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THE 1974 ARCHAEOLOGICAL INVESTIGATION
OF FORT ST. JOSEPH, ONTARIO

by
ELLEN R. LEE

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of Fort St. Joseph, Ontario,
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The archaeological investigation of Fort St. Joseph, a palisaded British military installation established in 1796, and burned by the Americans in 1814, was resumed during the summer of 1974 after a lapse of ten years. Previous work at the site on St. Joseph Island had been conducted by a team from the University of Toronto in 1963-64 under contract, for the National Historic Parks and Sites Branch. The 1974 excavations centred on the blockhouse, the powder magazine, an unidentified structure represented by a relatively intact chimney, and the west bastion and northwest curtain wall of the palisade. The work was primarily intended to recover information concerning the size, layout and construction of these structures in anticipation of site development.
Preface

Archaeological investigations at Fort St. Joseph National Historic Park were conducted from late July to mid October, 1974, by the Research Division of the National Historic Parks and Sites Branch, Department of Indian and Northern Affairs. The project, carried out in conjunction with park development, was directed by Karlis Karklins, an archaeologist with the Branch, assisted by the author. The crew was composed of local labour, archaeology students from various Ontario universities and several part-time volunteers.

Five structures were investigated: the blockhouse, powder magazine, an unidentified building represented by a relatively intact chimney, and the west bastion and northwest curtain wall of the palisade. The blockhouse was completely excavated to obtain as much information as possible concerning this building's dimensions, layout and construction in anticipation of reconstruction. The powder magazine, a partially standing masonry structure, was in need of stabilization. It was, therefore, totally excavated to expose all features to facilitate repointing and the retrieval of all archaeological data concerning the size, configuration and construction of the building. The area around the chimney structure was tested for building foundations, and the chimney base was exposed to obtain structural details. Artifacts which might help to date and identify the chimney structure were also sought. The west bastion was tested for evidence of a gun platform, while the
palisade's northwest curtain wall was trenched in an attempt to determine if a banquette and ditch had once been associated with the palisade.

In conjunction with the archaeological project, photogrammetry and extant recording of the blockhouse, powder magazine and chimney structure were carried out by the Historic Extant Recording and Drafting Section, Restoration Services Division, Engineering and Architecture Branch, Parks Canada.

Although the powder magazine had not been investigated before, all the other features excavated or tested in 1974 had been previously examined in 1963 and 1964 by the University of Toronto under contract to the National Historic Parks and Sites Branch. Under the direction of Helen Devereux in 1963, the investigation of the blockhouse was begun, both reentrant angles and one of the shoulder angles of the west bastion were located and the northwest palisade curtain was tested. Other features which were excavated or tested included the stores building, the guardhouse, the south half of the southwest ravelin, the land gate, water gate, some of the angles of the south bastion and the southeast palisade curtain. The walls of the old bakery were also uncovered.

In 1964, Michael Ashworth continued the excavation of the blockhouse, tested the chimney structure and located the remaining angles of the west bastion. Additional work included the complete excavation of the old bakery and the location of three of the angles in the east bastion, as well as the remaining angles in the south bastion and the two reentrant angles and one shoulder angle of the north bastion. A survey of the area outside the fort located a total of 32 possible foundation outlines of fur traders' and other civilian buildings.

Following the 1963-64 excavations, preliminary reports
were prepared by Devereux (1965) and Ashworth (1964), followed by a final report by Emerson, Devereux and Ashworth (1966). However, although these reports discussed the excavated structures in detail, certain questions remained unanswered and the interpretation of some features was not in accordance with the available historical data. Hence this report presents a complete description of the investigated structures and a discussion of the interpretation of features in light of data recovered during the 1974 excavations.

Sincere thanks are extended to Karlis Karklins for his help in the preparation of this report.
Introduction

General Historical Background
The American Revolution ended in 1783 with the Treaty of Paris. Under the terms of this treaty, the British were to relinquish all territory south of the Great Lakes to the Americans. However, the British feared that if they did so, their Indian allies, who had been ignored by the treaty, would unite and attack Upper Canada in retaliation (Lee 1966: 1). Therefore, they delayed the evacuation of such forts as the one at Michilimackinac, ostensibly because of the way the Americans were dealing with the restoration of Loyalist property. Finally, in 1794, the Loyalist question was settled, the Jay Treaty was signed and the British could delay no longer.

