurement: Length (incomplete) - 18.8 mm
Diameter (min.) - 7.8 mm
Diameter (max.) - 8.8 mm

Context: Disturbed context exterior to palisades.

Series C. Bone Pipe Stem. One bone pipe stem fragment was recovered.

Category 1 (Fig. 133f).

Form and Modification: One stem fragment of burnt bone has an irregularly shaped bore which is curved slightly. The outer surface has been polished and shows teeth marks.

Measurements: Length (incomplete) - 14.5 mm

Context: Disturbed context along south portion of west palisade(s).

Non-Formal Descriptions.

Jew's Harp. One ferrous jews harp (Fig. 134a) consists of a complete frame and a portion of the vibrator. The frame was forged from a rod with a diamond-shaped cross-section into a form with a rounded head and tapered shanks. One portion of one edge of the head is hammered flat at the point where the vibrator is attached. The frame is 8.85 cm long and 4.61 cm wide. It has a maximum thickness of 9.2 mm. The jew's harp was recovered from the fill of the cellar (F.26) associated with Structure 1.

Miscellaneous.

Musical Instrument Parts. Nine brass objects (Fig. 134b, f) which are possibly parts of a musical instrument were recovered from near the northwest corner of the fort. These objects are rectangular in form. The
central portion of eight of these form a single rectangular opening or slot. There are two such slots on the ninth object. Each object has a hole near one end of these slots. On some specimens, an iron rivet passing through this hole serves to attach a thin strip of brass to the object. The width of this strip is slightly less than that of the rectangular opening, so that the strip fits within it. All of these brass strips are incomplete. The eight objects with a single slot range in size from 3.06 cm long and 0.84 cm wide to 4.55 cm long and 1.13 cm wide. Only two of these are identical in size. The single specimen having two slots is 3.6 cm long and 1.9 cm wide. Each of the two slots is a different length. All specimens were recovered from either the fill of the north portion of the late period west palisade (3 specimens) or from nearby disturbed contexts.

Snuff Box. One round ferrous lid (Fig. 134k) is stamped with the words COPENHAGEN SNUFF around its perimeter and with the pattern of a tobacco leaf within a square at its centre. The lid has a diameter of 5.2 cm and the rim is 9 mm wide. It was found in the fill of the cellar (F.26) associated with Structure 1.

Activities (Writing)

Non-Formal Descriptions

Sealing wax. Small fragments of red sealing wax were recovered from various site 15R contexts. Many of these were recovered from contexts related to Structure 1. They were also recovered from later period miscellaneous pits, features 1 and 8. Sealing wax was also present in both the early and late period west palisade trenches and in the upper levels of fill of the south palisades. Other specimens were also recovered from disturbed contexts.

Slate Pencil. One fragment of a five-sided red-brown slate pencil (Fig. 134g) was recovered. The object has a maximum diameter of 5.3 mm and an incomplete length of 30.3 mm. It was recovered from a later period pit (F.1).
Steel Pens. Portions of three steel pens (Fig. 134h, j) were recovered. One specimen (not illustrated) is a holding device for a pen nib. It has a round shank and a semi-circular projection which would have terminated with two smaller projections situated at opposite sides of the semi-circular portion. The shank diameter is 6.5 mm and the object has a length of 32.2 mm. This pen component is marked with the words COLLEGIATE PEN. It was found attached to a clay pipe stem fragment which probably served as the handle of the pen. It was recovered from a context associated with Structure 1.

A second steel pen component was also recovered from a Structure 1 context. It is either a portion of a pen nib or a holder for a pen nib. It has a round shank with a diameter of 6 mm.

The third fragment was recovered from an exterior pit (F.130), and probably is a portion of a pen nib holder. It has a semi-circular cross-section, is 7 mm wide and has an incomplete length of 23.5 mm. The words PATENT [ JRY[L]ONDO [ are stamped on the object. C. Perry was a known supplier of pens to the Hudson's Bay Company in 1875, and could possibly be the maker of the latter pen component.

Adornment

Beads

Type 1. Glass Beads. Two thousand, seven hundred and thirty-nine beads from site 15R are discussed. The class of glass trade beads is divided into three series based on method of manufacture. The first series, drawn beads, are produced "by drawing out a bubble of molten and viscid glass into a long, slender tube". The second series, wire wound beads, involve "winding threads of molten glass around a wire which is later withdrawn" (Kidd and Kidd 1970: 48). The third series, mould-pressed beads, is manufactured by placing a blob of viscid glass over a conical-shaped mandrel and then pressing the bead into the desired shape with a two-piece mould. After moulding, facets could be applied by grinding. As the mandrel
did not completely perforate the bead, the perforation had to be completed by punching. This left a characteristic scar at the narrow end of the bead perforation (Karklins 2978: pers. com.).

The first two series, drawn and wire-wound beads, are typed according to the classification devised by Kidd and Kidd (1970). The description of these types includes the Kidds' identifying code, followed by shape, size, diaphanety, colour and number of specimens. All of the beads have smooth, rounded ends. A short definition of each attribute follows.

Examples of the identifying code are Ia (drawn, tubular, monochrome) beads and W1b (wound, round) beads. A second numerical digit following the code, e.g., W1bl, indicates the bead type number already assigned by the Kidds. An asterisk (*) replaces the number in the cases of those bead types not recorded by the Kidds.

Included under shape are tubular beads (round cross-section), circular beads (round cross-section, ring- or barrel-shaped beads), round beads, oval beads and faceted, circular beads. Tubular beads are separated from circular beads by the criterion that the length of the former is greater than the diameter.

The diaphanety of the glass is described employing the terms opaque, translucent and transparent (clear). Opaque glass is impervious to direct light except on the thinnest edges. Translucent beads allow light to pass through, yet diffuse light so that objects observed through them are indistinct. Objects observed through transparent beads are distinctly visible.

The following size categories are provided by the Kidds: very small, under 2 mm; small, 2-4 mm; medium, 4 mm; large, 6-10 mm; very large, over 10 mm. These size groupings refer to the diameter of the bead. The diameter and length ranges are given for each bead type.

Colours are designated using the names and codes in the Color Harmony Manual ( Jacobsen, et al. 1948). Also included are colour code equivalencies found in the Munsell Book of Color (Munsell Color Company 1960). An example would read: bright navy (13pg; 7.5PB 3/4). The colours were determined using transmitted fluorescent light.

The third series, mould-pressed beads, is not described by the Kidds. In this report the mould-pressed beads have similar shapes and are typed by colour. Each type is identified by the initial MP and is arbitrarily
listed and numbered in consecutive order. The attributes of each type are described as above.

Ia* (Fig. 135a) tubular; small size; translucent; Bright Teal (17pc; 5B 4/6); 1 specimen; ends are rounded. Diameter - 3.7 mm Length - 4.2 mm

If2 (Fig. 135b) faceted; large size; transparent; Light Grey (c; N 8/0); 2 specimens. Diameter Range - 8.9 mm Length Range - 6.6.5 mm.

If* (Fig. 135c) faceted; large size; transparent; Amber (31c; 7.5YR 7/8); 7 specimens. Diameter Range - 6.5 to 8.5 mm. Length Range - 5 to 8 mm.

If* (Fig. 135d) faceted; medium size; transparent; Aqua Green (19ic; 10BG 7/6); 1 specimen. Diameter 5.6 mm. Length - 6.7 mm.

If* (Fig. 135e) faceted; large size; transparent; Deep Turquoise Green (20 pe; 10BG 4/10) 1 specimen. Diameter - 6.1 mm. Length - 5.8 mm.

If* (Fig. 135f) faceted; medium to large size; transparent; Bright Navy (13pg; 7.5PB 3/4); 11 specimens. Diameter Range - 5.6 to 7.1 mm. Length Range - 4.7 to 6.4 mm.

If* (Fig. 135g) faceted; medium and large size; translucent; Rose Wine (81e; 10RP 4/6); 2 specimens. Diameters - 5, 8.5 mm. Length - 5, 8 mm.

If* (Fig. 135h) faceted; medium size; transparent; Bright Fuschia Purple (10na; 10P 5/12); 1 specimen. Diameter - 6mm. Length - 5.5 mm.

IIa2 (Fig. 135i) circular; small to medium size; opaque; Redwood (61e; 7.5R 5/6); 8 specimens; ends are rounded. Diameter Range - 2 to 5 mm. Length Range - 1.5 to 3 mm.

IIa7 (Fig. 135j) circular; small size; opaque; Black (p; N 1/0); 30 specimens; ends are rounded. Diameter Range - 2.5 to 4 mm Length Range - 1.5 to 3 mm.

IIa12 (Fig. 135k) circular; small size; translucent; Oyster White (b; N 9/0); 11 specimens; ends are rounded. Diameter Range - 2 to 4 mm Length Range - 1 to 3 mm.

IIa14 (Fig. 135 l) circular; very small to medium size; Opaque White (a; N 10/0);1028 specimens; ends are rounded. Diameter Range - 1.2 to 4.1 mm. Length Range - .7 to 3.5 mm.

IIa27 (Fig. 135m) circular; small size; transparent; Emerald Green (21nc; 7.5G 5/8); 1 specimen; ends are rounded. Diameter - 3 mm. Length - 3 mm.

IIa53 (Fig. 135n) circular; small to medium size; transparent; Ultramarine (13pa: 7.5PB 4/14); 1 specimen; ends are rounded. Diameter - 2.5 mm. Length - 2 mm.
IIa* (Fig. 135o) circular; very small size; transparent; Light Grey (c; N 8/0); 4 specimens; ends are rounded. Diameters - 1.5 mm. Lengths - 1 mm
IIa* (Fig. 135p) circular; very small to small size; opaque; Mustard Gold (2ne; 10 YR 7/8); 8 specimens, ends are rounded. Diameter Range - 1.5 to 3.5 mm. Length Range - 1 to 2 mm.
IIa* (Fig. 135q) circular; small size; translucent; Amber (31c; 7.5YR 7/8); 1 specimen; ends are rounded. Diameter - 2 mm. Length - 2 mm.
IIa* (Fig. 135r) circular; very small to medium size; translucent; Bright Teal (17 pc; 5B 4/6); 910 specimens; ends are rounded. Diameter Range - 1.3 to 5.2 mm. Length Range - .8 to 3.9 mm.
IIa* (Fig. 135s) circular; small to medium size; translucent; Deep Blue (14pc; 2.5PB 4/10); 270 specimens; ends are rounded. Diameter Range - 2.4 to 4.4 mm. Length Range - 1.8 to 3.2 mm.
IIa* (Fig. 135t) circular; very small size; opaque, Geranium Pink (7-l/2ea; 10 RP 6/6); 61 specimens; ends are rounded. Diameter Range - 1 to 2 mm. Lengths - 1 mm.
IIa* (Fig. 135u) circular; very small to medium size; transparent; Scarlet (7pa; 5R 4/14); 5 specimens; ends are rounded. Diameter Range - 1.5 to 4.9 mm. Length Range - .8 to 3 mm.
IIb18 (Fig. 135v) circular; transparent Light Grey (c; N 8/0) with 18 opaque White (a; n 10/0) stripes; large size; 1 specimen; ends are rounded; "Gooseberry". Diameter Range - 6.1 mm. Length - 5.3 mm
IIIA* (Fig. 135w) tubular; very large size; transparent Scarlet (7pa; 5R 4/14) over opaque Sunlight Yellow (1-l/2ga; 5Y 8/8); 1 specimen; ends are rounded. Diameter Range - 11.8 mm. Length 17.7 mm.
IIIIf1 (Fig. 135x) faceted; medium to large size; transparent Light Grey (c; N 8/0) over translucent Oyster White (b; N 9/0); 8 specimens. Diameter Range - 5 to 9 mm. Length Range - 4 to 7.5 mm.
IIIIf2 (Fig. 135y) faceted; medium to large size; transparent Ultramarine (13pa; 7.5PB 4/14) over translucent Light Aqua Blue (19ea; 2.5B 8/4); 39 specimens. Diameter Range - 5 to 9 mm. Length Range - 4 to 8 mm.
IIIIf* (Fig. 135z) faceted; large size; opaque Bright Dutch Blue (13ia; 7.5PB 4/10) over opaque Copen Blue (13-l/2ic; 7.5 PB 6/8); 2 specimens. Diameter Range - 9 mm. Length - 7 mm.
IVa9 (Fig. 135aa) circular; small size; transparent Scarlet (7pa; 5R 4/14) over Opaque White (a; N 10/0); 180 specimens; ends are rounded. Diameter
Range - 3 to 4 mm. Length Range - 2 to 3 mm.

Wlb14 (Fig. 135bb) round; very large size; opaque; Bright Dutch Blue (13la; 7.5PB 5/11); 1 specimen. Diameter Range - 20 mm.

Wlb* (Fig. 135ee) round; medium to large size; transparent; Scarlet (7pa; 5R 4/14); 10 specimens. Diameter Range - 5.1 to 8.9 mm. Length Range - 4.6 to 9.2 mm.

Wlb1 (Fig. 135cc) round; large size; opaque; White (a; N 10/0); 5 specimens. Diameter Range - 7.9 to 10 mm. Length Range - 8 to 10.3 mm.

Wlb* (Fig. 135ff) round and faceted; large size; translucent; Light Grey (c; N 8/0); 2 specimens. Diameter Range - 8.8 mm. Length Range - 7.7 mm. 1 fragmentary.

Wlb* (Fig. 135gg) round; medium size; translucent; Sunlight Yellow (1-l/2ga; 5Y 8/8); 2 specimens. Diameter - 5 mm. Length Range - 4.5, 5 mm.

Wlb* (Fig. 135hh) round; large size; transparent; Orange (41a; 5YR6/12); 3 specimens. Diameter Range - 7.2 to 8 mm. Length Range - 5.4 to 7.2 mm.

Wlb* (Fig. 135ii) round; large size; translucent; Dusty Orange (41c; 7.5YR 6/12); 1 specimen. Diameter - 8.5 mm. Length - 8 mm.

Wlb* (Fig. 135jj) round and faceted; large size; transparent; Deep Turquoise Green (20pe; 10G 4/10); 1 specimen. Diameter - 8.7 mm. Length - 7.2 mm.

Wlb* (Fig. 135kk) round; large size; transparent; Vivid Cerulean Blue (15pa; 7.5B 4/8); 1 specimen. Diameter - 9.5 mm. Length - 9 mm.

Wlb* (Fig. 135 ll) round; large size; transparent; Turquoise (17pa; 10BG5/7); 2 specimens. Diameter Range - 7 mm.

Wlb* (Fig. 135 mm) round; large and very large size; opaque; Copen Blue (14lc; 5PB 5/10); 2 specimens. Diazetrs - 9, 11.9 mm. Length Range - 9.3, 11.3 mm.)

Wlb* (Fig. 135nn) round; large size; transparent; Bright Teal (17pc; 5B 4/6); 4 specimens. Diameter Range - 6.5 to 8.3 mm. Length Range - 5 to 6.6 mm.

Wlb* (Fig. 135oo) round; medium to large size; transparent; Brilliant Blue (16na; 2.5B 5/8); 4 specimens. Diameter Range - 5.3 to 6.6 mm. Length Range - 5.9 to 6.7 mm.
Wlb* (Not illustrated) round; large size; transparent; Strong Blue (13-l/2ne, 5PB 3/8); 1 specimen. Diameter - 7.2 mm. Length - 6.8 mm.

Wlb* (Not illustrated) round but faceted; large size; translucent; Copen Blue (141c; 5PB 5/10); 1 specimen. Diameters - 9.4 mm. Length - 7.6 mm.

Wlb* (Fig. 135pp) round; large size; translucent; Medium Blue (161e; 7.5 B 5/6); 2 specimens. Diameters - 9.3, 10 mm. Length - 8.2, 8.3 mm.

Wlb6 (Fig. 135dd) round; large size; transparent; Bright Navy (13pg; 7.5 PB 3/4); 27 specimens. Diameter Range - 6.3 to 8.6 mm. Length Range - 4.1 to 7.7 mm.

Wlb* (Fig. 135qq) round and surface covered with raised ridges encircling the bead; large size; opaque; Bright Navy (13pg; 7.5 PB 3/4); 1 specimen. Diameter - 9 mm. Length - 8 mm.

Wlb* (Fig. 135rr) round; large size; translucent; Rose (7-1/2ic); 10RP 6/8; 1 specimen. Diameter Range - 9 mm. Length Range - 7 mm.

Wic1 (Fig. 135ss) oval; large to very large size; opaque; White (a; N 10/0); 19 specimens. Diameter Range - 6.4 to 17.8 mm. Length Range - 7 to 19.8 mm.

Wic* (Fig. 135tt) oval; medium size; transparent; Scarlet (7pa; 5R 4/14); 2 specimens. Diameters - 4 to 5 mm. Length - 9 mm.

Wic* (Fig. 135uu) oval; large size; opaque; Black (p; N 1/0); 1 specimen. Diameter Range - 6 mm. Length Range - 11 mm.

Wic** (Fig. 135vv) oval; large size; translucent; Vivid Cerulean Blue (15pa; 7.5B 4/8); 2 specimens. Diameters - 6.1, 6.2 mm. Length 10.1, 9.5 mm.

Wic* (Fig. 135ww) oval with 6 lengthwise facets; medium size; transparent; Bright Navy (13pg; 7.5 PB 3/4); 1 specimen. Diameter - 4 mm. Length - 10 mm.

WId* (Fig. 135xx) doughnut; large size; opaque; Black (p; N 1/10); 1 specimen. Diameter - 8 mm. Length - 5 mm.

WId* (Fig. 135yy) doughnut; large size; transparent; Strong Blue (13-l/2ne; 5PB 3/8), 2 specimens. Diameters - 6.5, 7.5 mm. Lengths - 4.5, 3.5 mm.

WIIc5 (Fig. 135zz) faceted; large size; transparent; Amber(31c; 7.5 YR 7/8); 2 specimens. Diameters - 8 mm. Lengths - 8 mm.
WIIIb* (Fig. 135A) round; very large 4 size; translucent Bright Navy (13 pg; 7.5PB 3/4) overlain by swirls of opaque black (p;N 1/0), opaque White (a; N 10/0) and opaque Maple (4ng; 5YR 4/4); 1 specimen. Diameter - 14 mm. Length - 12 mm.

WIIIb* (Figs. 135B, C) round; very large size; opaque White (a; N 10/0) with spiral lines of transparent Bright Navy (13pg; 7.5 PB 3/4); 8 specimens. Diameters - 10.1 mm.

WIIIb* (Fig. 135D) round; large size; opaque White (a; N 10/0) with wavy and spiral lines of transparent Scarlet (7pa; 5R 4/14); 4 specimens. Diameter Range - 9.5 to 10.2 mm. Length Range - 9.8 to 10.4 mm.