Fort Michilimackinac, the most westerly British military post, was in a very strategic location, both militarily and commercially. Since the British wished to maintain their sphere of influence and to continue trading in that area, they chose St. Joseph Island as the site for a replacement post. Fort St. Joseph was constructed on a promontory on the southwest tip of St. Joseph Island, facing the navigation passage called 'The Detour' which was part of the direct canoe and shipping route from Upper Canada to Lake Superior. The history of the fort is closely interwoven with that of the fur trade settlement which grew up around the fort and the Indian department which, for want of its own building, was probably housed on the main floor of the blockhouse throughout its occupation. Fort St.
Joseph was to become:

...a Rendez-vous for the Indian Traders
(returning with furs from their wintering
grounds round Lake Michigan and near the
Mississippi) where they meet the merchants or
their agents from Lower Canada, and receive a
fresh supply of goods for the ensuing winter;
this commerce has hitherto been carried on at
Michilimackinac during the whole of the month
of June, at which time about eight hundred
persons are thus assembled, besides Indians of
various tribes who resort to the Rendezvous for
presents or for news and sometimes to make
Peace under the King's protection (Lee 1966:
3).

In 1796, a temporary base camp was established
approximately 3/4 mi. west of the peninsula in which the
fort was to be built. It was at this camp "...that a treaty
with the Indians for the purchase of St. Joseph Island was
signed in the summer of 1798 at a large gathering of the
tribes accompanied by a great distribution of presents"
(Smyth 1974: n.p.; memo from H. Lambart to A.J.H.
Richardson).

Construction at the site of Fort St. Joseph was
initiated in the spring of 1797 by Lieut. Lacy who built a
20 ft. square temporary hut for Lieut. Landmann and began
work on the blockhouse for the use of the troops stationed
there. Landmann, an army engineer, arrived in April of
1798, and supervised the fort's construction during the
summers until his recall in 1800. He continued the building
of the blockhouse and the men were able to move into it in
the fall of 1798, although it was not completely finished.
One year later, the Commanding Officer "reported the kitchen
and bakehouse, guardhouse and 'blackholes', and the
blockhouse close to completion, but the magazine, wharf and stockade not yet started" (Lee 1966: 3).

Fort construction proceeded slowly after Landmann's recall in 1800. Although the upper floor of the blockhouse was to have accommodated both officers and enlisted men, in August of 1801, the Commanding Officer reported that the officers found it necessary to take up lodging in the traders' houses outside the fort (Emerson, Devereux and Ashworth 1966: 125). Because of the manner in which the blockhouse was built, maintained and often inadequately heated, it did not offer sufficient protection from the elements. It admitted the cold, rain, snow and wind and, occasionally, the roof fell in, being improperly plastered (Smyth 1974: n.p.; report by Captain Bruyères, 1802).

Sometime between 1800 and 1802, a storehouse was put up to be used as a workshop and engineer's store. Then, in January of 1802, the bakery burned to the ground. The fire threatened the nearby temporary powder magazine ("a few logs placed to form a kind of Temporary cover, with earth on the sides in a very insecure and improper situation;" Smyth 1974: n.p.; report by Captain Bruyères, 1802) and the blockhouse which was only 30 ft. from the bakery and covered with a roof of dry cedar shingles.

Captain Bruyères appraised the building situation at Fort St. Joseph in the fall of 1802 and made several comments and recommendations. He stated that in addition to the blockhouse, guardhouse and storehouse, the stockade and southwest ravelin had been constructed. He indicated that although the guns were at Fort St. Joseph, no work had been done toward framing or fixing gun platforms in the bastions. He did not specify whether the bastions themselves had actually been built. Among his recommendations he included specification for the construction of an all stone bakehouse and kitchen outside the fort near the water and the
construction of a permanent powder magazine in the north bastion. He also ordered the covering of the blockhouse roof with sheet iron and other interior repairs to the blockhouse to help to insulate it from the elements (Smyth 1974: n.p.; report by Captain Bruyères).