WIIIb* (Fig. 135E) oval; large size; opaque White (a; N 10/0) overlaid by floral design of transparent Scarlet (7pa; 5R 4/14), Apple Green (23ic; 10GY 6/6) and Turquoise Green (20nc; 5BG 5/8) 1 specimen. Diameter - 8 mm. Range - 12 mm.

WIIIb* (Fig. 135F) round; large size; opaque Bright Dutch Blue (131a; 7.5 PB 5/11) with spots of transparent Scarlet (7pa; 5R 4/14) and Turquoise (17pa; 10BG 5/7) on opaque White (a; N 10/0); 3 specimens. (Only one could be measured) Diameter - 10 mm. Length - 9 mm.

MP1 (Fig. 135G) faceted; large size; transparent; Tile Red (5ne; 10R 4/10); 1 specimen. Diameter - 9 mm. Length - 7 mm.

MP2 (Fig. 135H) faceted; large size; transparent; Scarlet (7pa; 5R 4/14); 10 specimens. Diameter Range - 8 to 10.5 mm. Length Range - 7 to 9.5 mm.

MP3 (Fig. 135I) faceted; large to very large size; transparent; (2.5PB 9/2). 5 specimens. Diameter Range - 6 to 13.5 mm. Length Range - 6 to 13 mm.

MP4 (Fig. 135J) faceted; large size; transparent; Amber (31c; 7.5 YR 7/8); 1 specimen. Diameter Range - 8 mm. Length Range - 7 mm.

MP5 (Fig. 135K) faceted; large to very large size; transparent; Turquoise Green (20ne; 5BG 5/8; 3 specimens. Diameter Range - 8 to 11 mm. Length Range - 7 to 10 mm.

MP6 (Fig. 135L) faceted; large to very large size; transparent; Bright Navy (13pg; 7.5 PB 3/4); 2 specimens. Diameter Range - 8, 12.5 mm. Length Range - 10, 7 mm.
MP7 (Fig. 135M) faceted; large size; transparent; Bright Rose (81a; 7.5RP 5/12); 2 specimens. Diameter Range - 7 mm - 5.9 mm. Length Range - 6 mm, 5 mm.

Miscellaneous, unidentifiable - 1 Light Grey, partially melted - 6 broken and weathered blue.

Discussion. A total of 66 bead types was identified for site 15R. This represents a greater proliferation of bead types compared to site 16R. At site 15R, the large faceted beads appear, both as tubular drawn and mould-pressed. Faceted beads account for 98 specimens or 3.6 percent of the total sample. The circular drawn beads are still the most popular type of bead but are generally much smaller than those recovered from site 16R. It appears that the same colours retained their popularity through the years. However, a slight decrease in the total percentage of blue and white beads is matched by an increase in the percentage of other colours.

Glass beads were recovered from most of the areas excavated at site 15R. Most of these, however, were recovered from sub-operations which included a portion of Structure 1 and from the northeast corner of the fort. A large number of beads (69) were also recovered from a late period pit (F.1) located along the north palisade.

Approximately 33 percent of the glass beads (893 specimens) were found near Structure 1. Of these, 357 specimens were associated with the occupation of Structure 1, 213 with the Structure 1 cellar (F.26), 95 with the outer fireplace (F.38) and 44 with the ash deposit (F.31) associated with Structure 1.

Approximately 47 percent (1276 specimens) were found in the northeast corner of the fort. Of these, 745 specimens were recovered from the occupation level, 170 from a late period pit (F.8), 43 from an early or late period pit (F.7) and 220 from a thin burn layer directly beneath the occupation level.

Type 2. Bone Beads. (Fig. 136a,d). All of the four bone beads recovered were cut by hand from the long bones of birds. None are decorated, but they show various degrees of polishing. Two specimens are complete. One is 17.5 mm long and has a diameter of 10 mm. The other complete bead is
35 mm long and has a maximum diameter of 21.8 mm. One bead is broken, but has complete length of 19.8 mm and diameter of 9.5 mm. The fourth specimen was never completed. The section of bone from which it was being made is cracked and broken. The bead that was intended to be made would have been 47 mm long and would have had a maximum diameter of 14.4 mm. Three bone beads were associated with Structure 1, while one was recovered from a disturbed context along the north palisades.

Type 3. Shell Beads.

Variety a. Dentalium (Dentalium pretiosum) (Fig. 136e,f). Five dentalium shell beads were recovered, four of which are complete or nearly complete. One end of each complete specimen has been cut and smoothed so that the shell could be threaded. All are polished. The complete specimens range in length from 20.5 mm to 31 mm. Two specimens were associated with an early period pit (F.20) and one specimen was associated with each of the following: Structure 1; a charcoal deposit south of the south palisades; and an exterior pit (F.128).

Variety b. Shell Discoidal Beads (Fig. 136g,l). Thirty-nine single-holed, disk-shaped shell beads were recovered from site 15R. These are grouped into three size ranges. Thirty-two specimens range in diameter from 8.8 mm to 12.2 mm, and in thickness from 1.4 mm to 3.5 mm. Four specimens range in diameter from 6.8 mm to 7.1 mm, and in thickness from 1.4 mm to 2.4 mm. These specimens are white in color although many appear to have been burnt grey. Many appear to have been polished. A single specimen has a diameter of 16.8 mm and a thickness of 3.5 mm. It is of a yellowish-white color. Grooves have been incised on one face of the bead as well as on its outer and inner edges. Two other specimens are fragmentary.

Discoidal shell beads are distributed widely. William Orchard (1975: 32) states: "On the Pacific Coast, particularly among the tribes of California, such beads, from a quarter to a half of an inch in diameter, have been called wampum and were a medium of exchange; and similar beads were used for a like purpose by the Indians of the East".

At site 15R, the discoidal shell beads were recovered from contexts associated with Structure 1 (26 specimens), an ash deposit (F.31) southeast corner of Structure 1 (1 specimen), the fireplace (F.38) outside the southeast corner of Structure 1 (5 specimens), a possible early period pit
(F.113, one specimen), an exterior charcoal deposit (F.48, one specimen),
two exterior pits (F.128, one specimen and F.130, one specimen) and
disturbed contexts (3 specimens).

Finger Rings. Eight finger rings were recovered. Three of these are silver
while five are copper alloy. (Also See wire, Copper Alloy).

These rings are separated into classes, series, types and varieties.
Classs are distinguished by the presence or absence of glass sets. Series
are differentiated on the basis of general form. Types are distinguished
on the basis of ring shape and/or the number and arrangement of sets, while
varieties are differentiated by the colour and shape of the set or by the
variations in design on the ring face.

Colours are designated by using the names and codes in the Color
Harmony Manual (Jacobsen et. al. 1948) and/or colour code equivalencies
found in the Munsell Book of Color (Munsell Color Company 1960). The site
15R rings are categorized as follows. Diameters given are the inside band
diameters.

Class 1. Rings with Glass Sets.

Series A. Wide bands (greater than 4 mm in width); no face.

Type 1. Flat inner band surface; convex outer surface.

Variety a. No decoration (Fig. 137d). The single copper
alloy specimen of this variety has a diameter of 21.5 mm and is 4.7 mm
wide.

Series B. Narrow bands (4 mm or less in width); No face.

Type 1. Flat inner band surface; convex outer surface.

Variety a. No decoration (Fig. 137e,h). There are four
specimens of this variety. One silver band has a diameter of approximately
19 mm and is 2.1 mm wide. One copper alloy band has a diameter of 15.8 mm
and is 3.5 mm wide. A mark stamped on its inner surface reads X .
A second copper alloy band has a diameter of 17.1 mm and is 2.4 mm wide.
GOLD is stamped three times on the inner surface of the band. Two of these
appear to have been mis-struck, since they are stamped one over the other.
A third copper alloy band is fragmentary but is 3.5 cm wide. It appears to
have been cut and bent, possibly for use as a child's ring.
Type 2. Flat inner and outer band surfaces.

Variety a. engraved design (Fig. 137i,j). There are two specimens of this variety. Both are silver and both are engraved on their outer surface with a single band composed of numerous diagonal lines placed parallel to each other. One specimen has a diameter of 17.5 mm and is 3.3 mm wide. The other has a diameter of approximately 18 mm and is 1.8 mm wide.

Discussion. Four finger rings were found in closed contexts. Single specimens of C2SBT1Va were recovered from each of the late period west palisade trench fill and the early period north palisade trench fill. Two specimens of C2SBT2Va were associated with Structure 1.

Non-Formal Descriptions

Bracelet. One possible fragment (Fig. 138a) of copper alloy was recovered. It is round in cross-section. The inner surface is smooth while the outer surface is cut by a number of deep notches. One end of the fragment appears to be broken, while the opposite end is slightly rounded and appears to have been the finished end of an open-ended bracelet. The cross-sectional diameter of the fragment is 4.5 mm, while the inner diameter of the complete object, if circular in form, would have been approximately 5.8 cm. The object was recovered from an early or late period pit (F.86).

Danglers. Two danglers were recovered. One tinkling cone (Fig. 138b), a trapezoidal sheet of copper rolled to form a truncated cone, is 4.03 cm long and has a maximum diameter of 8.8 mm. One similarly formed somewhat cone-shaped brass dangler (Fig. 138c) is 11.37 cm long and has a maximum diameter of 8.4 mm. Both danglers were recovered from exterior pits (F.129 and F.130).

Earring. One gilt brass earring (Fig. 138d) was recovered. It consists of two components; a hinged attachment device and a pendant. The attachment device consists of a flat circular decorative element and two semi-circular pieces of wire. A thick semi-circular piece of wire is attached to the back of the decorative element, while a thinner piece of wire is attached to the thicker piece by means of a pin passing through both. This allows the thin piece of wire to pivot on the thicker piece. The thin piece of wire would have passed through the ear and attached to the decorative
element by hooking itself through a hole in that element. The pendant is very ornate, consisting of numerous pieces of brass which have been welded together and gilt. The central portion of the pendant is decorated with a number of raised star-shapes. An eye at the end of this ornament serves to connect it to the attachment device. The attachment device has a diameter of 1.5 cm while the pendant is 3.3 cm long. The earring was recovered from an exterior pit (F.130).

**Hawk Bells.** Two brass hawk bells were recovered. One consists of a hemispherical crown and back with slightly protruding rims. The crown has circular perforations at either end of a slit, while the back appears to have had a single crudely punched perforation through its centre. This specimen is crushed, but had a diameter of approximately 16 mm. The second specimen (Fig. 138e) is similar in form except that the perforation in the back appears to have been cut. In addition, its crown also has a central circular indentation and its back has a single decorative circular groove. The bell is 16.8 mm in diameter. The single hawk bell recovered from a closed context is from an exterior pit (F.130).

**Hinged Cross-Pins.** One silver and one brass cross-pin were found. The silver specimen (Fig. 138f) was probably a fastening device for a trade silver brooch. It is identical to some of the cross-pins on brooches recovered from Rocky Mountain House site 16R. This specimen has parallel sides except for one end which tapers to a sharp point. The opposite end is rolled back to form a small loop. The underside of the pin is flat while the top is slightly convex. It is 21.1 mm long, 1.8 mm wide and 0.45 mm thick. This pin was recovered from a late period pit (F.1). The brass specimen (Fig. 138g) is parallel-sided and one end is rolled back on itself to form a small loop. The central portion of the pin is slightly raised above its edge and end. It is 6.52 cm long, 4.5 mm wide and 0.8 mm thick.

**Jewellery Fasteners.** Two types of fastener were recovered. One broken brass ring-shaped fastener (Fig. 138h) possibly used for attaching a pendant to a chain, has a diameter of 8.1 mm. Another fastening device (Fig. 138i) consists of an eye attached to a hollow cylinder. The base of the cylinder has a ridge on its inner surface which may have served to hold an expandable spring type attachment device. The object is 13 mm long and has a diameter of 4.3 mm. Both fasteners were recovered from disturbed contexts.
Pendants. One bone, two metal and one shell pendant were recovered.

Bone. One polished bone object (Fig. 138j) appears to have been used as a pendant. It is broken but contains a portion of a biconically-drilled hole. The object was found in an exterior pit (F.127).

Metal. One copper and one iron pendant were recovered.

The copper specimen (Fig. 138k) is triangular-shaped. Its narrow end is perforated and its wider end is scalloped. The pendant is 6.9 cm long and has a maximum width of 2.9 cm. It was recovered from a disturbed context.

The iron specimen (Fig. 138l) is somewhat heart-shaped. There is a single round fastening hole at one end and four decorative square holes at the centre of the object. The pendant is 2 cm long, 1.37 cm wide and 1.3 mm thick. It was found in the late period west palisade trench.

Shell. The single shell pendant (Fig. 138m) is rectangular-shaped. It is incomplete, containing only a portion of a perforation at one end. It is 13.6 mm long and 11.3 mm wide, and was recovered from a disturbed context.

Pendant Chain. One brass chain fragment (Fig. 138n) consists of four figure-eight shaped links averaging 10.7 mm long, 4.3 mm wide and 1 mm thick. It was found in the early period west palisade trench.

Clothing.

Buckles.

Three complete buckles and one buckle fragment were found. These are divided into types based on general form. Types are separated into varieties based on orientation of the pin and tongue to the frame. They probably served as clothing or harness buckles.

Type 1. Four-sided frame; no pin; tongue attached to side of frame.

Variety a. Tongue crosses width of frame. There are two specimens of this variety. One copper buckle (Fig.139a) appears to have been cut from a sheet of copper. It has a rectangular frame and single-prong tongue. It is 3.34 cm long and 2.58 cm wide. The other buckle (Fig. 139b) is ferrous, and also has a rectangular frame and single-prong tongue. It is 2.46 cm long and 1.3 cm wide.
Type 2. Four-sided frame; pin is integral part of frame

Variety a. Pin crosses width of frame. The single buckle of this variety is of moulded brass (Fig. 139c). It has a rectangular frame which is curved slightly upward. The pin is recessed on the frame, and contains two thickenings which serve to centre the tongue on the pin. The tongue is single-pronged. The face of one side of the frame is raised slightly above the rest of the frame. A maker's mark is moulded onto the back of the opposite side of the frame. It is composed of what appears to be a C, R and G within a rectangle. The frame is 3.14 cm long and 2.6 cm wide.

Buckles. Category 1. One fragment of an iron pin and prong (Fig. 139d) was recovered. The pin would not have been cast as an integral part of the frame. The prong has a length of 1.47 cm.

Discussion. Two buckles were recovered from closed contexts. One of TlVa is associated with Structure 1, while the iron pin-prong fragment was recovered from an ash deposit (F.31) associated with Structure 1.

Buttons.

Sixty-three metal buttons, 55 shell buttons, 54 bone buttons, 7 glass buttons, fragments of at least 10 leather buttons and two metal eyes were recovered. The terminology used to describe these buttons is as follows: the button, the complete article consisting of an eye and a disk; the disk, the complete article not including a projection used as means of attachment; the eye, the projection or hole(s) in the disk which serve as a means of attachment; the face, the side of the disk opposite the eye and/or intended to face away from the garment to which it would have been attached; the back, the side of the disk from which the eye projects and/or which was intended to face toward the garment to which it would have been attached.

Two manufacturing methods were used for the buttons which have one-piece metal disks with wire eyes. One method involved casting the button with the wire eye in place in the mould. This created a small mound of metal, a 'boss', around the bottom of the eye. Buttons manufactured in this way were generally finished by cutting the back of the disk with a lathe. This produced circular striations. A button finished in this way is said to have a spun back. The other manufacturing method involved brazing the eye to the cast or cut disk.
Three one-piece metal buttons which had holes serving as eyes were usually cast, although one may have been cut.

The face pieces of buttons having two-piece metal disks were crimped over cast back-pieces of brass or iron. Wire eyes were either brazed to the backs or may have been attached by means of a hole in the disks.

The metal buttons were decorated by means of moulding and die-stamping. Buttons decorated by moulding take on the design of the mould in which they were cast. Die-stamping involves the use of specially designed dies which are used to impress a design onto a button blank.

Two manufacturing methods seem to have been used to form the shell buttons. Some buttons went through a single drilling procedure, in which the eyes passed through the entire thickness of the disk. Others were produced in two drilling steps. First, a relatively large central area was thinned. Then the eyes were drilled within this central recess.

The bone buttons appear to have been cut to their rough form, shaped, drilled and smoothed. The glass buttons appear to have been moulded.

The method used for categorizing the buttons is based upon the following distinctions. Classes are differentiated on the basis of structure and material. Series are distinguished by method of manufacture, type by minor variations in material and varieties by shape and decoration. The buttons are categorized as follows:

Class 1. One-piece metal disk; metal eye

Series A. Disk cast with eye in place; spun back.

Type 1. Copper alloy; may or may not be tin-plated.

Variety a. Flat face; slightly concave or flat back; not decorated (Fig. 140a). There are 24 specimens of this variety. These range in diameter from 15.7 mm to 23 mm.

Variety b. Flat face; raised rim on back; not decorated (Fig. 140b-d). There are 7 specimens of this variety. They range in diameter from 14.2 mm to 21.1 mm.

Type 2. Pewter.

Variety a. Flat face; slightly concave back; not decorated (Fig. 140e). The single specimen of this variety is 22.6 mm in diameter.
Type 3. Iron.

Variety a. Convex face; raised rim on back; not decorated (Fig. 140f). The single specimen of this variety has a diameter of 16.3 mm.

Series B. Eye brazed to back.

Type 1. Copper alloy; may or may not be gilt.

Variety a. Flat disk; no lettering on back (Fig. 140g). The single specimen of this variety has a diameter of 13 mm.

Variety b. Flat to slightly concave-convex disk; lettering impressed on back (Fig. 140h, m). There are six specimens of this variety. One (15R13W12-3) appears to be gilt, and has a diameter of 12.88 mm. Its lettering reads "SUPERFINE•LONDON". Another (15R14V2-1) contains unreadable lettering just within a circle formed of small impressed dots. It has a diameter of 12.8 mm. A third button (15R15V2-20) has a diameter of 19.5 mm. Lettering within two concentric impressed circles reads "IMPERIAL STANDARD". A fourth button (15R15V3-6), 20.8 mm in diameter, has lettering which reads "IMPERIAL QUALITY". A fifth button (15R15W6-3) is 24.9 mm in diameter. "RICH IMPERIAL COLOUR" is impressed within two concentric circles on its back. The sixth button (15R24T1-1) is 20.1 mm in diameter. STAND COL TREBLE GILT is impressed within two concentric circles composed of small impressed dots, and outside of an innermost circle made up of small impressed circles linked together.

Class 2. One-piece metal disk; holes in disk serve as eyes.

Series A. Cast; four-holed; recessed centre.

Type 1. Iron.

Variety a. Not decorated (Fig. 140n). There are six specimens of this variety. They range from 11.7 mm to 16.8 mm in diameter.

Type 2. Pewter; possibly zinc-plated.

Variety a. (Fig. 140o). Decorated. The single specimen (15R11W1-1) of this variety is 16.6 mm in diameter. The flat portion of the face is decorated with small diamond-shaped projections.

Type 3. Brass.

Variety a. (Fig. 140p). Not decorated; no lettering. The single specimen (15R15W3-1) of this variety has a diameter of 17.2 mm.
Variety b. (Fig. 140q). Decorated face; lettering on back. The single specimen (15R14V2-2) of this variety is 16.4 mm in diameter. Decoration on the face consists of a circle of raised dots along the edge of the central depression. Lettering on the flat portion of the back reads: *F & B* •LONDON•*.

Series B. Cast; four-holed; raised rim on face; slightly concave-convex disk.

Type 1. Possibly pewter; possibly silver-plated.

Variety a. (Fig. 140r). Not decorated. The single specimen (15R15W8-3) of this variety is 13.4 mm in diameter.

Series C. Cast or cut; four-holed; flat disk.

Type 1. Iron.

Variety a. (Fig. 140s). Not decorated. The single specimen of this variety is 16.9 mm in diameter.

Class 3. Two piece metal disk, metal eye.

Series A. Face piece crimped onto back piece; metal eye attached by means of hole in centre of back piece or face and back piece.

Type 1. Brass face; iron back

Variety a. (Fig. 141a). Decorated face. The single specimen of this variety has a diameter of 19.6 mm. The face has a die-stamped decorative pattern consisting of impressed curved lines between which are numerous small impressed dots. The centre has a sunburst-like design composed of six curved impressed lines radiating out from a large central impressed dot.

Class 3. Series A. Type 1. Category 1. One button fragment (15R14W1) consists of a perforated iron back piece and a small portion of the brass face piece (Fig. 141b). No decorative elements are present on these portions of the button. The button is 18.5 mm in diameter.

Type 2. Brass face and back.

Variety a. Flat face; decorated; lettering on back (Fig. 141c). The single specimen (15R17H1-1) of this variety has a diameter of 19.3 mm. The face piece has a moulded basket weave design. The back is marked *WARRANTED*QUALITY along the outside edge. The word SUPERIOR is within an impressed circle central to the button back.
Series B. Face piece crimped onto back piece; eye brazed to back.

Type 1. Brass face and back.

Variety a. Dome-shaped face; not decorated (Fig. 141d).

Five specimens of this variety range in diameter from 11.5 mm to 14.2 mm.

Class 3. Category 1. One dome-shaped brass face piece (15R9H1-2) has a diameter of 11.7 mm. The back piece was not recovered.

Class 4. Two-piece metal disk; holes in disk serve as eyes.

Series A. Face piece crimped onto back piece; four-holed; face has recessed centre.

Type 1. Brass face; iron back.

Variety a. Decorated face (Fig. 141e). The single specimen of this variety is 17 mm in diameter. The face is decorated with a circle of raised dots along the edge of the central recess.

Class 5. Two-piece metal disk; cross-pin serves as means of attachment.

Series A. Face piece crimped onto back piece; open centre.

Type 1. Brass face; iron back and cross-pin.

Variety a. Decorated; lettering on face (Fig. 141f). The single specimen (15R11V1-2) of this type is 11.5 mm in diameter. The word TRADE and other obliterated words appear in script form. The words are interspersed with various decorative elements.

Class 6. Three-piece disk; metal back and rim; glass face; metal eye.

Series A. Rim crimped onto back piece; inlaid face piece; eye brazed to back.

Type 1. Brass rim and back; glass face.

Variety a. Lettering on back (Fig. 141g). The single specimen (15R9H1-3) of this type is 11.2 mm in diameter. It has a faceted purple glass inset. The words *ORANGE* GILT are impressed on the back.

Class 7. One-piece shell disk; holes in disk serve as eyes.

Series A. Three-holed disk; holes drilled within central recess.

Type 1. White shell.

Variety a. Not decorated (Fig. 141h). The single specimen of this variety is 9.1 mm in diameter.
Series B. Four-holed disk; holes drilled within central recess.

Type 1. White shell.

Variety a. Not decorated (Fig. 141i,j). Twenty-three specimens of this variety range in diameter from 7.9 mm to 26.6 mm. The size and form of the central recess varies from a sharply sloping deep depression to a gently sloping shallow depression.

Variety b. Decorated face (Fig. 141k,l). Six buttons of this variety range from 8.7 mm to 12.9 mm in diameter. Five of these are decorated with incised lanceolate circular and linear elements. The other is decorated with incised lines and a series of interconnected semicircles.

Series C. Four-holed disk, no central recess.

Type 1. White shell.

Variety a. Not decorated (Fig. 141m). Sixteen specimens of this variety range in diameter from 6.7 mm to 12.5 mm.

Class 7. Category 1. Fragments of nine shell buttons, not identifiable as to series, were recovered.

Class 8. One-piece bone buttons.

Series A. Three-holed disk (Fig. 141n). The five specimens of this series have three holes arranged linearly within central recesses on their faces. The outer edges of the buttons are bevelled on both sides. The specimens range in diameter from 11.5 mm to 12.5 mm.

Series B. Four-holed disk (Fig. 141o). The forty-six specimens of this series have four holes arranged in a square within a central recess. The back of all these buttons are convex while the rims on the face are usually rounded. They range in diameter from 11 mm to 19.4 mm.

Series C. Five-holed disk (Fig. 141p). The single specimen (15R25H1-2) of this series has a diameter of 17.9 mm. It has a central recess and rounded rim on the face and a convex back. One hole is situated at the centre of a square formed by the other four holes.

Class 8. Category 1. Two bone button fragments, not identifiable as to series, were recovered.

Class 9. One-piece glass disk; holes in disk serve as eyes.

Series A. Four-holed disk; central recess on face; convex back and face (Fig. 141q). Four specimens of this series range in diameter from 10 mm to 11.3 mm. All are white in colour.
Series B. Four-holed disk; central recess on face; convex back; face has rounded rim (Fig. 141r). One complete button (15R14W3-4) and two fragments of this series were recovered. The complete button has a diameter of 16.6 mm.

Class 10. Leather disk; metal eye (Fig. 141s). The pieces of leather buttons (15R25L7-18) which were recovered consisted of three complete buttons (brass eyes attached to leather disks), seven brass eyes and four leather disks. The eyes are 6.6 mm long and the disks 9 mm in diameter.

Buttons. Category 1. Eyes. Two brass eyes were recovered. One is slightly footed, while the other is associated with a brass boss.

Discussion. Many of the buttons recovered from site 15R are similar to types described by Stanley South (1964). Most of these types had been recovered from an 1800-65 context (See Table 14).

Many of the site 15R buttons were also similar to buttons recovered from other Rocky Mountain House sites. Buttons with one-piece metal disks, eyes cast in boss and spun backs (C1SAT1Va) were recovered from sites 16R and 13R. Those with eyes brazed to the backs of plain one-piece disks (C1SBT1Va) were also recovered from these sites. A two-piece dome-shaped brass button (C3SBT1Va) was recovered from site 16R, four-holed shell buttons (C7SBT1Va) were recovered from site 16R and four-holed bone buttons (C8SB) were recovered from sites 16R and 1R. Lettered brass buttons (C1SBT1Vb) from site 15R vary somewhat from those recovered at site 16R. The lettering of the 15R specimens appears to have been die-stamped; all letters are impressed. The site 16R specimens appear to have been lettered in various ways. The letters were either die-stamped or impressed individually. The lettering was both impressed and raised.

All button varieties which contained buttons from undisturbed contexts were represented in Structure 1 or other late period contexts. The only varieties represented in early period contexts are: C1SAT1Va; C7SBT1Va; C7SBT1Vb; C7SCT1Va; C7 Cat. 1 and C8SA. (See Table 13).

Non-Formal Descriptions

Fabric. Three fabric fragments were recovered. One (Fig. 142a) is rectangular with scalloped edges and cut ends. It appears to consist of cotton warp (longitudinal) elements and copper weft elements. The weave
pattern forms a series of thick diagonal lines set between two parallel lines running the length of the fabric. The fragment is 2.3 cm wide and 10 cm long.

A second fabric fragment (Fig. 142b) appears to consist of silk threads woven in a one-over, one-under pattern. The fragment is 2.4 cm wide and 5.7 cm long. Two parallel edges are finished, while the other two are frayed.

Also recovered were short lengths of brown and black two-ply wool yarn.

The cotton-copper fabric was found in an early period ash deposit (F.72), while the other two fabric fragments were associated with Structure 1.

Hook. One brass clothing hook (Fig. 142c) consists of a single piece of brass wire with a rectangular cross-section. The wire was doubled over and the two free ends were bent down to form two eyes. The opposite end of the folded wire was bent upwards 180 degrees to form a hook bill. The object has a length of 24.5 mm and a width of 14.6 mm. It was recovered from a disturbed context just outside the west gate(s) of the fort(s).

Grooming

Non-Formal Descriptions

Brush handles. Two fragments of antler brush handles (Fig. 142d,e), possibly from shaving brushes, were found. One fragment is from the round lower portion of the handle and has two sets of threads on its inner surface. One would have received the handle proper while the other would have received the portion holding the bristles. The threaded portion of the handle would have had a diameter of approximately 3 cm. It is 1.04 cm wide and has a maximum thickness of 4.5 mm.

The second fragment may have had a function similar to the first. However, only one threaded end is present, the opposite end being broken. There is a raised rim on the outer surface of the threaded end. The fragment has an incomplete length of 2.02 cm. Both fragments are from disturbed contexts.
Mirror Glass. Sixteen fragments of mirror glass were recovered from site 15R. No complete mirrors were found. However, portions of two mirrors were mendable. All sherds retained some silvering and were only recognized as mirror glass due to this feature.

The cross-mended fragments formed a portion of a round or oval mirror. The glass was a light green (10GY6/4) (Fig. 146f.). The glass is 1.52 mm thick including the backing. The backing has a granular grey-brown appearance probably representing a tin and mercury backing. One sherd was recovered from the hearth, F.38, and mended with nine fragments from an associated soil layer outside the feature.

Two mended fragments form a right-angled corner fragment of a mirror (Fig. 146e). The edges of the mirror are chipped, possibly intentionally. The glass is blue-green (5BG5/6) and is 1.23 mm without the backing and 1.45 mm thick including the backing. The backing is tarnished in appearance, probably representing a more modern backing of silver. The fragments were recovered from the mixed cultivation zone.

Two other light green (7.5G7/2) – (7.5G8/2) fragments were recovered. One is 1.2 mm thick with backing and was recovered from F.1. The other is 1.83 mm thick with backing and was recovered from the disturbed cultivation zone. The silvering may be the tin and mercury type. However, the diagnostic granular appearance is not distinct.

Two clear mirror glass fragments are present. These are 2.03 mm and 1.95 mm thick including backing. The backing may be the tin and mercury type but the diagnostic features are not clear. The fragments are from the disturbed cultivation zone.

All site 15R fragments are probably from small hand mirrors. The glass is probably broad glass, crown glass being too thin to be ground flat and not strong enough (Roenke 1978: 14).

Mirror glass was recovered from features 1 (pit) and 38 (outer fireplace associated with Structure 1), and from a soil layer associated with the hearth of Structure 1. These are late period contexts. It seems consistent that mirror glass would be recovered from the refuse or building areas represented here.
Non-Formal Descriptions

Stopper. A carved antler stopper consists of a short threaded shank and a relatively large flat handle (Fig.142f). The handle is approximately oval-shaped in outline except that the end of the handle opposite the shank is somewhat angular. The handle has a maximum thickness of 4.4 mm and tapers to a thickness of 1.7 mm at the end opposite the shank. The shank is 7 mm long and has a diameter of 6 mm. The object has a total length of 34.2 mm and width of 18 mm, and was found in a Structure 1 context.

Structural Context of Utilization

Included in the structural context of utilization section are artifacts associated with building hardware and miscellaneous structural materials.

Building Hardware.

Nails. A total of 6516 nails and nail fragments were recovered. These include 1489 complete nails, 3734 fragments containing the nail head, and 1293 shank fragments. The majority of the nails are hand-wrought, only 126 complete machine-cut nails being identified.

The establishment of nail types is dependent on which nail characteristics can be measured accurately. Since nearly all the site 15R nails are in poor condition due to breakage and corrosion, only length, basic head type and basic shank end form are considered. Head type is based on general head shape, since the type and number of facets often cannot be observed. Determination of shank end form is based on the taper qualities of the shank. Corrosion made the determination of some of these features uncertain. Other characteristics are noted where they differ considerably from the usual form. The following nail types and varieties take into account only complete nails with identifiable heads or shank ends (See Also Table 15).

Class 1. Ferrous Nails

Series A. Hand-wrought. Hand-wrought nails have several physical attributes which characterized their technique of manufacture. A major identifying attribute is that the shanks usually taper on all four sides, although on a few specimens the taper is slightly more pronounced on two
opposite sides of the shank. Occasionally, the taper is located in the immediate vicinity of the point.

Type 1. Rose head. The rose head is typified by having three to five low angle facets. This faceting forms a head which has its highest point near its centre. The head is usually somewhat round in outline when viewed along the long axis of the shank. It is generally well-centered on and overhangs the shank.

Variety a. Sharp point (Fig. 143a). The shanks of this variety taper on four sides to approximate a single point at the shank end. There are 792 nails of this variety. They range in length from 21 mm to 163 mm. Of these, 717 are from 50 mm to 94 mm long.

Variety b. Chisel point (Fig. 143b). The shanks of nails of this variety taper predominantly on two sides to form a relatively thin edge at the shank end. Eighty nails of this variety range in length from 34 mm to 157 mm. Of these, eight are 62 mm to 64 mm, six are 69 mm to 70 mm, six are 85 to 87 mm and six are 132 mm.

Variety c. Flat point (Fig. 143c). Specimens of this variety have shanks which taper mostly on two opposite sides. The remaining two sides of the shank diverge just before reaching the end of the shank, and form a relatively thin shank end. The overall shape of the shank end varies somewhat and may be either rounded or squared. There are seven specimens of this variety which range in length from 70 mm to 144 mm.

Type 2. Squared rose head. This type differs from type 1 specimens in that their heads are approximately square in outline when viewed along the long axis of the shank. In other respects, they are similar to type 1.

Variety a. Sharp point (Fig. 143d). Thirty-four of this variety range in length from 27 mm to 202 mm. Twenty-five of these are from 62 mm to 105 mm long.

Variety b. Chisel point (Fig. 143e). Forty-four specimens of this variety range in length from 64 mm to 206 mm. Fifteen of these range in length from 64 mm to 98 mm, 26 from 121 mm to 172 mm, and three from 188 mm to 206 mm.

Type 3. Clasp head. The clasp head is characterized by having two major facets running at a relatively sharp angle to the plane perpendicular to the long axis of the shank. These facets form a ridge over the centre of the shank. The head is usually well centered on and overhangs the shank mostly on two sides.
Variety a. Sharp point (Fig. 143f). There are 171 specimens of this variety. They vary in length from 34 mm to 85 mm. Of these, 165 range from 53 mm to 74 mm, having a peak length of 62 mm.

Type 4. Flat head. Flat heads are typified by having an upper surface that is flat and perpendicular to the long axis of the shank. The head is usually centered on the shank and overhangs it. The head is approximately round in outline when viewed along the long axis of the shank.

Variety a. Sharp point (Fig. 143g). The 83 specimens of this variety range in length from 20 mm to 102 mm. Eighty-two of these vary from 20 mm to 89 mm in length.

Variety b. Chisel point (Fig. 143h). Fifteen specimens vary from 29 mm to 130 mm in length. In some specimens, the cross-section of the upper half of the shank is round rather than square or rectangular.

Type 5. Squared flat head. These specimens differ from type 4 specimens in that their heads are approximately square in outline when viewed along the long axis of the shank.

Variety a. Sharp point (Fig. 143i). The six specimens of this variety have lengths of 29 mm (2 specimens), 30 mm, 83 mm, 87 mm and 105 mm.

Variety b. Chisel point (Fig. 143j). Four specimens of this variety have lengths of 54 mm, 130 mm and 140 mm.

Type 6. T-head. The upper surface of the T-head is usually flat or has two to three low angle facets. The head overhangs the shank completely or predominantly on two opposite sides. The head is usually centered on the shank, but may overhang the shank mostly on one side.

Variety a. Sharp point (Fig. 143k). Sixty-three specimens range in length from 34 mm to 113 mm. Of these, 18 are 53 mm to 58 mm long and 28 are 61 mm to 72 mm long.

Variety b. Chisel point (Fig. 143l). Ten specimens range in length from 44 mm to 179 mm. Four of these are from 63 mm to 66 mm long.

Series A. Category 1. Unidentified head type; sharp point. Thirty-two specimens range in length from 32 mm to 105 mm.
Series A. Category 2. Unidentified head type; chisel point. Three specimens have lengths of 66 mm, 123 mm and 157 mm.

Series B. Machine-cut. Machine-cut nails possess several physical attributes which characterize their technique of manufacture. Machine-cut nail shanks taper predominantly or exclusively on two opposite sides and the shank ends are usually blunt. In general, they are more uniform in shape and size than hand-wrought nails. Other machine-cut characteristics cannot be observed on the nails recovered because of the high degree of corrosion.

Type 1. Die-stamped, gable-shaped head. Heads of this type have two major facets running at a low-angle to the plane perpendicular to the long axis of the nail shank. These facets create a low ridge over the centre of the shank. The head is usually well-centered on and overhangs the shank mostly on two opposite sides.

Variety a. Blunt point (Fig. 143m). The shank ends of this variety taper predominantly on two opposite sides. The amount of taper, however, is usually slight, so that the shank end cross-section is nearly square. Seventy-seven specimens of this variety range in length from 47 mm to 95 mm. Of these, 57 are 63 mm to 70 mm long and 15 are 74 mm to 79 mm long.

Type 2. Die-stamped, squared flat head. Squared flat heads of machine-cut nails are more regular in outline than those of hand-wrought nails.

Variety a. Blunt point (Fig. 143n). There are 16 specimens of this variety. They range in length from 31 mm to 77 mm.

Type 3. Die-stamped, L-head. The upper surface of the head of specimens of this type is usually flat. The head overhangs the shank completely on one side.

Variety a. Blunt point (Fig. 143o). The two specimens of this variety have lengths of 25 mm and 32 mm.

Type 4. Hand-wrought, rose head. Heads of specimens of this type are similar to those of hand-wrought nails with rose heads.

Variety a. Blunt point (Fig. 143p). There are 16 specimens of this variety. They range in length from 32 mm to 77 mm. Of these, five are 62 mm to 65 mm long.
Type 5. Hand-wrought squared rose head. Heads of specimens of this type are similar to those of hand-wrought nails with square rose heads.

Variety a. Blunt point (Fig. 143q). Twelve specimens range in length from 45 mm to 67 mm. Of these, eleven are 53 mm to 67 mm long.

Type 6. Hand-wrought flat head. Heads of specimens of this type are similar to flat heads of hand-wrought nails.