Captain Gustave Nichols was given the responsibility of carrying out Bruyères' recommendations. In his report of August 18, 1804, he stated that a new bakehouse/kitchen had been built, masons were working on the magazine, the upper storey of the blockhouse was being weatherboarded and its roof had been covered with sheet iron (Emerson, Devereux and Ashworth 1966: 136). In November he ordered the copper hinges and locks for the powder magazine and it was probably completed sometime before the end of 1805.

On his arrival on June 7, 1806, Commandant Captain Muir complained that "this garrison has never been finished" - it lacked gun platforms and a banquette, and had only one ravelin (Emerson, Devereux and Ashworth 1966: 144). Although this complaint was made more than once about Fort St. Joseph, it is difficult to ascertain if any further work was actually attempted on the defenses after 1806, other than propping and bracing the palisade.

It is doubtful that any major construction was attempted by the military at Fort St. Joseph after 1806. However, it should be stated that Captain Bruyères noted in his report in 1802 that with the addition of a chimney and plastering the inside, the storehouse could be converted to quarters for the men or officers. When the storehouse was excavated, a chimney was located approximately in the centre of the building (Emerson, Devereux and Ashworth 1966: 73).

It is not exactly certain when the first fur traders arrived at St. Joseph Island. It seems likely, however, that their move corresponded to that of the British military and the Indian Department from Michilimackinac to St. Joseph
after the signing of the Jay Treaty. In March of 1798, the North West Company requested building lots on either side of the narrow neck of land joining the peninsula to the island. By that summer, John Ogilvie (probably of Parker, Gerrard and Ogilvie, in opposition to the NWCo.), George Gillespie (North West Company), David Mitchell (Michilimackinac Company), Jean Baptiste Toussaint Pothier (Michilimackinac Company), Monsieur Chiset and Monsieur Frerot were preparing to build; and Captain Lamothe (Indian Department Interpreter), Thomas Duggan (Indian Department Storekeeper), Charles Langlade (Indian Department stores), Mr. Birkett and Mr. Chauvin were already building either dwellings or stores (E. Vincent 1975: pers. comm.). On May 28, 1800, Daniel Harmon (1903: 11) wrote in passing "As it is not long since a settlement was made here, they have only four dwelling houses and two stores, on other parts of the peninsula.... The North West Company have a house and store here. In the latter they construct canoes...."

Under the Jay Treaty, duties were placed on imports of British goods into American territory but Canadians were allowed to continue trading south of the border. Up until 1805, there was no competition from American traders. Although the Montrealers built houses and stores on St. Joseph Island, Michilimackinac remained the chief centre for trade "into the Michigan and Wisconsin regions right to the Mississippi and Missouri Valleys" (Lee 1966: 7). The settlement at Fort St. Joseph never became an important fur trade centre but was more of a depot for storing supplies in transit and a part time residence for agents of the fur trade. However, as American-British relations began to deteriorate and the American government began to put obstacles in the path of Canadians trading into areas south of the border, the post at St. Joseph became an instrument to protect and further the interests of the fur traders.
At this stage, it might be useful to point out that the interests of the fur traders and the British military went hand in hand. The Indians with whom the Montrealers were trading naturally came within the British sphere of influence: they came to the fort to trade, to receive gifts, to obtain or contribute provisions; they made treaties of friendship and, in times of British-American hostility, often became useful and powerful allies. Thus the activities of the fur traders served to maintain and expand the boundaries of British territory and influence.

The fur traders, on the other hand, were dependent upon the military for protection. They also needed the British government to further their interests in terms of economic agreements which affected their right to trade in certain areas and the conditions under which trade could take place. For example, if the British were to control the area south of Michilimackinac, the Montreal traders would have unrestricted access to that area. In return, the British would be assured of the support of the respective Indians. As it was, after England gave up Michimackinac in 1796, a great number of Indians from south of the border were persuaded to continue to visit the British at Fort St. Joseph. They had not been favourably impressed by England's loss of power, but with the help of the fur traders, their loyalty was regained.