Variety a. Blunt point (Fig. 143r). The two specimens of this variety are 23 mm and 64 mm long.

Class 1. Category 1. Tapered head (Fig. 143s). Eight specimens of this type range in length from 26 mm to 100 mm. The heads of these nails are flat and two sides taper gradually into the shank. The upper edges of these two-sides are usually angular, although in one case they are rounded.

Class 1. Category 2. Tacks (Fig. 143t). The tacks recovered consist of relatively thin wide sharp-pointed shanks with relatively large rose heads. The five specimens of this category have lengths of 12 mm, 14 mm, 20 mm (2 specimens) and 23 mm.

Class 2. Copper Alloy Nails.

Series A. Hand-wrought.

Type 1. Flat head.

Variety a. Sharp point (Fig. 143u). The five specimens of this variety are 27 mm, 28 mm (2 specimens), 29 mm and 36 mm long.

Type 2. Rose head.

Variety a. Chisel point (Fig. 143v). The single specimen of this variety has a length of 55 mm.

Series B. Machine-cut.

Type 1. Die-stamped L-head. The single specimen (Fig. 143w) of this type is 33 mm long. The shank end is somewhat sharp-pointed, but may originally have been blunt; it appears to have been altered after its initial manufacture.

Non-Formal Descriptions.

Bolts (Fig. 144a,b). Three iron bolts, incomplete and unthreaded, were recovered. Two have square flat heads, while one has a square domed head. The former two specimens are similar in having round shanks, while the
latter specimen has a square slotted shank. One round-shanked specimen has a maximum head width of 23.4 mm and shank diameter of 19 mm. It is 10 cm long (incomplete). The other round shanked specimen has a maximum head width of 17.5 mm and shank diameter of 16.5 mm. It is 12.6 cm long (incomplete). The head of this specimen is relatively deep, being 15 mm. The square shanked specimen has a maximum head width of 23.2 mm and shank width of 16 mm. It is 2.8 cm long and has a slot in the upper portion of the shank running parallel to the long axis of the bolt. The two round-shanked bolts may have served as drop-bolts on a wagon. They were recovered from disturbed contexts near the west gate(s) of the fort(s).

Eye-Spikes. Two ferrous eye-spikes (Fig. 144c) were recovered. Each was forged from a single piece of metal and consists of a circular loop centered on an evenly tapered sharply pointed shank. The loop of one specimen has a circular cross-section, while that of the other is rectangular. The shanks of both specimens are rectangular in cross-section. Both eye-spikes are 6.4 cm long. They have inner eye diameters of 7 mm and 8 mm. Both objects are from disturbed contexts.

Hasp. One hasp fragment consists of a rectangular bar of wrought iron forming a single loop of what probably was a figure 8-shaped fastener (Fig. 144d). This fragment includes a folded over end which forms a hingelike pivot point. The specimen is 11.35 cm long. The complete hasp probably would have been 16 cm long. The hasp may have been used on a door or gate. The object is from a disturbed context near the northeast corner of the fort.

Miscellaneous Hooks and Eyes. Eight miscellaneous hooks and eyes were recovered. Two hooks (Fig. 144e) consist of an iron rod with a rectangular cross-section bent to form a triangular 'eye' and a hooked end set perpendicular to the eye. These hooks have lengths of 47 mm and 51.5 mm.

Another object (Fig. 144f) appears to be a fragment of a large hook, sharpened to a point at one end. It has been fashioned from a round iron rod 16 mm in diameter. The hooked section has a maximum depth of 8.6 cm.

One eye (Fig. 144g) consists of an iron rod with a circular cross-section bent to form an eye at one end and bent 90 degrees at the other end. The latter end is somewhat chisel-shaped and may have been driven into a wall or other wooden object. This eye has a length of 10 cm.
Another round iron rod (Fig. 144h) is bent to form an eye at either end. These eyes are set perpendicular to each other. One end of this rod exhibits a deep worn notch. The object is 12.5 cm long.

Another eye is fragmentary and consists of an eye formed by a round iron rod and a portion of the shank set perpendicular to the eye. The eye has a maximum diameter of 3.7 cm.

One fragmentary eye consists of round iron stock bent at one end to form a partially closed eye. The opposite end is broken. The eye has a maximum diameter of 28.4 mm.

The remaining object (Fig. 144i) is a portion of a large eye, the shank of which has been cut-off. The eye itself is formed from round stock and has a maximum diameter (exterior) of approximately 5.8 cm. These eyes may have served utilitarian or structural functions.

Three of these objects were associated with Structure 1, while one was recovered from the fireplace (F.38) just southeast of Structure 1. The two other hooks and eyes from closed contexts were recovered from an exterior pit (F.127) and the occupation level at the southeast corner of the fort.

Latch Guides. Two probable latch guides (Fig. 144j,k) for a sliding bolt latch are ferrous and consist of a staple welded to a flat rectangular plate. The staples are rectangular-shaped and would have guided rectangular bolts. Both plates have a fastening hole at either end. The plate of one specimen is 4.6 cm long and 1.8 cm wide. Its staple extends 1.6 cm from the plate. The plate of the other latch guide is 5.3 cm long and 2 cm wide. Its staple extends 2.5 cm from the plate. Both latch guides were recovered from disturbed contexts. One was found along the south section of the west palisade, while the other is from near the northeast corner of the fort.

Ring. One iron ring (Fig. 145c) has a maximum diameter of 44.5 mm. The inner and outer surface are convex while the two sides are flat. It was recovered from a context associated with Structure 1.

Screws, Slotted (Fig. 145d). Three screws with slotted flat heads are incomplete but appear to have been identical to each other. The more complete specimen has a head diameter of 7.7 mm and is 19.8 mm long. Two were associated with Structure 1, while one was recovered from the occupation level just outside the southeast corner of the fort.
Staples. Eighteen ferrous staples and staple fragments have open loops which have two parallel arms of equal length. A shank connects the two arms. Fifteen of the staples are rounded open loops, while three are squared.

The shank cross-sections of the rounded specimens are square, rectangular or somewhat round. The cross-sections of the arms of these staples are square to rectangular. Of these round staples (Figs. 145e,f), the arms of five taper uniformly to a sharp point, those of four taper mostly on two sides to form a chisel-shaped point, and both arms of six are broken. Those with sharp points range in size from 6.1 cm long by 2.5 cm wide to 10.4 cm long by 5.7 cm wide. Those with chisel-shaped points vary in size from 7.2 cm long by 2.7 cm wide to 9.9 cm long by 3.3 cm wide. All chisel-shaped points of the round staples are oriented parallel to the plane of the staple.

The shank cross-sections of the square specimens (Figs. 145g,h) are square to rectangular. The cross-sections of the arms of these staples are rectangular. Of these square staples, the arms of two taper uniformly on two sides to form a chisel-shaped point oriented parallel to the plane of the staple. The arms of the third square staple also taper on two sides, but are slightly shouldered; the points of these arms are oriented perpendicular to the plane of the staple and are bent slightly inward below the shoulder. The latter specimen may have served as a handle. The former two staples are 9.8 cm long by 6.6 cm wide and 10.9 cm long by 7.7 cm wide. The latter 'staple' is 8.4 cm long by 3.4 cm wide.

The rounded staples were recovered from scattered early and late period features, including F.20; F.38; F.39; F.72; F.128; the inner and outer west palisade trench fill and the overburden above the southeast corner bastion. The single square staple from a closed context was found in the trench fill of the southeast corner bastion.

Strap Hinges. Two single-strap hinge fragments (Figs. 145a,b) are similar in form, having parallel sides and a single end loop above the plane of the strap. They differ, however, in the method by which the loops were formed. The loop of the smaller specimen was formed by rolling back one end of the strap. That of the larger specimen was formed by bending the strap back on itself and welding the free end closed. The smaller specimen has a width of 3.09 cm and an incomplete length of 5.43 cm. The fragment contains one
fastening hole. The larger specimen has a width of 4.28 cm and an incomplete length of 19 cm. It contains two fastening holes. The larger specimen was associated with Structure 1, while the smaller is from a disturbed context along the north end of the west palisade.

Window Glass. A total of 2048 window glass fragments were recovered (Fig. 146). One-thousand three hundred and thirty-seven fragments (66 percent) were from F.1, a refuse pit, located on the southern edge of the outer north palisade trench. The glass recovered was not clearly either broad glass or crown glass. No diagnostic features for either type were clearly visible or measurable. However, it is noted that crown glass remained predominant in England until the mid-1800s even though broad/cylinder glass was widely adopted in the United States and the rest of Europe by the 1830s (Roenke 1978: 7).

As manufacturing methods improved, pane sizes for everyday use increased. The demand for larger panes appears to have favoured cylinder glass which could be cut to larger sizes. No complete window pane fragments were recovered from site 15R. The fragments recovered show right angle corners. The maximum length of a pane edge present is 12.65 cm.

The colour of the glass depends on the trace elements or impurities present. The colours evinced in the site 15R sample were blue-green (2.5BG 5/4 to 3/4 and 7/4, 10G 6/6), green (2.5G 8/4, 7/4, 7/6, 10GY 7/6, 7/4) and clear. The greenish tints are caused by iron oxide. Removal of this tint was possible by adding a decolourizing agent. During the 19th century this was commonly manganese. Arsenic also became common later in the century (Roenke 1978: 19-20).

Roenke (1978) presents information on flat glass from the Pacific Northwest area of the U.S.A. He suggests that, during the fur trade era, flat glass thicknesses increased through time. A comparison of window glass thicknesses from feature 1 at site 15R to those from the Pacific Northwest indicates that the site 15R sample does not fit into the scheme developed by Roenke.

Roenke's data indicates that thicknesses of flat glass is between 0.045 inches (1.1 mm) to 0.055 (1.4 mm) inches for the period 1835 to 1845, and increases to 0.075 (1.9 mm) inches for the period 1850 to 1865. These dates roughly correspond to the early and late phases at site 15R.
Window glass thicknesses from the single dump event of feature 1 at site 15R ranged from 0.8 mm to 1.9 mm (0.031 inches to 0.075 inches). The sample contained 136 clear glass fragments, 650 green glass fragments and 551 blue-green glass fragments. Clear glass thicknesses range from 0.8 mm to 1.55 mm (0.031 inches to 0.063 inches); a primary mode occurred at 1.15 mm (0.061 inches). Green glass thickness ranged from 0.8 mm to 1.95 mm (0.032 inches to 0.074 inches); primary, secondary and tertiary modes occurred at 0.95 mm, 1.25 mm and 1.55 mm (0.037, 0.049 and 0.061 inches). Blue-green glass thicknesses ranged from 0.8 mm to 1.85 mm (0.031 inches to 0.071 inches) a primary mode occurred at 1.25 mm (0.049 inches) and a secondary mode at 0.95 mm (0.033 inches).

The Roenke study does not distinguish between window glass colours. The total glass frequency distribution modes for feature 2 at site 15R were 0.95 mm (0.033 inches), a primary mode resulting mainly from green and blue-green glass, and a secondary mode at 1.25 mm (0.049 inches), resulting from all three glass colours. These figures are lower than those suggested by Roenke for the Pacific Northwest at comparable time periods. The possibility that Rocky Mountain House may have had a supplier of window glass different from those for the Pacific Northwest may account for the differences noted between glass thicknesses for the two areas.

The thinner values obtained for Rocky Mountain House feature 1 window glass may also indicate that thinner crown glass continued in use later at Rocky Mountain House than in the Pacific Northwest. The thinner modes of flat glass recovered from feature 1 may represent crown glass, while the thicker modes may represent cylinder-glass.

Miscellaneous

Non-Formal Descriptions

Chinking. Chinking was recovered from most of the areas excavated at site 15R. It appeared to be most heavily concentrated, however, near Structure 1 and in the upper fill layers of a miscellaneous late period pit, feature 8. All of the chinking appears to consist of a mixture of clay and fine sand. It is either grey-brown or orange in colour, the latter colour being due to burning. Some of the chinking contains the impression of wood having at
least one flat surface, suggesting that the chinking probably was used to fill gaps between squared logs. One piece is partially covered with white wash or 'white mud'.

Putty, Window. Window putty totalling 131 cm in length was recovered. It appears to be lime-based and contains no inclusions. Most pieces have a triangular cross-section. That side which was not set against either the frame or the window has an average width of approximately 11 mm. All of the window putty, along with a large amount of window glass, was recovered from a layer of fibrous wood within a miscellaneous late period pit (F.1) set against the north palisade.

Miscellaneous Context of Utilization
Included under this heading are unidentified objects and miscellaneous scrap.

Non-Formal Descriptions
Miscellaneous Glass
This group includes those glass fragments which were too small or non-descript to be assigned to a specific form or function group. Also included are those pieces that are melted.

Twenty-eight fragments of small, unidentifiable and/or melted clear, lead glass were recovered. Also included are one melted and three small light blue glass fragments, and six light green melted fragments.

Unidentified Glass Object.
This group includes those fragments of glass for which a specific function was not determined.

One fragment (15R9G8-2) of a slightly concave, rounded rectangular clear, lead glass object was recovered from the wood layer at the base of F.72, an early period ash dump. The fragment is 1.9 mm thick at the centre and thins to the edges. The object has a width of 9.2 mm and has an incomplete length of 11 mm. This may be part of a jewellery inset.

Unidentified Metal Objects.
Copper Alloy. Eleven unidentified copper alloy objects are treated.

Two coiled springs (Fig. 147a, b) have diameters of approximately 9 mm. The largest has a minimum length of 33.5 mm (incomplete). These were recovered from a context associated with Structure 1.
One long coiled spring-like object (Fig. 147c) has a diameter of 6 mm and would have had an original length of approximately 6 cm. It may have served an ornamental function. This was recovered from mixed contexts near the southeast bastion.

One thin dome-shaped piece of metal (Fig. 147d) associated with a ring of metal has a diameter of 10.4 mm. It may be a button fragment, and was recovered from the ash deposit east of Structure 1 (F.31).

One flat thin object is a small bar with a projection at either end (Fig. 147e). Each projection is pierced with a single hole. The object is 2.12 cm long, and was recovered from a context relating to the occupation of structure 1.

One fragment of what may be the threaded rim of a small metal container (Fig. 147f) has a diameter of 9 mm. It was recovered from a Structure 1 context.

One eyelet (Fig. 147g) has a diameter of 7.3 mm, and was recovered from a context related to Structure 1.

One possible kettle lug fragment (Fig. 147h) consists of a strip of copper with a hole at either end. It has a length of 4 cm. It was recovered from a disturbed context near the northeast corner of the fort.

One cut metal fragment (Fig. 147i) has a hole at one end and is slightly concave-convex. It has a maximum dimension of 2.9 cm. It was recovered from mixed contexts near the southeast corner of the fort.

One notched metal object (Fig. 147j) with a central threaded hole has a diameter of 12.5 mm and a length of 10.4 mm. This was recovered from disturbed contexts near the west gates of the forts.

One copper alloy object (Fig. 147k) consists of three components connected by means of a pin passing through each component. One component is a 4.5 cm long metal strip with a projection at one end. Another component is fragmentary, consisting only of the portion surrounding the pin hinge. The third component is incomplete, but is shaped and positioned so that it would have covered the other components. The function served by this object is unknown. It was recovered from the late period palisade trench fill.

Ferrous. Fifty-six ferrous objects are treated.

Seven wedge-shaped objects (Fig. 148a-c) range in length from 3.1 cm to 6.6 cm, and in width from 8.2 mm to 13 mm. Some may have served as axe head wedges or may be tangs from files or other tools.
One broken cone-shaped object (Fig. 148d) is 51.5 mm long.

Five nail-like objects (Fig. 148e-h) have sharp-pointed shanks and heads that flare on two sides only. The upper surface of the head is cut diagonally to the plane perpendicular to the long axis of the shank. These objects vary in length from 3.75 cm to 6.63 cm. All were recovered from disturbed contexts.

Three objects (Fig. 148i,j) consist of a flat or rectangular shank and a flat hooked end. The largest specimen has a shank with a rectangular cross-section, which is tapered to form a chisel-shaped point opposite the hooked end. The two smaller specimens have shanks with flat (thin rectangular) cross-sections. These may have served as trap catches. They range in length from 4.6 cm (incomplete) to 9 cm. One was recovered from a late period pit (F.1), one from a disturbed context near a miscellaneous exterior pit (F.128) and one from a context relating to the occupation of Structure 1.

Two ferrous objects (Fig. 148k,l) are similar in that they consist of a piece of metal rod tapered and turned down at each end. The smaller specimen is thickened near its centre. Both may be incomplete furniture drawer pulls. The smaller specimen has a maximum dimension of 26.2 mm, while that of the larger is 74.2 mm long. The larger was recovered from disturbed contexts near the southwest corner of the fort, while the smaller was from just outside the southeast corner.

One ferrous piece of wire (Fig. 148m) 3 mm in diameter is bent to a form which may have served as a drawer pull. This object was recovered from a miscellaneous early or late period pit (F.113).

Three specimens are fragmentary objects (Fig. 148n-p) having thin rectangular cross-sections. One end of each of these objects is V-shaped. That portion forming the base of the V is flattened and somewhat tapered to a chisel-shaped point. All have been broken. The largest fragment has a length of 6 cm. All were recovered from disturbed contexts.

Two sections of ferrous pipe (Fig. 149a,b) were found. One appears to have been cut on each end, and has a diameter of 22 mm and a length of 18.7 mm. The other also appears to have been cut and a portion of one end has been bent back along the pipe to form a hook. This section of pipe has a diameter of 20.5 mm and is 53 mm long. The former specimen was recovered from disturbed contexts while the latter is from a probable early period miscellaneous pit (F.37).
One large section of ferrous pipe (Fig. 149c) has a diameter of 20 mm and is 26.5 cm long. One end has been flattened. This object was recovered from a miscellaneous early period pit (F.20).

Three circular ferrous 'collars' (Fig. 149d-f) were recovered. One has a diameter of 56.2 mm and is 21 mm wide. The metal is 6 mm thick. Another has a diameter of 39.3 mm and is 26.6 mm wide. The metal is 11.2 mm thick. The third 'collar' has a diameter of 36.5 mm and is 23.6 mm wide. The metal has a maximum thickness of 8.6 mm, but is somewhat thinner at one end. The former two objects were recovered from disturbed contexts. The latter was from mixed early and late period fort contexts.

One slightly curved piece of ferrous strapping (Fig. 149g) is rounded at one end. This end has a central round hole. The opposite end is broken and contains a portion of a square or rectangular hole. The object is 27.1 mm wide and 12.5 cm long (incomplete). It was recovered from disturbed contexts outside the fort.

Another piece of iron strapping (Fig. 149h) is 23.5 mm wide and 12.5 cm long (incomplete). It contains three square holes. A clasp headed nail is present in one of the holes. This was recovered from mixed early and late period contexts near the southeast bastion.