In 1805, merchants who were not American citizens were prohibited from trading beyond the Mississippi as this particular area had recently been purchased from France and was therefore not covered by the Jay Treaty. In that same year, in an effort to gain control of trade within their territories, the Americans set up government-operated trading posts at such places as Chicago and Michilimackinac. These posts had little success but independent American traders were beginning to enter the competition for furs and
British returns began to diminish. In an attempt to combat this threat, a group of Montreal traders banded together to form the Michilimackinac Company in 1806. This company had its headquarters at Michilimackinac but was supplied from Montreal. An agreement was made between the Michilimackinac Company and the North West Company to divide their theatres of operation along the border; the former to trade in the U.S., the latter in Canada.

In the following year, John Jacob Astor formed the American Fur Company. His operation seriously challenged the supremacy of the Montreal traders in the area south of the upper Great Lakes. Then another blow was dealt the Canadians in December of 1807. President Jefferson enacted an embargo prohibiting the importation of British goods into the United States. The American Fur Company profited tremendously by this legislation.

The embargo made trade impossible for the Michilimackinac Company. Unable to trade at Michilimackinac, the company prepared to move their operation to St. Joseph Island and even began building there, putting up two stores and a dwelling house on Rains Point (Bayliss 1938: 208-209). The wintering partners had considered selling their shares to John Astor's American Fur Company but their Montreal partners bought them out in 1810, forming the Montreal Michilimackinac Company. In the meantime, agents of the Montreal fur traders had succeeded in persuading the American government to lift the embargo for them. The agreement was that "their goods will be imported into Makina and their Furs exported to any place they please without any molestation or interruption whatever on the part of the U.S." (Bayliss 1938: 208-209). Just before the embargo was reimposed, the Montreal Michilimackinac Company merged with Astor's company to form
the South West Fur Company, with equal shares going to each company.

Early in 1811 the embargo was reimposed. Although the South West Fur Company was half American-owned, it was not exempt from the embargo as it was supplied mainly out of Montreal. During the summer of 1811, trade goods piled up in the company's storehouses at St. Joseph. The traders dealt with this problem by smuggling £10,000 worth of goods into the Mississippi Valley (D. Lee 1966: 9-10).

Both the North West Company and the South West Company had urged the British to seize the post at Michilimackinac even before the War of 1812 was declared. As a matter of fact:

In a memorandum...evidently written in January, 1812, Major General Brock proposed: "The Co-operation of the N. West and S. West companies - To take the Post of Michilimackinac, and remove St. Joseph's to it. "Otherwise, the members of the North West Fur Company...advised the removal of "the Garrison and Post of St. Joseph's up to the falls of St. Mary's where a very eligible position may be taken up, either upon one of the island in the straits, or upon the British side. That the Post of St. Joseph's affords no protection whatever to their Trade, as it is upon a large Island, which has no command over the channel to the Right and left of it. That this change of position of the Garrison, would enable them to concentrate their force upon Lake Superior at St. Mary, and combine their operations with our Troops....General Brock...concurred with [these views] and stated...his anxious wish that the Post of St. Joseph might be removed to the falls
of St. Mary." Gray to Prevost, York 29 January, 1812 (Smyth 1974: n.p.).

The strategic importance of Michilimackinac was recognized by the Commanding Officer of Fort St. Joseph, as well as the British military commanders in Lower Canada. Fort Michilimackinac was much better fortified than Fort St. Joseph. Being the most northwesterly fort of any military significance, it commanded a large and valuable territory. Seizing Michilimackinac was "the means of Securing the Communication to the Mississippi and retaining and Supporting all the Indian Tribes in their present happy disposition so favourable to the interest of Britain" (1966: 15; Robert Dickson to General Brock, 13 July, 1812). A decisive military victory would also help to ensure the support of the Indians who were to play an important role in the outcome of the war.