A third piece of strapping (Fig. 150a) is composed of two straps each having three holes. Three rose headed nails are present in these holes. The strapping 32.8 mm wide and 7 cm long, and was recovered from a mixed early and late period context.

One thick ferrous strap (Fig. 150b) is 7.2 mm thick, 4 cm wide and 11.5 cm long. It contains a single, countersunk hole. Each end has been cut. The object was recovered from a mixed early and late period context.

One pointed ferrous shank (Fig. 150c) may be part of a large staple. The object has a rectangular cross-section and is 17.7 cm long. The end opposite the point is bent at a sharp angle and broken. This object was recovered from a disturbed context near Structure 1.

One ferrous object (Fig. 150d) may have been made from a file. It consists of a shank having a tang at one end. The opposite end is flattened and bent back on itself to form a hook. This was also recovered from a disturbed context near Structure 1.
One object (Fig. 150e) is similar to a pintle, except that the pointed shank end has a round cross-section, while the opposite end is square. The pointed shank is 8.8 cm long. The opposite end is broken. The object was recovered from a disturbed context just within the west palisade.

One object (Fig. 150f) has a square shank tapering on four sides to form a chisel-like point and may have served as a small chisel. The end opposite the point is broken.

One object (Fig. 150g) has a round shank flattened at each end. One end is bevelled sharply to form a chisel-like point. The object has a shank diameter of 2.9 mm and is 9.9 cm long. The object was recovered from an early period ash pit (F.72) just outside the west palisade.

One object (Fig. 150h) has a round cross-section and tapers to a sharp point at one end. The opposite end is broken. It has a maximum diameter of 3.4 mm and is 32.1 mm long. It was also recovered from an early period ash pit (F.72).

One iron rod (Fig. 150i) is tapered at one end to form a chisel-shaped point. The opposite end is broken. The object has a shank diameter of 7.2 mm and is 8.9 cm long. It was recovered from disturbed contexts near Structure 1.

One object (Fig. 150j) has a wide rectangular shank with a chisel-like point and an L-shaped 'head'. The object is 6.5 cm long, and was recovered from a context relating to the occupation of Structure 1.

One short ferrous rod (Fig. 151a) has one blunt rounded end and one end which has been slightly spread. It is 4.85 cm long and has a maximum width of 1.9 cm. It was recovered from a disturbed context near the west gates of the forts.

One object (Fig. 151b) has a shank that is tapered to a point at one end and hooked at the opposite end. The object is 8.7 cm long and was recovered from a disturbed context near the southeast corners of the forts.

One V-shaped object (Fig. 151c) has an iron rivet passing through its centre. The object measures 4.4 cm across and its rivet is 2.8 cm long. It was recovered from a context related to Structure 1.

One small rectangular-shaped object with an open centre (Fig. 151d) may have served as part of a fastening device. The object is 20.2 mm long and was recovered from a disturbed context near the west gates of the forts.
One somewhat figure 8-shaped object (Fig. 151e) is 4.4 cm long. One loop of the figure 8 is wider than the other. The object may have served as part of a fastening device, possibly for a harness, and was recovered from a disturbed context just outside the west gates of the forts.

One threaded shank (Fig. 151f), 8 mm in diameter and 31.5 cm long, was recovered from a probably early period miscellaneous pit (F.39).

One blade-like object (Fig. 151g) is tapered only near the tip. The opposite end is broken. The finished end contains a single small hole. The object is 17.6 mm wide and 5.3 cm long, and was recovered from just inside the west gates of the forts.

One portion of what may be a crudely made thumb latch (Fig. 151h), 5.9 cm long, was recovered from a disturbed context along the west palisades.

One cartridge-shaped object (Fig. 151i) is 4.72 cm long and has a diameter of 10.7 mm. It was recovered from an early period ash pit (F.72) just outside the west palisade.

One hand-forged sled runner-shaped object (Fig. 151j) has one curved edge and a central enlargement containing a square hole. It is 6.8 cm long and was recovered from a disturbed context along the west palisades.

One possible pot or stove leg fragment (Fig. 151k) has a triangular cross-section and a short projection at one end. It is 7.8 cm long and was recovered from a disturbed context near the apex of the late period east palisade.

One flat piece of iron, rounded and pierced with a single hole at one end, is 38.1 mm long (Fig. 151 l). It was recovered from along the west palisades of the fort.

Another flat piece of iron (Fig. 151m) is pierced with a single hole at one end, and broken at the opposite end. The strap 44.5 mm long, curved, and may be a spur fragment. It was recovered from a disturbed context near the southeast corner bastion.

Another flat piece of iron (Fig. 151n) is rounded at one end and broken at the other. There is a single hole at the rounded end and portions of two holes at the opposite end. It is 3.4 cm long and was recovered from an early or late period pit (F.86) inside the west palisades.

One curved flat piece of iron (Fig. 151o) is slightly flattened perpendicular to the long axis of the object at one end, and is 45.5 cm long. It was recovered from a disturbed context near the west gates of the forts.
One thin flat piece of iron (Fig. 151p) is nearly oval shaped and has a diameter of 5 cm. It was recovered from disturbed contexts near the west gates of the forts.
Interpretation and Historical Identification

Two building phases were documented archaeologically at site 15R. The early fort appeared to have been completely replaced with new palisades, bastions, galleries, gateways, interior separations, and at least some buildings. Some buildings associated with the early fort may have continued in use during the late period. However, since most of the interior of the fort was not excavated, the degree of rebuilding which took place with regard to interior structures is unknown. The one building that was exposed, is a late period structure which had not been associated with the early period fort.

The early and late period palisades differed in size, shape and construction technique. The rectangular early period palisade was replaced by a slightly larger palisade which enclosed it. The east palisade of the late period fort was composed of two segments meeting at a 140 degree angle. Whereas the early period palisade consisted of longitudinally sectioned palisade posts and round inner filler posts, the late period posts were set on grooved sills, while the early period posts were set directly on the ground. The sills may have served a levelling function and allowed the late period palisade posts to be capped by a horizontal plate.

Two bastions were associated with the early period fort while three were associated with the late period fort. The early period bastions were situated at the southeast and southwest corners of the fort. The late period bastions were situated in the southeast, southwest and northeast corners. All except the early period southeast corner bastion appeared to be of post-on-sill construction. This bastion was of en pile construction, and may have been replaced during the early period by a bastion of post-on-sill construction.

A gallery probably existed along all but the south side of the early period fort, and along all sides of the late period fort. The modes of construction of both the early and late period galleries were probably similar.
One gateway associated with the early period fort was exposed. This was situated central to the west palisade. Although no other early period gateway was documented archaeologically, it is assumed that at least one other gateway existed. This was probably situated along the east palisade since that side of the fort was oriented toward the river.

At least three gateways were associated with the late period fort. One of these was situated central to the west palisade. Another was at the apex of the east palisade. The third was in the south section of the east palisade.

The early period fort contained at least one major interior separation (F.82 and F.40) which probably ran across its entire width. It also contained other separations, most of which probably spanned gaps between the palisade and building walls. The late period fort may have contained an interior separation running its width, but evidence for this is not as firm as for the early period fort. The late period enclosure also contained smaller separations similar to those of the early fort.

Only one building was exposed, and this was associated with the late-period fort. However, a number of pits were exposed which may have served as cellars. These may have been associated with either or both early and late period buildings. The single building exposed appeared to be of post-on-sill construction. No evidence was found to suggest that a post-in-ground construction technique was used for any of the structures at site 15R.

One black and white aerial photograph (Fig. 8) was taken in 1966 showing site 15R highlighted by crop and shadow marks (Steer 1976: 23-5). Most of the north and south palisades, and the entire west palisade are evident. Also showing is an interior separation corresponding to features 82 and 40, which apparently extended across the entire width of the fort. What may have been an interior separation corresponding to features 63 and 83 appears to have run from the south palisade north to the separation previously described. Other features which are evident in this photo include a large round feature (probable cellar) corresponding to feature 86, two smaller round features just to the east of feature 86, and a large northwest quadrant of the fort exhibits some linear irregularities which may denote the presence of a major structure.
The archaeological findings at site 15R have been substantiated to a large extent by historical illustrations and journal references. This is especially true for the later building phase.

Paul Kane visited Rocky Mountain House in the spring of 1848. He produced a watercolor and subsequent oil painting (Figs. 5, 6) depicting what appears to be the expanded version of Rocky Mountain House. Both works depict identical scenes, showing the fort in a large open prairie. The view is from the northeast. As a result, only the north and east palisades are represented. Bastions are shown at the northeast and southeast corners. None is depicted at the northwest corner. Gateways are shown at the apex of the east palisade and in the southern portion of the east palisade. Within the fort are a large building with a chimney at its northwest corner and a flagpole. The building is situated along the west palisade and the flagpole is between the northeast and southwest corners of the fort. What may be the upper portion of the south palisade and possibly an interior separation are also depicted. Unidentified features which may be gallery support posts or chimneys project above the north palisade.

The north and east palisades appear to have shapes and dimensions identical to the excavated remains of the late period fort. These palisades are shown to have consisted of upright posts, the tops of which had been capped with a horizontal plate. What appears to be the east half of the south palisade is shown to be somewhat higher than the north and east palisades. What may be an interior partition of the same height as the south palisade appears to run north from the south palisade and then, possibly, to make a turn to the west. Whether or not an interior partition was intended to be represented is unclear. The representation may have been designed to depict the entire length of the south palisade.

The two square bastions depicted by Kane appear to have been of post-on-sill construction, with the top portion of the bastion overhanging the lower portion. The bastions have four-sided sloped roofs. Two loopholes or windows are shown in the east side of each bastion. Two additional loopholes or windows may be depicted on the north side of the northeast bastion.

Of the two gateways depicted in the east palisade, the one at the apex is relatively small. The larger one in the south section of the east palisade is framed. The gate itself appears to have been constructed of upright planks.
Dr. James Hector, a member of the Palliser expedition, visited Rocky Mountain House in 1858. He made a sketch of the post which appears to depict the late period palisade enclosure. The sketch had been drawn from the same angle as the works by Kane, but appeared to have been taken from a higher and more distant vantage point. Of note in this sketch is the angular east palisade and a gateway located on the north portion of this palisade. This gateway is situated just north of the apex of the palisade and was probably meant to represent the gateway shown by Kane at the apex itself. At least one large building is shown within the fort. This appears to be situated along the north palisade. The sketch was very roughly done and probably is not accurate with regard to details.

Historical references to construction details and periods of construction at Rocky Mountain House 1835-16 are sparse (See Fort Description). It appears, however, that the initial construction of the fort took place during 1835-37. The only other written reference regarding major construction activities was an 1860 proposal to set up new bastions and stockades. The early period features exposed at site 15R probably represented the fort that was constructed during 1835-37. There are very few historical references to this building phase, either written or pictorial. The late period features exposed must have been constructed prior to Kane's visit in the spring of 1848, since the fort depicted by him closely resembles those features. The fort must have stood as such until at least 1858, when Hector drew a sketch depicting a fort very similar to that depicted by Kane. Since no evidence was found for the construction of a third major palisade, the proposed construction activities of 1860 were either never carried out or consisted only of repairing the already existing structures.
Appendix A. Analysis of Faunal Remains from Site 15R, Rocky Mountain House by Heather Nicol (edited by Donald N. Steer).

Introduction

Archaeological investigations at site 15R were first undertaken in 1975. Excavations under the direction of Donald N. Steer of Parks Canada continued over the next 2 summers, concluding at the end of the 1977 field season. The faunal analysis was carried out during the winter of 1978 by the zooarchaeological Identification Centre, National Museum of Natural Sciences, Ottawa.

Detailed descriptions and interpretations of the site are presented in the principle archaeological report, as well as in earlier interim reports (Steer 1976, Steer and Rogers 1976). The history of the fort and evidence for its historical identification are discussed in a report by David Smyth (1976). Of the large quantity of bone material recovered from the site, only a small quantity was submitted for identification, the latter originating from selected contexts. Ten depressional features which appeared to be secure in context were involved (See Table 16; Fig. 9).
METHODS

All bone fragments were identified to the smallest taxonomic class, each piece being counted separately unless modern breakage was indicated. Minimum numbers were estimated for each species identified, based upon the frequency of skeletal duplication within each feature.

Specimens were checked for age, sex, burning, butchery, and secondary alteration in order to extract all pertinent information from the refuse material.

When identifications were complete and the minimum number of individuals in each feature determined, calculation of meat contribution of each species was undertaken. In this way, the importance of each in the dietary economy of Rocky Mountain House 15R could be assessed. Data for meat contributions of each species is derived from Banfield (1974), Godfrey (1966), Rick (1976), Scott and Crossman (1973), as well as reference specimens of known age and sex.
SPECIAL CONSIDERATIONS

Bone material submitted for analysis was selected from 10 features which appeared to be secure in context. The site had been subjected to much modern disturbance and more bone was left unanalyzed, because of uncertain context, than was identified in this report. Figure 9 is the plan of Rocky Mountain House site 15R, showing where these features are located.
A total of 2478 bone pieces were contained within the 10 features analyzed. A summary of identification of fragments to each class is presented below. Classes are arranged in order of importance within the sample.

<table>
<thead>
<tr>
<th>Class</th>
<th>Total No.</th>
<th>Identifiable</th>
<th>Unidentifiable</th>
<th>% Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAMMAL</td>
<td>2198</td>
<td>763</td>
<td>1435</td>
<td>87.0</td>
</tr>
<tr>
<td>BIRD</td>
<td>206</td>
<td>85</td>
<td>121</td>
<td>9.0</td>
</tr>
<tr>
<td>FISH</td>
<td>63</td>
<td>15</td>
<td>48</td>
<td>3.0</td>
</tr>
<tr>
<td>MOLLUSC</td>
<td>11</td>
<td>8</td>
<td>3</td>
<td>.5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>2478</td>
<td>871</td>
<td>1607</td>
<td>99.5</td>
</tr>
</tbody>
</table>

Of the total of bone material identified, 65 per cent was unidentifiable, and only 35 per cent could be assigned to species. Mammal was the most important class, providing over 87 per cent of identifications.

FISH

Fish were minimally represented in the site 15R material. A total of 63 fragments were identified, of which only 15 (23.8 per cent) pieces could be assigned to species. A quantity of fish scales were also submitted for identification, most of which appeared to have come from the same species. Unfortunately, a lack of reference material did not allow the identification of these scales. The benefits derived from such an analysis are minimal, since it is not possible to estimate the number of individuals represented by scale fragments.

Only the rainbow trout and the whitefish were identified, both of which are available in the area of the site. The problems of distinguishing between lake and mountain whitefish are discussed elsewhere (See site 16R Faunal Analysis - Steer and Rogers 1978). Whitefish from the site 15R sample was treated in the same manner, and lake and mountain whitefish were both considered as possible species.

While Hudson's Bay Company records show that fish was important in the
fur trade post diet, this does not seem to be the case at site 15R. In part, this might have been the result of a lack of fisheries. Smyth (1978) notes that extensive fisheries associated with Rocky Mountain House site 15R did not develop until the 1860s when lakes distant to the site were used. Thus, the fish present in the site 15R material might all have been taken in limited numbers close to the post. This is suggested by the accounts of fish taken close to the site (Smyth 1976), and by the type of species identified. Both whitefish and trout are early winter spawners, and would have moved into shallow waters and been more accessible during winter months, at the time when they were most needed by the Rocky Mountain House inhabitants. If mountain rather than lake whitefish were represented by the elements assigned to this genus, then it would have been readily available, as would be rainbow trout, in the numerous rivers which were close to the post.

BIRD
A total of 213 bird bone fragments were identified, or 9 per cent of bone recovered from site 15R. Of these fragments, 85 could be identified to species (39.9 per cent), the remaining 128 pieces (60.1 per cent) were assignable to class only.

Much of the bird bone present in the sample came from aquatic species such as duck, goose, swan and crane. Over 58 per cent of identifiable bone specimens were attributed to these species. The remaining proportion of bird bone was assignable to tetraonid species, and nuisance and song birds such as raven, crow, and thrush.

The gray partridge was identified, but its presence in the site 15R bird bone must be considered as intrusive. This species was introduced to North America long after the abandonment of Rocky Mountain House site 15R.

A lack of diagnostic bone morphology of certain specimens meant that specific identifications could not be made. This was the case for all large Tetraonids identified and all small tetraonids. While large goose bones recovered are probably from the Canada goose, the presence of the white-fronted goose in areas near Rocky Mountain House means that caution must be used in goose identification. This problem, the difficulty of distinguishing between similar species of overlapping range, is discussed
more completely in the report of bone identifications from Rocky Mountain House site 16R.

Fowling activity appears to have been concentrated on the taking of aquatic birds; particularly geese, and tetraonids (generally grouse). These would tend to be the most available birds in the area. A reliance on geese and "partridge" is suggested not only from historical records relating to the Hudson's Bay Company (Innes 1956: 132) but also from the bird bone identified at Rocky Mountain House site 16R. The reason for the greater use of these species would simply be one of season, and availability. Geese would migrate into the area in spring and fall, when they were needed either to stock provisions to tide the occupants over winter months, or to provide fresh meat at the end of the winter. Grouse, being year round residents of the province, would be available in winter when the population of the fur post was at its maximum.

Species such as raven and crow might have been used as food, but it is just as likely that they were killed for feathers or for sport. The thrush identified in the bird bone might have been killed by the fort's occupants, but it is more likely that its inclusion in the bird material is fortuitous, since it represents no real food resource. If birds were selected for bright feathers for ornamentation, then perhaps it was taken for these purposes.

Age, Sex and Seasonality

One bone specimen (from an undetermined species) displayed a build-up of medullary bone. This indicates that the bird was female, and was taken prior to laying, probably in spring. No other diagnostic material was recovered which could be used to assess the sex of individuals present.

Two humeri from one mallard, gadwall, or pintail were aged. On the basis of some porous bone at shaft extremities and a line visible between the proximal epiphysis and diaphysis, these elements were assessed to be of immature age. This would place the death of the individual in the late summer to fall. These two humeri were the only bone specimens which were indicative of a specific time of death, the remaining bird material was of unknown osteological age.
From the limited evidence of medullary bone and immature bone, it appears that birds were taken in spring and fall, but, this does not indicate that fowl was not taken at other times of the year. Since most fur posts, including Rocky Mountain House site 15R, opened for the trading season in the fall, and were closed again in the spring, the use of summer and fall migrants and year-round resident tetraonids makes sense. While a few residents or company employees might have remained at the post throughout the year, taking birds when available, the most important avifauna would be those which were available when the number of occupants was at its maximum, from fall through spring.

Cut Marks on Bird Bones
Only 15 bird bones had been cut, all of these from large or medium large birds. All of these cuts were related to disarticulation or butchery, being found in the joint area of the bird. Only swan, goose, and large tetraonid bones had been cut. The remaining bird bones were probably of a small enough size to facilitate the cooking of the carcass whole.