Thanks to an agent of John Astor, the British garrison at Fort St. Joseph learned of the Declaration of War in 1812 before the Americans at Michilimackinac. As soon as he was given the go-ahead by General Brock, Commanding Officer, Captain Roberts of Fort St. Joseph launched a surprise attack on Michilimackinac. On 16 July 1812, he departed St. Joseph on a North West Company ship with two iron 6 pounder guns and 46 regular troops (D. Lee 1966: 15-16). The number of Indians and fur traders accompanying him varies from one account to the next. However, according to Lieut. Hanck, American Commander of Michilimackinac, "The following particulars relating to the British force were obtained after the capitulation from a source that admits no doubt; Regular troops, 46, including four officers; Canadian militia, 260. Total, 306, Savages - Sioux, 56; Winnebagoes, 48; Tallesawains, 39; Chippewas and Ottawas, 572. Total 1021" (Smyth 1974: n.p.). The fur traders involved were mostly associated with and armed by the South West Fur Company; most
of the North West Company men being away at Fort William.

Under cover of darkness, the aforementioned force proceeded to Michilimackinac, surrounded the fort, placed its guns on the high ground to the rear of the fort which commanded the garrison, and demanded the surrender of the Americans. Michilimackinac was surrendered without a shot being fired. Two days later, a large group of Nor'Westers and Indians arrived in haste from Fort William, disappointed that they had missed the action (Smyth 1974: n.p.).

Fort Michilimackinac was controlled and occupied by the British throughout the remainder of the war. The fur traders (mostly South West Fur Company) and the Indian Department removed themselves and their operations to Michilimackinac along with the military. Seven men were left at Fort St. Joseph to take care of the buildings and livestock.

In July of 1814, an American force landed at Fort St. Joseph and burned the fort to the ground. Captain Sinclair wrote to the Secretary of the U.S. Navy from St. Joseph that "We were favored in winds and arrived here on the 20th. The enemy had abandoned his works consisting of a fort and large blockhouse, etc.; those we destroyed but left untouched the town and N.W. Company's storehouses" (Smyth 1974: n.p.). It seems likely, however, that at least some of the traders' or Indian Department buildings caught fire also, as Robert Livingstone made a claim for the loss of his house, wharf and store at the end of the war (Smyth 1974: n.p.; memo from H. Lambart to A.J.H. Richardson). The two masonry buildings - the powder magazine and the new bakery - were the only structures left standing at Fort St. Joseph. The South West Fur Company buildings on Rains Point were left intact, thanks to one of John Astor's agents who was on board the American ship looking out for Astor's interests (D. Lee 1966: 16).

The war ended with the signing of the Treaty of Ghent in December of 1814. Once again Michilimackinac reverted to the
Americans and the British were forced to look for another replacement. They temporarily occupied Fort St. Joseph and the South West Fur Company's buildings on Rains Point while searching for a new site. Fort St. Joseph was considered but rejected because it had a very poor harbour and most of its buildings had been destroyed. After some consideration, Drummond Island was chosen as the site for a new British fort because it had a better harbour. The South West Fur Company sold its buildings on Rains Point to the British at half price as the war had failed to gain them the right to trade south of the border and it appeared that their business operations would be severely, if not permanently, curtailed. At least one of these structures was moved to the new post on Drummond Island.

While the British occupied the post on Drummond Island, they maintained their livestock and their powder magazine at Fort St. Joseph. It is probable that the powder magazine again served its original function as a storage place for powder and ordnance and the new bakery was used as a barracks by the corporal's guard which was stationed there to guard the magazine and livestock (Emerson, Devereux and Ashworth 1966: 188-189). It was recommended in 1818 that the contents of the powder magazine be brought to the Drummond post because Fort St. Joseph was too far away. There is no record however of this move ever actually taking place and a commission report stated in 1825 that the corporal's guard was still stationed at Fort St. Joseph guarding the magazine and livestock (Emerson, Devereux and Ashworth 1966: 189). This situation probably remained unchanged until Drummond Island was declared to be part of American territory. In 1828, the British established a new post at Penetanguishene at the east end of Georgian Bay and Fort St. Joseph was finally and completely abandoned (E. Vincent: pers. comm.).

Nine years later, in 1837, Rains Point was re-occupied -
not by the military or fur traders this time but by a settler. Major William Rains was one of the founders of a small settlement which was established at Milford Haven (roughly 7 miles northeast of Rains Point) in 1835. In 1837 a disagreement between the settlers led to Major Rains giving up his share in Milford Haven and establishing his residence on the point just to the east of old Fort St. Joseph. He built a fairly substantial homestead consisting at least of a large house and barns. In doing so he may or may not have removed, used or destroyed part of the remains of the South West Fur Company's buildings. He remained on the point which is named after him until 1849, when he moved to another part of the island.