Two specimens which had also been cut for butchery purposes showed meat removal marks in the mid-shaft area. This indicates that disarticulation of large birds was probably done for the sake of convenient cooking, rather than for removal of only specific portions of the bird.

Mammals account for 2198 bone pieces, 763 of which were identifiable (35 per cent). Of the remaining 1435 unidentifiable mammal fragments, 1098 (77 per cent) come from large artiodactyls.

Large artiodactyl species identified include bison, domestic cow, (which had been introduced at Rocky Mountain House) moose, elk, mule deer and caribou. The bison was the most commonly identified of these species.

The hunting of cervids (moose, elk, mule deer and caribou) can best be described by the following quote, written by Hector in 1858:

There is very little known of this part of the country
during summer months, as the fort is abandoned every spring until the following autumn. When the Company's people first arrive, which is generally in October, they get plenty of wapiti and other kinds of deer round the fort, and not so far distant moose and rein-deer are always to be found (Smyth 1976: 187)

The availability of large artiodactyls close to the fort during winter months is probably the best explanation of their frequent occurrence in the food refuse.

A variety of smaller mammals were also identified, most of which appear to have been used for food. Small rodents such as squirrels, voles, deer mice, and lemmings are probably not associated with the historical occupation, since they are ubiquitous in the area and commonly burrow into the ground. These are not included in the estimation of meat contributions (See Table 19).

Butchery marks associated with Canis species, lynx, hare, and beaver show that these mammals were used for food. The eating of dog, hare, and beaver is mentioned in historical journals dating to the 18th century (Smyth 1976, 1978). Lynx is generally assumed to have been taken for its fur, but it appears that at site 15R it was also eaten.

Bear, porcupine, and marten were also identified in small numbers. Both bear and porcupine seem to have been food species, since butchery marks were found on several bones. Marten does not appear to have been butchered, and this small mustelid was most likely a fur rather than food resource.

Canis species
Although most canid bones could not be identified beyond genus, one mandible was assigned to the domestic dog, on the basis of the spacing of teeth and the depth of the mandible. Reports from Rocky Mountain House site 16R (1799-1821) suggest that dogs were often eaten by the Northwest Company men, and it is likely that the dog was used for food as well as pulling sleighs at site 15R.
Bos and Bison

The techniques used for distinction between Bos and Bison have been discussed with respect to the site 16R food refuse (Steer and Rogers 1978). Within the site 15R sample, fewer morphologically undiagnostic Bos-Bison elements were identified. These are treated as a separate group from either bison or domestic cattle. In meat estimations the minimum number of Bos-Bison calculated are multiplied by the average weight of a wood bison rather than a domestic cow. The wood bison weight is used rather than that of cow simply because the probability is greater of these being bison, the most frequently identified mammal in the bone debris.

A small percentage of domestic cow bone was identified. This bone may be considered as dating to the fur post. Oxen were introduced in the 1840s and kept at the site (Smyth 1978). Since domestic cattle were introduced after 1861, as were domestic pigs, it may be that domestic cattle bones in the site 15R food refuse are from oxen rather than beef or dairy cattle.

Age, Sex and Seasonality

Sex determination of mammals identified was not possible for the most part, as little diagnostic bone was recovered. One antler specimen from an elk showed that the antler had been attached to the frontals at the time of death. This indicates that the head of the animal had been taken to the site, or at least that the antler was not shed and picked up later. The number of male elk cannot be estimated from the antler material identified.

Several fetal artiodactyl bones were recovered from a minimum of 3 individuals. This would indicate, however, that several female adults had been taken during winter months prior to calving.

Most bone fragments identified were from individuals whose age could not be assessed by osteological criteria, and are therefore of unknown age. However, none of these bone pieces were juvenile by osteological standards. This was determined either by the presence of fused early fusing epiphyses, or by a lack of porous and morphologically undeveloped bone, associated with juvenile or fetal age.

Some adult, sub-adult, and immature individuals were identified, but
in most cases such age categories were too broad to be of use in determining either the specific age of the animal at death, or the season in which the animal died. Only fetal bone was useful in showing that large artiodactyls were taken throughout the winter.

Cut Marks on Mammal Bones

Butchery cuts were found regularly on large artiodactyls, elk, moose, bison and cow. Of large artiodactyl fragments identified, 38 per cent had been cut, most for butchery rather than skinning or meat removal purposes.

Figures 152 through 157, below denote the location and number of butchery cuts and meat removal cuts associated with large artiodactyls. Skinning marks, and cuts associated with carpals and tarsals and other small bones not shown in the diagrams are listed below the appropriate figures.

Cuts on large artiodactyls consistently occur in the joint areas. Meat removal cuts were more commonly found in mid-shaft areas where the meat might have been cut from the bone when being eaten or being prepared for cooking. Skinning marks occur either in the lower limb area, where skinning commences, or on the outer surface of the mandible where the skin is removed from the head.

While heavy implements such as axes, cleavers and saws appear to have been used for butchery of bone from large mammals, smaller mammals were generally disarticulated by use of a lighter implement such as a knife. Only a few of the smaller mammals, such as Canis species, lynx, bear and beaver display butchery marks on bones. The remaining small mammals do not appear to have been disarticulated, with the exception of the snowshoe hare. Only 3 hare bones had been cut, showing that although at times this species may have been portioned, generally it was cooked in an articulated or semi-articulated state.

Most cuts on lynx bones were in the area of the joints. This suggests the disarticulation of the carcass for use as food. More butchery than skinning marks were seen on lynx bones, again showing the use of this mammal for food as well as fur.

Only one bear bone, that of an extremity, had been cut. This cut was probably incurred when the foot of the bear was taken off.
Butchery marks are generally missing from beaver bone at archaeological sites unless the animal is of a good size. Guilday, Parmalee, and Tanner (1962) suggest that beaver may be stewed in one piece, unless of adult stature. While all the cut bone from the site 15R beaver might be from immature individuals, these appear to have been approaching adult size, and would probably be too large for the cooking pot.

MOLLUSCS
Only 11 mollusc fragments were recovered, 8 of which were identifiable to species. Most unidentifiable fragments were from valves of mussels and 1 from dentalium.

The blue mussel and dentalium were the only identifiable species, both marine molluscs from the west coast. They must have been obtained through trade, and were probably important as ornamental items for Indian groups trading at Rocky Mountain House. Neither species is considered as a food species within this report, and molluscs are excluded from the estimation of meat contribution.
Dietary Inferences
A total of 14269.6 kg of animal meat was estimated from the identifiable bones in the site 15R food refuse material. Of this total, 14176.3 kg (99.3 per cent) was contributed by mammals. The remaining 0.7 per cent was contributed by both fish (13.7 kg - 0.1 per cent) and bird (79.6 kg - 0.6 per cent). Information with respect to the average weight of individuals of each species identified in the food refuse was taken from various sources (Rick 1976: 61-3; Cleland 1971; Zooarchaeological Identification Centre; Banfield 1974; Godfrey 1966). The estimation of meat contribution per species allowed an assessment of the relative importance of each species as a meat resource, rather than the relative importance of each species as indicated by the number of bones recovered. Data used in the estimation of meat contribution of species is summarized in Table 19.

All identified fish was assumed to have been used as food. With mammals and birds, however, it was not certain whether all individuals present could be considered as food refuse. Such small mammals as meadow voles, lemmings, deer mice and flying squirrels were not included in the estimation of mammalian meat provided because they are probably fortuitous inclusions. Even if these small rodents were deliberately hunted by the occupants at site 15R, the amount of meat they provided was negligible.

Crows and ravens might have provided meat for the fur post's occupants, and therefore they are included in meat estimations of birds. However, the small thrush species identified is not included, for the same reasons as small rodents. The gray partridge is another species which is not included, simply because it was introduced to North America at a later date than that of the Rocky Mountain House occupation.

Fur-bearing species, such as lynx and marten, may be positively identified as food species by the presence of butchery cuts on bones recovered from these species. This is in contrast to the bones of these same species identified in the site 16R material, all of which showed only skinning cuts or no cuts at all. Apart from the small rodents previously mentioned, all mammals identified appear to have been used as food,
although some may also have been taken for furs as well as food.

The most important of mammals identified in the site 15R food refuse was bison. Bison alone accounted for 44.5 per cent of the estimated meat. During the 1850s the bison robe trade was booming, as the demand for robes increased (Smyth 1976: 26). At the time of the site 15R occupation, the decline of buffalo had not begun. The copious quantity of buffalo in the area of Rocky Mountain House during some winters was only checked by a natural fluctuation of local populations during others. While overkill may have occurred in the area surrounding the historic fur post, this was temporary situation at most. Not until after 1861 did the decline in bison become chronic. Thus, at site 15R, as at site 16R, the bison was the basic commodity of the dietary economy.

While bison formed the mainstay of the diet, elk was another important food species. In some winters when bison were less numerous, elk were probably relied upon to a greater extent. In the winter of 1848 Gladstone notes that elk were the most common game around the fort, and reports that over 600 were killed in one season, the meat of these elk being "as good as buffalo" (Smyth 1978). Interestingly, the percentage of meat contributed by elk at site 15R is less than moose (elk - 15.4 per cent, moose - 19.1 per cent). In 1858, Hector commented that elk, moose, deer, and caribou could all be found in the Rocky Mountain House area, although moose and caribou were obtained at greater distances from the fort. Cabbrie, or pronghorn antelope could also be taken, but only in the spring (Smyth 1976: 187).

While an adequate supply of large artiodactyls may have been available near the fort, small mammals such as beaver were declining throughout the area (Smyth 1976: 26). From site 15R, beaver provided only 55.7 kg (0.4 per cent) of meat from the meat weight calculations presented in Table 19.

Dogs were also used for food, but infrequently, as suggested by both the percentage of meat contributions at site 15R which could be assigned to Canis species, and historical references to dog eating. Gladstone (Smyth 1978) reports that dogs were killed and eaten when other meat ran out, and that most dogs were bought from Indians. He also relates that dog "steaks" were popular, under these conditions.

Snowshoe hare supplied a good percentage of identifiable bone, but a small percentage of meat, according to Table 19. There are many references
to the hunting of "rabbit" after 1861 at Rocky Mountain House, but few references which pertain to the 1835–61 fur post. Gladstone notes in 1848 that "rabbits are a thing of the past" (Smyth 1978). What this means is unclear, but perhaps there was a natural decline in the number of hares which could be taken close to the site, or perhaps this small species had been temporarily hunted out.

Lynx appears to have been a more popular food species than at Rocky Mountain House site 16R. However, the amount of meat provided by lynx is relatively insignificant, some 0.3 per cent of the total of estimated meat. Grizzly bears were more important, however. Although only 1 individual was identified, it contributed 1.1 per cent of estimated meat. Since more meat and grease was provided through trade than could be taken locally, the true importance of bear in the Rocky Mountain House diet is probably not adequately expressed by this percentage.

Domestic cattle were also present at the site. The first account of oxen was made in 1848 (Smyth 1978), but domestic beef or dairy cattle were not mentioned. Only a small proportion of meat (6.4 per cent) could be assigned to domestic cattle, and this may be due to the fact that the Company discouraged the use of oxen for food (Smyth 1978).

Birds were not an important component of the Rocky Mountain House diet, according to meat estimations. Birds provided only 0.5 per cent of meat estimations. Most important were large geese, trumpeter swans and other aquatic species. Tetraonids, large and small grouse and perhaps the prairie chicken, were the most important terrestrial species identified. The significance of these species in the fort diet has been adequately discussed in the site 16R report (Steer and Rogers 1978). Interestingly, domestic chicken was not identified in the site 15R material, although it had been present at the earlier Rocky Mountain House site 16R fur post.

Only a minute proportion of meat came from fish. It appears that prior to the development of fisheries in the area, little attention was paid to fishing in local waters. Only 0.1 per cent of meat calculations could be assigned to fish species.
Seasonality
According to historical sources, much of the hunting at Rocky Mountain House site 15R occurred during winter months. At this time the number of occupants at the fort was at its maximum. Most of the available information about seasonal hunting at the post must be supplied by historical sources rather than by the faunal sample itself. Little osteological evidence was revealed which might allow an assessment of the season or specific age (in months) in which the animals identified in the food refuse had died. The only reliable evidence of winter hunting appears to be the identification of several fetal artiodactyls, indicating that a pregnant female had been killed in the winter, prior to calving.

With smaller mammal species, particularly those which played an important part in the fur trade, little information could be deduced with regard to seasonal hunting. Small furbearers are always best taken in the winter, if the pelt is of most importance. However, since many butchery marks appear on small furbearing species identified in the sample, it is safe to assume that at times they provided food for the site's occupants. Bearing this in mind, it is impossible to determine the season in which these species were taken, since they might have provided meat for company men stationed at the post throughout the year. Historical reports are not explicit in discussing the hunting of furbearing animals for meat. Only "rabbits" are mentioned as being taken close to the site during winter months (Smyth 1976).

Birds were probably taken from late spring through early fall. Unfortunately little information could be gathered from historical records with respect to fowling activities at the post. Examination of the bird bone did reveal, however, some seasonal osteological characteristics. Medullary bone found on one specimen showed that some birds were taken in spring. Immature bone from a mallard, pintail or gadwall shows that birds were also taken in the late summer or fall. Perhaps the fall was the time which saw the greatest utilization of migratory avian resources, since at this time it would be possible to prepare and preserve the meat for winter months ahead (Innis 1956: 132). Tetraonids might be taken at all times of the year, and the fact that they were available throughout the winter might be one factor which made them an important food resource.

The fish bones included in the bone material were all from species
which spawn in early winter. Fish could have been available at all times of the year, depending upon the species and the waterbody fished. It appears, however, that only those species available in winter months were of, at most, marginal importance at Rocky Mountain House.

Molluscs were not taken; only species available in trade with Pacific Coast Indians were identified. It is more likely that the shells were imported for use in making Indian ornaments rather than for food.

Summary
Most of the hunting at Rocky Mountain House took place during winter months, as the fur post was generally abandoned at the end of the trading season in the spring. The percentages and meat contributions of species identified in the food refuse material from this site probably reflect their availability at this time.

According to historical sources large artiodactyls could be found in the sheltered river valley, and these appeared to have provided most of the meat needed by the fort occupants. When large artiodactyls were scarce, smaller mammals such as rabbits were important in providing meat, as were fish which could be taken in winter months (Smyth 1976).

Birds were most probably taken in the spring and fall, when migratory species passed through the area of the site. This was suggested by the presence of medullary bone and by immature duck specimens, the former indicating spring fowling and the latter indicating late summer and fall fowling.

Stocked provisions must have reached Rocky Mountain House, and supplemented the diet, but no trace would remain of these. Pemmican and large quantities of bear grease must also have been stored at the site, obtained either from the Company or from trade with Indian tribes.

Historical records indicate that survival at the site was often precarious and periods of near starvation set in. At these times, either shipments of supplies alleviated conditions or occupants of the post began to collect available small mammals and fish (Smyth 1976).

Historical records also indicate that there were tremendous fluctuations of game species in the area (Smyth 1976, 1978). Bison were
often scarce in one winter and numerous in the next. Both natural population fluctuations and human predation were probably factors which induced scarcity at times, although during the time site 15R was operated by the Hudson's Bay Company, the decline in bison numbers had not become critical.

How well the sample identified reflects the true conditions of subsistence at Rocky Mountain House site 15R cannot be ascertained. Over 90 per cent of the meat appears to have been provided by large artiodactyls, with only small supplementations from small mammals, birds and fish. Reports of tremendous numbers of large artiodactyls killed dominate journal references dealing with the dietary economy during this period (e.g. Gladstone reports 600 elk taken in one winter: Smyth 1978), while references to small game are limited. This does suggest that the composition of the food refuse identified at site 15R provides a realistic picture of the dietary economy between 1835 and 1861.
Comparison Between Site 16R and 15R Faunal Remains

Comparisons between samples of a different size and of a different sampling technique may often be dangerous. Since the samples for the two sites, 15R and 16R, are neither complete, nor equivalent in size or area of the site represented, differences in composition and percentages within the food refuse analyzed may be misleading. However, in the absence of a complete sample, some comparison is necessary, to outline what may perhaps be general trends or differences in dietary economy. Bearing in mind the difference between samples, and the difficulties involved in dealing with unequal volumes of refuse material, there appear to be some minor differences worth noting.

It appears that birds may have been a more important component in the North West Company diet at site 16R. While avian species account for approximately 9 percent of the site 16R faunal bone, they account for only 0.4 percent of the later period site 15R samples. There is a greater variety of bird species identified in the site 16R material. While waterfowl are most important, tetraonids, passenger pidgeon, raptorial birds and domestic chicken were also recovered. In the site 15R sample, on the other hand, the minute proportion of bird bone identified came almost exclusively from waterfowl, with smaller proportions of tetraonids.

Some differences also occur in the mammal bone material. The number of beaver is drastically reduced in the site 15R sample, supporting the theory that this small furbearer was declining in the area (Smyth 1976: 26). Lynx, however, becomes a most important species in the site 15R material, having been less substantially represented within the site 16R mammal bone. There are now associated with this species butchery cuts, showing its use as a food animal, while in the site 16R sample no such butchery cuts occur.

It appears that the number of hare found in the site 15R material is almost double that of the site 16R sample. Smyth (1976) makes mention in several instances of the importance of rabbit during lean winters. Why hare seems more important at the Hudson's Bay Company post cannot be determined on the basis of this information, but may perhaps be related to
the fact that it would be an available species close to the site.

There are some slight differences between the two posts in the ratio of moose and elk. Elk is more important on the basis of the sample, at the Northwest Company site 16R, while moose is more important at the Hudson's Bay Company, site 15R. This may or may not be of any significance, and could easily reflect local population fluctuations of these particular species or a bias on the part of the sample.

It may be that many of the differences in percentage which occur between sites 15R and 16R are a result of unequal sampling. However, the overall tendency is towards an increase in the amount of large game, and a decrease in reliance on small game in the site 15R material. In contrast, the site 16R material contains greater numbers of small mammals, birds and fish, and a greater variety of these species. Such differences might be related to the notion of a decline in availability and variety of game in the area, as suggested by Smyth (1978), or might be the result of the different utilization of resources by two different cultures.
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<tr>
<td>F.20</td>
<td>F.1</td>
<td>F.2</td>
</tr>
<tr>
<td>F.23</td>
<td>F.8</td>
<td>F.7</td>
</tr>
<tr>
<td>*F.30</td>
<td>F.11</td>
<td>**F.19</td>
</tr>
<tr>
<td></td>
<td>F.48 (exterior)</td>
<td></td>
</tr>
<tr>
<td>F.32</td>
<td>F.63</td>
<td>F.46</td>
</tr>
<tr>
<td>F.33</td>
<td>F.70</td>
<td></td>
</tr>
<tr>
<td>*F.36</td>
<td>F.118</td>
<td>F.68</td>
</tr>
<tr>
<td>F.37</td>
<td></td>
<td>F.77</td>
</tr>
<tr>
<td>F.39</td>
<td></td>
<td>F.86</td>
</tr>
<tr>
<td>F.65</td>
<td></td>
<td>F.98</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F.110</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F.113</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F.117</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F.127 (Exterior)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F.128 (Exterior)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F.129 (Exterior)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F.130 (Exterior)</td>
</tr>
</tbody>
</table>

* Possible prehistoric pit
** Possible 20th century depression
Table 5. Miscellaneous Posts and Postholes

<table>
<thead>
<tr>
<th>Early Period</th>
<th>Late Period</th>
<th>Early or Late Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>F.25</td>
<td></td>
<td>F.69</td>
</tr>
<tr>
<td>F.42</td>
<td></td>
<td>F.115</td>
</tr>
</tbody>
</table>
Table 6. Miscellaneous Trenches

<table>
<thead>
<tr>
<th>Early Period</th>
<th>Late Period</th>
<th>Early or Late Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>F.5</td>
<td>F.67</td>
<td>F.76</td>
</tr>
<tr>
<td>Feature</td>
<td>Dimensions</td>
<td>Fill Material</td>
</tr>
<tr>
<td>---------</td>
<td>------------</td>
<td>---------------</td>
</tr>
<tr>
<td>F.3</td>
<td>40 cm (N-S) by 20 cm (E-W)</td>
<td>Orange ash period</td>
</tr>
<tr>
<td>F.6</td>
<td>70 cm (N-S) by 165 cm (E-W) by 13 cm below estimated occupation level</td>
<td>Charred wood, chinking, humus and clay</td>
</tr>
<tr>
<td>F.27</td>
<td>115 cm (N-S) by 110 cm (E-W) by 29 cm below estimated occupation level</td>
<td>Grey ash mottled with charcoal and red clay</td>
</tr>
<tr>
<td>F.35</td>
<td>70 cm (N-S) by 60 cm (E-W) by 16 cm below estimated occupation level</td>
<td>Grey ash and charcoal</td>
</tr>
<tr>
<td>F.49</td>
<td>55 cm (N-S) by 55 cm (E-W)</td>
<td>Grey brown silty clay mottled with charcoal, wood and stones</td>
</tr>
<tr>
<td>F.50</td>
<td>35 cm (N-S) by 40 cm (E-W)</td>
<td>Charcoal</td>
</tr>
<tr>
<td>F.51</td>
<td>40 cm (N-S) by 60 cm (E-W)</td>
<td>Charcoal</td>
</tr>
<tr>
<td>F.52</td>
<td>37 cm (N-S) by 47 cm (E-W)</td>
<td>Wood and charcoal</td>
</tr>
<tr>
<td>F.53</td>
<td>30 cm (N-S) by 35 cm (E-W) by 7 cm below estimated occupation level</td>
<td>Charcoal</td>
</tr>
<tr>
<td>F.54</td>
<td>50 cm (N-S) by 50 cm (E-W)</td>
<td>Charcoal and chinking</td>
</tr>
<tr>
<td>F.55</td>
<td>35 cm (N-S) by 28 cm (E-W)</td>
<td>Charcoal</td>
</tr>
<tr>
<td>Feature</td>
<td>Dimensions</td>
<td>Fill Material</td>
</tr>
<tr>
<td>---------</td>
<td>------------</td>
<td>---------------</td>
</tr>
<tr>
<td>F.56</td>
<td>60 cm (N-S) by 1.5 m (E-W)</td>
<td>Grey clay containing wood, charcoal and black silt</td>
</tr>
<tr>
<td>F.57</td>
<td>45 cm (N-S) by 48 cm (E-W)</td>
<td>Grey silty clay containing black silt, charcoal and wood</td>
</tr>
<tr>
<td>F.60</td>
<td>55 cm (N-S) by 1 m (E-W)</td>
<td>Medium brown silty clay with black silt and wood</td>
</tr>
<tr>
<td>F.61</td>
<td>40 cm (N-S) by 70 cm (E-W) by 13 cm below estimated occupation level</td>
<td>Grey clay with wood, charcoal, bones and black silt</td>
</tr>
<tr>
<td>F.72</td>
<td>5.9 m (N-S) by 2.6 m (E-W) by 21 cm below estimated occupation level</td>
<td>Ash, loam, charcoal, stones, wood and bones</td>
</tr>
<tr>
<td>F.80</td>
<td>37 cm (N-S) by 57 cm (E-W)</td>
<td>Charcoal and wood</td>
</tr>
<tr>
<td>F.101</td>
<td>45 cm (N-S) by 45 cm (E-W)</td>
<td>Orange ash</td>
</tr>
<tr>
<td>F.120</td>
<td>95 cm (N-S) by 2.4 m (E-W)</td>
<td>Light brown clay containing ash, chinking and charcoal</td>
</tr>
<tr>
<td>F.121</td>
<td>35 cm (N-S) by 35 cm (E-W) by 5 cm below estimated occupation level</td>
<td>Charcoal and chinking</td>
</tr>
<tr>
<td>F.122</td>
<td>77 cm (N-S) by 30 cm (E-W)</td>
<td>Grey clay mottled with charcoal, wood and chinking</td>
</tr>
<tr>
<td>Feature</td>
<td>Dimensions</td>
<td>Fill Material</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>F.123</td>
<td>76 cm (N-S) by 40 cm (E-W)</td>
<td>Grey silty clay mottled with white ash. Rocks covered most of feature</td>
</tr>
<tr>
<td>F.124</td>
<td>60 cm (N-S) by 1.9 m (E-W)</td>
<td>Grey silty clay containing a large amount of charcoal and wood</td>
</tr>
<tr>
<td>F.125</td>
<td>23 cm (N-S) by 32 cm (E-W)</td>
<td>Wood and charcoal</td>
</tr>
<tr>
<td>F.126</td>
<td>55 cm (N-S) by 32 cm (E-W)</td>
<td>Grey clay mottled with charcoal, wood and ash</td>
</tr>
<tr>
<td>F.131</td>
<td>70 cm (N-S) by 55 cm (E-W)</td>
<td>Grey clay mottled with charcoal and wood chips</td>
</tr>
</tbody>
</table>
Table 8. Artifact Associations of Other Miscellaneous Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Artifact Associations</th>
</tr>
</thead>
<tbody>
<tr>
<td>F.3</td>
<td>None</td>
</tr>
<tr>
<td>F.6</td>
<td>One piece of miscellaneous clear unidentified glass</td>
</tr>
<tr>
<td>F.27</td>
<td>3 plain clay pipe stem fragments, 4 plain clay pipe bowl fragments, 1 clay pipe fragment marked IF on spur, 1 machine-cut nail, 7 nail fragments, 2 clear lead round bottle fragments and 2 window glass fragments</td>
</tr>
<tr>
<td>F.35</td>
<td>4 copper alloy wire fragments, 3 plain clay pipe stem fragments, 2 plain clay pipe bowl fragments, 3 hand-wrought nails, 5 nail fragments and 1 ceramic sherd of variety SCT2Vu</td>
</tr>
<tr>
<td>F.49</td>
<td>None</td>
</tr>
<tr>
<td>F.50</td>
<td>None</td>
</tr>
<tr>
<td>F.51</td>
<td>None</td>
</tr>
<tr>
<td>F.52</td>
<td>None</td>
</tr>
<tr>
<td>F.53</td>
<td>None</td>
</tr>
<tr>
<td>F.54</td>
<td>None</td>
</tr>
<tr>
<td>F.55</td>
<td>None</td>
</tr>
<tr>
<td>F.56</td>
<td>None</td>
</tr>
<tr>
<td>F.57</td>
<td>None</td>
</tr>
<tr>
<td>F.60</td>
<td>None</td>
</tr>
<tr>
<td>F.61</td>
<td>1 iron projectile point and 2 hand-wrought nails</td>
</tr>
<tr>
<td>F.72</td>
<td>1 gunflint, 1 piece of lead shot, 1 brass upholstery tack, 1 antler utensil handle, 2 iron barrel hoop fragments, 20 plain clay pipe stem fragments, 12 plain clay pipe bowl fragments, 5 glass beads, 1 piece of fabric, 4 hand-wrought nails, 1 machine-cut nail, 10 nail fragments, 1 round staple, 3 miscellaneous ferrous objects, 1 ceramic sherd of variety SCT2Vdd and 1 ceramic sherd of Category B, 1 clear lead fiddle-shaped bottle fragment, 3 pieces of miscellaneous clear lead glass, 2 pieces of window glass and 1 piece of lead window glass</td>
</tr>
<tr>
<td>F.80</td>
<td>None</td>
</tr>
<tr>
<td>F.101</td>
<td>2 nail fragments</td>
</tr>
<tr>
<td>F.120</td>
<td>None</td>
</tr>
<tr>
<td>F.121</td>
<td>None</td>
</tr>
<tr>
<td>F.122</td>
<td>None</td>
</tr>
<tr>
<td>F.123</td>
<td>1 quartzite flake and 1 plain clay pipe stem fragment</td>
</tr>
<tr>
<td>F.124</td>
<td>1 plain clay pipe bowl fragment and 1 nail fragment</td>
</tr>
<tr>
<td>F.125</td>
<td>None</td>
</tr>
<tr>
<td>F.126</td>
<td>None</td>
</tr>
<tr>
<td>F.131</td>
<td>1 dentalium shell bead and 1 hand-wrought nail</td>
</tr>
<tr>
<td>Variety</td>
<td>Early Period</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Variety b. Light green glass</td>
<td>F.40, F.89</td>
</tr>
<tr>
<td>Variety c. Clear glass: lead</td>
<td>F.27</td>
</tr>
</tbody>
</table>
Table 9. Continued

<table>
<thead>
<tr>
<th>Variety d. Clear glass: soda</th>
<th>Early Period</th>
<th>Late Period</th>
<th>Early and/or Late Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Associated with the hearth of Structure 1</td>
<td>In the southwest corner of the forts; along the northern section of the east edge of the forts</td>
<td></td>
</tr>
</tbody>
</table>

| Variety e. Amber            | -            | F.31. Burned sod horizon | - |
|                             |              | Along the northern section of the east edge of the forts |

| Variety f. Light blue glass | -            | -                        | - |
|                             |              | Along the northern section of the east edge of the forts |

Type 2. Square Sectioned

<table>
<thead>
<tr>
<th>Variety a. Clear glass: lead</th>
<th>Early Period</th>
<th>Late Period</th>
<th>Early and/or Late Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner west palisade trench fill</td>
<td></td>
<td></td>
<td>Along the west edge of the forts</td>
</tr>
</tbody>
</table>

Type 3. Fiddle-shaped

<table>
<thead>
<tr>
<th>Variety a. Clear glass: lead</th>
<th>Early Period</th>
<th>Late Period</th>
<th>Early and/or Late Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>F.72</td>
<td>-</td>
<td>F.77, F.98</td>
<td></td>
</tr>
</tbody>
</table>
**Table 9. Continued**

<table>
<thead>
<tr>
<th>Type 4. Polygon Sectioned</th>
<th>Early Period</th>
<th>Late Period</th>
<th>Early and/or Late Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variety a. Light green glass</td>
<td>F.103. Inner west palisade trench fill</td>
<td>F.8, F.31, F.67, F.84, F.102, F.118</td>
<td>F.86, F.129. Northeast corner area of the forts</td>
</tr>
<tr>
<td>Variety b. Clear glass: lead</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Variety c. Clear glass: soda</td>
<td>-</td>
<td>F.31</td>
<td>Southwest corner area of the forts</td>
</tr>
<tr>
<td>Variety d. Light blue glass</td>
<td>-</td>
<td>-</td>
<td>Along the northern section of the east edge of the forts</td>
</tr>
</tbody>
</table>
Table 9. Continued

<table>
<thead>
<tr>
<th></th>
<th>Early Period</th>
<th>Late Period</th>
<th>Early and/or Late Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variety e. Smoked glass: lead</td>
<td>-</td>
<td>-</td>
<td>F.86</td>
</tr>
<tr>
<td>Category 1. Finish Fragments</td>
<td>-</td>
<td>F.1, F.8</td>
<td>Norheast corner area of the forts</td>
</tr>
</tbody>
</table>

Series B. Table glass

Type 1. Stemware

Variety a. Clear glass: lead

Type 2. Unstemmed Ware

Variety a. Clear glass: lead

Category 1. Stoppers

Category 2. Miscellaneous Bottle Glass and Tableglass

<table>
<thead>
<tr>
<th></th>
<th>Early Period</th>
<th>Late Period</th>
<th>Early and/or Late Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F.72, F.97. Inner west palisade trench fill</td>
<td>F.1, F.8, F.26, F.31, F.102. Burn layer above Structure 1; Outer east, west and north palisade trench fills</td>
<td>F.6, F.77, F.86, F.128, F.129, F.130. Southeast, southwest and northeast corner areas of the forts</td>
</tr>
</tbody>
</table>
Table 10. Ware Types and Associated Features and Context from Site 15R

<table>
<thead>
<tr>
<th>Ware Type</th>
<th>Early Period</th>
<th>Late Period</th>
<th>Early and/or Late Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stoneware</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type 1.</td>
<td>Fine stoneware: grey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variety a.</td>
<td>Brown salt-glazed</td>
<td></td>
<td>F.45</td>
</tr>
<tr>
<td>Type 2.</td>
<td>Fine stoneware: buff</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variety a.</td>
<td>Clear salt-glazed</td>
<td></td>
<td>F.129</td>
</tr>
<tr>
<td></td>
<td>b. Clear salt-glazed with a</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>brown glaze at the shoulder</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>g. Light tan salt-glazed (exterior)/white</td>
<td></td>
<td>F.128</td>
</tr>
<tr>
<td></td>
<td>salt-glazed (interior)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>j. Buff-white glazed</td>
<td></td>
<td>Inner west palisade</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>trench fill</td>
</tr>
<tr>
<td>Porcelain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type 2.</td>
<td>Soft-past</td>
<td></td>
<td>F.113, F.129</td>
</tr>
<tr>
<td>Variety a.</td>
<td>Plain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earthenware</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type 1.</td>
<td>Fine earthenware: buff</td>
<td></td>
<td>Burned layer</td>
</tr>
<tr>
<td>Variety b.</td>
<td>Blue glaze</td>
<td></td>
<td>associated with the</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>burning of Structure 1</td>
</tr>
<tr>
<td>Type 2.</td>
<td>Fine earthenware: white</td>
<td></td>
<td>F.1</td>
</tr>
<tr>
<td>Variety a.</td>
<td>Plain: clear/white glaze</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 10. Continued

<table>
<thead>
<tr>
<th>Earthenware</th>
<th>Early Period</th>
<th>Late Period</th>
<th>Early and/or Late period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 2. Fine earthenware: white.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variety a. Plain: clear/white glaze.</td>
<td>-</td>
<td>F.1</td>
<td>-</td>
</tr>
<tr>
<td>Variety b. Plain: clear glaze with pale yellow tint.</td>
<td>F.20</td>
<td>-</td>
<td>F.113</td>
</tr>
<tr>
<td>Variety c. Plain: clear glaze with pale blue tint.</td>
<td>-</td>
<td>-</td>
<td>F.110</td>
</tr>
<tr>
<td>Variety d. Plain: clear glaze with a grey tint.</td>
<td>-</td>
<td>-</td>
<td>F.86</td>
</tr>
<tr>
<td>Variety e. Plain: clear glaze.</td>
<td>-</td>
<td>F.1</td>
<td>-</td>
</tr>
</tbody>
</table>

Patterns Introduced Prior to 1848

B700 ca. 1838-67

Inner north palisade trench fill; Burnt sod horizon

F.1, F.26, F.31, F.38, F.70. Outer west palisade trench fill 1835 - 48 - 1861; Along east wall and over wall sill of Structure 1, collapsed plaster from east wall of Structure 1; Burned layer assoc. with the burning of Structure 1.

F.128, F.86. Upper levels of inner and outer south palisade trenches
<table>
<thead>
<tr>
<th>Early Period</th>
<th>Late Period</th>
<th>Early and/or Late Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>B772 ca. 1839-post 1882</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Botanical ca. 1828-post 1836</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bramble post 1847</td>
<td>-</td>
<td>F.38. At mouth of hearth, Structure 1; Outer west palisade trench fill 1835-48 - 1861</td>
</tr>
<tr>
<td>British Flowers ca. 1829-present</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Broseley ca. 1818-post 1847</td>
<td>-</td>
<td>F.1, F.128, F.130. Upper levels of inner and outer south palisade trenches</td>
</tr>
<tr>
<td>Bryon Groups ca. 1833-1847</td>
<td>-</td>
<td>F.11</td>
</tr>
<tr>
<td>Bryon Views ca. 1833-1868</td>
<td>-</td>
<td>F.1, F.118. Outer south palisade trench fill</td>
</tr>
<tr>
<td>Camilla ca. 1833-present</td>
<td>-</td>
<td>Collapsed plaster from east wall of Structure 1</td>
</tr>
<tr>
<td>Chinese Gardens ca. 1834-pre-1879</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Table 10. Continued</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Early Period</td>
<td>Late Period</td>
</tr>
<tr>
<td>Continental Views 1845-post-1882</td>
<td>Inner north and west palisade trench fills</td>
<td>F.1</td>
</tr>
<tr>
<td>Flower Vase ca. 1828-20th Century</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Fruit and Flowers ca. 1826-20th Century</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Geranium ca. 1818-20th Century</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Italian ca. 1816-20th Century</td>
<td>Inner west palisade trench fill</td>
<td>F.86, F.98. In S.W. corner of forts, 1835-61</td>
</tr>
<tr>
<td>Lily ca. 1837-20th Century</td>
<td>Inner west palisade trench fill</td>
<td>F.1, F.26, F.38. Rubble below plough zone &amp; above Structure 1 building remains (collapse of Structure 1); At mouth of hearth, Structure 1; Waste from hearth, Structure 1; Outer west, north, &amp; east palisade trench fills 1835-48 - 1861</td>
</tr>
</tbody>
</table>
Table 10. Continued

<table>
<thead>
<tr>
<th>Material</th>
<th>Early Period</th>
<th>Late Period</th>
<th>Early and/or Late Period</th>
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<td>F.48. Soil in S.E. corner of forts, 1835-61</td>
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<td><strong>Ionic 1845-47</strong></td>
<td>F.20, F.97. Burnt sod horizon; Inner north palisade trench fill</td>
<td>F.21, F.70. Outer N.E. corner of forts, trench fill; Rubble above Structure 1; Occupation layer associated with Structure 1</td>
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<td><strong>Patterns Introduced Post-1848</strong></td>
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<td><strong>Lotus post-1850</strong></td>
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<td><strong>Sardinia 1858-1910</strong></td>
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<td><strong>Undated Patterns</strong></td>
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<td>F.113, F.128</td>
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<td><strong>Fibre</strong></td>
<td>F.84</td>
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<td>Swiss Cottage</td>
<td>Inner west palisade - trench fill</td>
<td>F.26, F.31. Burn layer associated with Structure 1; Collapsed plaster from east wall of Structure 1</td>
<td>F.86, F.113, F.128</td>
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Table 11. Distribution of Clay Pipe Types from Closed Contexts

**T1Va (56 Specimens)**

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<td>6</td>
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<td>5</td>
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<td>8</td>
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<td>11</td>
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**T2Va (10 Specimens)**

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**T3Va (1 Specimen)**

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Table 12. Provenience of Site 15R Clay Pipes by Type

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Table 13. Distribution of Buttons Recovered from Site 15R

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<td>94 (2) 155 (3)</td>
<td>37 (2)</td>
</tr>
<tr>
<td>98 (1) 165 (1)</td>
<td>38 (5)</td>
</tr>
<tr>
<td>121 (1) 170 (1)</td>
<td>40 (3)</td>
</tr>
<tr>
<td>128 (1) 172 (2)</td>
<td>42 (1)</td>
</tr>
<tr>
<td>129 (1) 188 (1)</td>
<td>43 (2)</td>
</tr>
<tr>
<td>130 (1) 197 (1)</td>
<td>44 (1)</td>
</tr>
<tr>
<td>133 (1) 206 (1)</td>
<td>45 (1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ClSAT3Va - 171 Specimens (11.7%)</th>
<th>ClSAT4Vb - 15 Specimens (1.0%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm (#)</td>
<td>mm (#)</td>
</tr>
<tr>
<td>34 (1) 57 (4)</td>
<td>29 (1)</td>
</tr>
<tr>
<td>36 (1) 58 (3)</td>
<td>33 (1)</td>
</tr>
<tr>
<td>42 (1) 59 (5)</td>
<td>37 (1)</td>
</tr>
<tr>
<td>53 (2) 60 (13)</td>
<td>50 (1)</td>
</tr>
<tr>
<td>55 (1) 61 (13)</td>
<td>57 (2)</td>
</tr>
<tr>
<td>56 (2) 62 (20)</td>
<td>71 (1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ClSAT4Vb - 15 Specimens (1.0%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm (#)</td>
</tr>
<tr>
<td>75 (1) 102 (1)</td>
</tr>
<tr>
<td>92 (2) 130 (1)</td>
</tr>
</tbody>
</table>
Table 15. Continued

\begin{tabular}{|c|c|c|}
\hline
\textbf{ClSAT5Va - Six Specimens (0.4\%)} & \\
\hline
\textbf{mm} & \textbf{(#)} & \textbf{mm} & \textbf{(#)} \\
\hline
29 & (2) & 87 & (1) \\
30 & (1) & 105 & (1) \\
83 & (1) & & \\
\hline
\textbf{ClSAT5Vb - Four Specimens (0.3\%)} & \\
\hline
\textbf{mm} & \textbf{(#)} & \textbf{mm} & \textbf{(#)} \\
\hline
54 & (1) & 130 & (1) \\
122 & (1) & 140 & (1) \\
\hline
\textbf{ClSAT6Va - 63 Specimens (4.3\%)} & \\
\hline
\textbf{mm} & \textbf{(#)} & \textbf{mm} & \textbf{(#)} \\
\hline
34 & (1) & 68 & (3) \\
36 & (2) & 69 & (2) \\
37 & (1) & 70 & (2) \\
44 & (1) & 71 & (2) \\
48 & (1) & 72 & (1) \\
53 & (1) & 75 & (1) \\
54 & (2) & 76 & (1) \\
55 & (4) & 77 & (1) \\
56 & (5) & 78 & (1) \\
57 & (4) & 79 & (1) \\
58 & (2) & 82 & (1) \\
61 & (1) & 83 & (1) \\
62 & (2) & 86 & (1) \\
63 & (4) & 88 & (1) \\
64 & (4) & 97 & (1) \\
65 & (4) & 113 & (1) \\
66 & (3) & & \\
\hline
\textbf{ClSAT6Vb - Ten Specimens (0.7\%)} & \\
\hline
\textbf{mm} & \textbf{(#)} & \textbf{mm} & \textbf{(#)} \\
\hline
44 & (1) & 78 & (1) \\
63 & (1) & 145 & (1) \\
64 & (1) & 159 & (1) \\
65 & (1) & 179 & (2) \\
66 & (1) & & \\
\hline
\end{tabular}
Table 15. Continued

<table>
<thead>
<tr>
<th>ClSBT1Va - 77 Specimens (5.3%)</th>
<th>ClSBT5Va - 12 Specimens (0.8%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm (#)</td>
<td>mm (#)</td>
</tr>
<tr>
<td>47 (1)</td>
<td>69 (2)</td>
</tr>
<tr>
<td>49 (1)</td>
<td>70 (1)</td>
</tr>
<tr>
<td>55 (1)</td>
<td>74 (1)</td>
</tr>
<tr>
<td>59 (1)</td>
<td>75 (4)</td>
</tr>
<tr>
<td>63 (1)</td>
<td>76 (2)</td>
</tr>
<tr>
<td>64 (12)</td>
<td>77 (3)</td>
</tr>
<tr>
<td>65 (18)</td>
<td>78 (4)</td>
</tr>
<tr>
<td>66 (12)</td>
<td>79 (1)</td>
</tr>
<tr>
<td>67 (5)</td>
<td>95 (1)</td>
</tr>
<tr>
<td>68 (6)</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ClSBT2Va - 16 Specimens (1.1%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm (#)</td>
</tr>
<tr>
<td>31 (1)</td>
</tr>
<tr>
<td>32 (1)</td>
</tr>
<tr>
<td>37 (1)</td>
</tr>
<tr>
<td>39 (1)</td>
</tr>
<tr>
<td>41 (1)</td>
</tr>
<tr>
<td>42 (1)</td>
</tr>
<tr>
<td>43 (2)</td>
</tr>
<tr>
<td>44 (1)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>ClSBT3Va - 2 Specimens (0.1%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm (#)</td>
</tr>
<tr>
<td>25 (1)</td>
</tr>
<tr>
<td>32 (1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ClSBT4Va - 16 Specimens (1.1%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm (#)</td>
</tr>
<tr>
<td>32 (1)</td>
</tr>
<tr>
<td>46 (1)</td>
</tr>
<tr>
<td>47 (1)</td>
</tr>
<tr>
<td>50 (1)</td>
</tr>
<tr>
<td>54 (1)</td>
</tr>
<tr>
<td>57 (2)</td>
</tr>
<tr>
<td>60 (1)</td>
</tr>
</tbody>
</table>
Table 15. Continued

Miscellaneous Nails and Tacks

Class 1. Cat. 1 - (Tapered Head) - Eight Specimens (0.6%)

<table>
<thead>
<tr>
<th>mm</th>
<th>(#)</th>
<th>mm</th>
<th>(#)</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>(1)</td>
<td>48</td>
<td>(1)</td>
</tr>
<tr>
<td>31</td>
<td>(2)</td>
<td>88</td>
<td>(1)</td>
</tr>
<tr>
<td>35</td>
<td>(1)</td>
<td>100</td>
<td>(1)</td>
</tr>
<tr>
<td>37</td>
<td>(1)</td>
<td></td>
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</tbody>
</table>

Class 1. Cat. 2 - (Tacks) - Five Specimens (0.4%)

<table>
<thead>
<tr>
<th>mm</th>
<th>(#)</th>
<th>mm</th>
<th>(#)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>(1)</td>
<td>20</td>
<td>(2)</td>
</tr>
<tr>
<td>14</td>
<td>(1)</td>
<td>23</td>
<td>(1)</td>
</tr>
</tbody>
</table>

C2SAT1Va - Five Specimens (0.4%)

<table>
<thead>
<tr>
<th>mm</th>
<th>(#)</th>
<th>mm</th>
<th>(#)</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>(1)</td>
<td>29</td>
<td>(1)</td>
</tr>
<tr>
<td>28</td>
<td>(2)</td>
<td>36</td>
<td>(1)</td>
</tr>
</tbody>
</table>

C2SAT2Va - One Specimen (0.1%)

<table>
<thead>
<tr>
<th>mm</th>
<th>(#)</th>
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</thead>
<tbody>
<tr>
<td>55</td>
<td>(1)</td>
</tr>
</tbody>
</table>

C2SBT1 - One Specimen (0.1%)

<table>
<thead>
<tr>
<th>mm</th>
<th>(#)</th>
</tr>
</thead>
<tbody>
<tr>
<td>33</td>
<td>(1)</td>
</tr>
</tbody>
</table>
Table 16. Features Involved in the Site 15R Faunal Analysis

<table>
<thead>
<tr>
<th>Feature Number</th>
<th>Feature Type</th>
<th>Period</th>
<th>Location</th>
<th>Lot Designations</th>
</tr>
</thead>
<tbody>
<tr>
<td>F.1</td>
<td>Pit</td>
<td>Late</td>
<td>Inside north palisade</td>
<td>15R25L3-8</td>
</tr>
<tr>
<td>F.20</td>
<td>Pit</td>
<td>Early</td>
<td>Below building Structure 1</td>
<td>15R16U4,U5</td>
</tr>
<tr>
<td>F.82</td>
<td>Separation Trench</td>
<td>Early</td>
<td>Runs off west palisade</td>
<td>15R1242</td>
</tr>
<tr>
<td>F.98</td>
<td>Pit</td>
<td>Early or late</td>
<td>To north of west gateways</td>
<td>15R17G4-12</td>
</tr>
<tr>
<td>F.113</td>
<td>Pit</td>
<td>Early or late</td>
<td>Northeast corner of early fort</td>
<td>15R22G4,G8,15R23G4,G6,67</td>
</tr>
<tr>
<td>F.26</td>
<td>Cellar</td>
<td>Late</td>
<td>Within building Structure 1</td>
<td>15R13W3,W12,W14,W15,W17,W19, W20,15R14V6,V12</td>
</tr>
<tr>
<td>F.127</td>
<td>Pit</td>
<td>Early or late</td>
<td>To west of fort</td>
<td>14R60C2-4</td>
</tr>
<tr>
<td>F.128</td>
<td>Pit</td>
<td>Early or late</td>
<td>To west of fort</td>
<td>14R60E2-4</td>
</tr>
<tr>
<td>F.129</td>
<td>Pit</td>
<td>Early or late</td>
<td>To west of fort</td>
<td>14R61D2-9</td>
</tr>
<tr>
<td>F.130</td>
<td>Pit</td>
<td>Early or late</td>
<td>To west of fort</td>
<td>14R62B2-10</td>
</tr>
</tbody>
</table>
Table 17. Species Identified at Rocky Mountain House, Site 15R.

<table>
<thead>
<tr>
<th>Species</th>
<th>Total</th>
<th>MNI</th>
<th>Cut</th>
<th>Burned</th>
<th>Carnivore Gnawn</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FISH</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whitefish</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(Coregonus clupeaformis or</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prosopium williamsoni)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rainbow Trout</td>
<td>12</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(Salmo gairdneri)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Identifiable Fish</td>
<td>15</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total Unidentifiable Fish</td>
<td>48</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL FISH</td>
<td>63</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>BIRD</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large goose</td>
<td>32</td>
<td>7</td>
<td>9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(cf. Branta canadensis)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trumpeter Swan</td>
<td>8</td>
<td>6</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(Olor buccinator)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mallard, Pintail, or Gadwall</td>
<td>7</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(A. platyrhynchos, A. acuta,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>or A. strepera</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern Shoveller</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(Spatulaclypeata)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 17. Continued

<table>
<thead>
<tr>
<th>Species</th>
<th>Total</th>
<th>MNI</th>
<th>Cut</th>
<th>Burned</th>
<th>Carnivore Gnawn</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Large Tetraonid</strong> (Pediocetes phasianellus, Dendragapus obscurus, Tymanuchus cupido)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>8</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Small Tetraonid</strong> (Bonasa umbellus or Canchites canadensis)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Gray Partridge</strong> (Perdix perdix)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Sandhill Crane</strong> (Grus canadensis)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Raven</strong> (Corvus corax)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Crow</strong> (Corvus brachyrhynchos)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Thrush species</strong> (Turdidae sp.)</td>
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<td></td>
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</tr>
<tr>
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<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total Identifiable Bird</strong></td>
<td>85</td>
<td>34</td>
<td>15</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Unidentifiable Bird</strong></td>
<td>121</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>TOTAL BIRD</strong></td>
<td>206</td>
<td>34</td>
<td>15</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Species</td>
<td>Total</td>
<td>MNI</td>
<td>Cut</td>
<td>Burned</td>
<td>Carnivore Gnawn</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-------</td>
<td>-----</td>
<td>-----</td>
<td>--------</td>
<td>-----------------</td>
</tr>
<tr>
<td>MAMMAL</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Beaver (Castor canadensis)</td>
<td>13</td>
<td>4</td>
<td>2</td>
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</tr>
<tr>
<td>Snowshoe Hare (Lepus americanus)</td>
<td>106</td>
<td>12</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Dog/Wolf or Coyote (Canis species)</td>
<td>15</td>
<td>5</td>
<td>3</td>
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<tr>
<td>Grizzly Bear (Ursus horribilus)</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Lynx (Lynx canadensis)</td>
<td>60</td>
<td>12</td>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wolverine (Gulo luscus)</td>
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<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Marten (Martes americanus)</td>
<td>8</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Porcupine (Erethizon dorsatum)</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
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</tr>
</tbody>
</table>
Table 17. Continued

<table>
<thead>
<tr>
<th>Species</th>
<th>Total</th>
<th>MNI</th>
<th>Cut</th>
<th>Burned</th>
<th>Carnivore Gnawn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flying Squirrel</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(Glaucomys sabrinus)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meadow Vole</td>
<td>39</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(Microtus pennslyvanicus)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Lemming</td>
<td>18</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(Large Microtine)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deer Mouse</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(Peromyscus species)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mule Deer</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
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<td>91 -</td>
<td>21 -</td>
<td>1098 -</td>
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<td>Mammal (Unidentifiable Fragments)</td>
<td>13 -</td>
<td>21 -</td>
<td>48 -</td>
<td>28 -</td>
<td>11 -</td>
<td>169 -</td>
<td>2 -</td>
<td>7 -</td>
<td>31 -</td>
<td>5 -</td>
<td>335 -</td>
</tr>
<tr>
<td>TOTAL MAMMAL</td>
<td>144 7</td>
<td>381 21</td>
<td>341 14</td>
<td>365 18</td>
<td>109 7</td>
<td>473 15</td>
<td>51 5</td>
<td>27 4</td>
<td>213 12</td>
<td>102 14</td>
<td>2207 118</td>
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<tr>
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<tr>
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<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>TOTAL PFR FEATURE</td>
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<td>348 15</td>
<td>410 25</td>
<td>115 8</td>
<td>533 19</td>
<td>58 10</td>
<td>57 8</td>
<td>287 27</td>
<td>113 15</td>
<td>2487 161</td>
</tr>
</tbody>
</table>

TOTAL FRAGMENTS IDENTIFIED: 2487
Table 19. The Amount of Meat Provided by Animals Found at Rocky Mountain House, Site 15R.

<table>
<thead>
<tr>
<th>Species</th>
<th>MNI</th>
<th>Live Weight per Individual (kg.)</th>
<th>Useable Meat per Individual (kg.)</th>
<th>Total Useable Meat (kg.)</th>
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</thead>
<tbody>
<tr>
<td><strong>FISH</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Whitefish</td>
<td>2</td>
<td>1.82</td>
<td>1.46</td>
<td>2.9</td>
</tr>
<tr>
<td>Rainbow Trout</td>
<td>2</td>
<td>6.75</td>
<td>5.4</td>
<td>10.8</td>
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<tr>
<td><strong>TOTAL FISH</strong></td>
<td>4</td>
<td></td>
<td></td>
<td>13.7</td>
</tr>
<tr>
<td><strong>BIRDS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large Goose</td>
<td>7</td>
<td>4.1</td>
<td>2.87</td>
<td>20.1</td>
</tr>
<tr>
<td>Trumpeter Swan</td>
<td>6</td>
<td>11.35</td>
<td>7.95</td>
<td>47.7</td>
</tr>
<tr>
<td>Mallard, Pintail or</td>
<td>2</td>
<td>1.00</td>
<td>0.7</td>
<td>1.4</td>
</tr>
<tr>
<td>Gadwall</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern Shoveller</td>
<td>2</td>
<td>0.6</td>
<td>0.42</td>
<td>0.8</td>
</tr>
<tr>
<td>Large Tetraonid</td>
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<td>0.8</td>
<td>0.56</td>
<td>4.5</td>
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<tr>
<td>Small Tetraonid</td>
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<td>0.51</td>
<td>0.25</td>
<td>1.0</td>
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<td>1</td>
<td>4.54</td>
<td>3.18</td>
<td>3.2</td>
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Table 19. Continued

<table>
<thead>
<tr>
<th></th>
<th>MNI</th>
<th>Live Weight per Individual (kg.)</th>
<th>Useable Meat per Individual (kg.)</th>
<th>Total Useable Meat (kg.)</th>
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</thead>
<tbody>
<tr>
<td>Raven</td>
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<td>0.57</td>
<td>0.6</td>
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<td>Crow</td>
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<td>0.30</td>
<td>0.3</td>
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<td>32</td>
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<td>Beaver</td>
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<td>15.9</td>
<td>11.13</td>
<td>55.7</td>
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<td>Snowshoe Hare</td>
<td>12</td>
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<td>0.7</td>
<td>8.4</td>
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<tr>
<td>Dog/Wolf/Coyote</td>
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<td>22.5</td>
<td>11.25</td>
<td>56.3</td>
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<tr>
<td>Grizzly Bear</td>
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<td>Wolverine</td>
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<td>9.52</td>
<td>9.5</td>
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<tr>
<td>Marten</td>
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<td>0.9</td>
<td>0.63</td>
<td>1.3</td>
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<td>Porcupine</td>
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<td>Mule Deer</td>
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<td>157.5</td>
<td>78.75</td>
<td>315.</td>
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<td></td>
<td>MNI</td>
<td>Live Weight per Individual (kg.)</td>
<td>Useable Meat per Individual (kg.)</td>
<td>Total Useable Meat (kg.)</td>
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<tr>
<td>--------</td>
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<td>----------------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>Caribou</td>
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<td>62.5</td>
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<td>Moose</td>
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<td>363.2</td>
<td>181.6</td>
<td>2724.</td>
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<td>Elk</td>
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<td>110.</td>
<td>2200.</td>
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<td>317.8</td>
<td>6356.</td>
</tr>
<tr>
<td>Bos-Bison</td>
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<td>635.6</td>
<td>317.8</td>
<td>1271.2</td>
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<td>Cow</td>
<td>5</td>
<td>363.20</td>
<td>181.6</td>
<td>908.</td>
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</tbody>
</table>

**TOTAL MAMMAL**

**TOTAL MEAT**