On being abandoned, Fort St. Joseph automatically became part of a Military Reserve belonging to the Ordnance; as surveyed by T.N. Molesworth in the summers of 1853-54. Rains Point was also included in the Reserve. For almost 70 years, the reserve remained relatively isolated and undisturbed. Then a request for timber privileges sparked interest in Fort St. Joseph. Subsequently, the fort's value as a national historic site was recognized. On November 23, 1926, the parcel of land was transferred from the Ordnance, Admiralty and Railway Lands Branch to the control of the Canadian National Parks Branch.

During July of 1926, the site was surveyed and consolidation work was carried out on the three standing masonry structures (the powder magazine, the new bakery and a double chimney of unknown origin) at Fort St. Joseph. These structures were repointed and, where necessary for the stability of the structure, built up. J.W. LeB. Ross, President of the Sault Ste. Marie Historical Society and a government engineer, supervised the work on behalf of the Historic Sites and Monuments Board. During the summer of 1928, a tablet commemorating the site was erected on the
southwest face of the double chimney.

During the 1930s and early 40s, there was little activity at the fort, largely owing to its inaccessibility. Then in 1948, the construction of an access road linked the site to the rest of the island. A parking lot was placed near the fort. Unfortunately, in the process of building the road, a large amount of gravel was taken from the Rains Point area, possibly destroying valuable information regarding the South West Fur Company buildings and those of Major Rains. The following year, in order to "clean up" the old fort and to facilitate the cutting of grass and the eradication of poison ivy, a bulldozer was brought in and portions of the site were levelled. During the summer of 1950, more levelling was done and a circular drive was made, cutting through the centre of the fort and around the south side of the point. The levelling and road building destroyed a great deal of irreplaceable historical information. The bulldozer appears to have removed all traces of the building associated with the large double chimney of unknown origin. It also removed the upper portions of the remains of the guardhouse, old bakery, south bastion, water gate, the southwest and southeast palisade lines, and generally disturbed or removed an unknown number of artifacts in the above mentioned areas, as well as around the blockhouse. It remains to be seen how much destruction or disturbance was done to the fur traders' and Indian Department buildings which were scattered around the fort.

Geographical Setting

Fort St. Joseph is located on the southernmost tip of St. Joseph Island which is situated at the northwest corner of Lake Huron, at the east end of St. Marys River which connects Lake Huron and Lake Superior (Fig. 1). St. Joseph Island is
approximately 30 mi. southeast of Sault Ste. Marie, Ontario, and is roughly 19.6 mi. long (northwest-southeast) and 12.8 mi. wide (northeast-southwest). The island, approximately 96,000 acres or 150 sq. mi. in size, is covered with deep glacial drift derived from Pre-Cambrian rocks (Chapman and Putnam 1951: 201). The central, highest area of the island consists of morainic hills and uplands which were high enough to exist as islands in glacial Lake Algonquin (Chapman and Putnam 1951: 85) and now rise to a height of approximately 560 ft. above the level of Lake Huron. Below this central area are broad boulder covered terraces, gravel beaches, plains of deeper sands and drumlins with bouldery surfaces—all modified by deposits of fine-textured pink and gray ganded lacustrine clay laid down by glacial Lake Algonquin. Glacial Lake Nipissing, formed by the partial draining of Lake Algonquin, is responsible for the series of bouldery beach ridges which encircle the periphery of the island (Chapman and Putnam 1951: 85).

Old Fort St. Joseph Point is a small kidney-shaped peninsula approximately 1550 ft. wide (northwest-southeast) and approximately 1000 ft. long (northeast-southwest) (Fig. 2). The land forming the point rises from a narrow cobble beach at 581 ft. A.S.L. to a maximum height of 618.5 ft. in a prominence in the approximate centre of the peninsula. The peninsula is joined to the rest of the island by a low, flat, swampy neck or isthmus. The neck's narrowest width is roughly 850 ft. across at its juncture with the peninsula. It does not rise above 581 ft. A.S.L. except in cases of cultural features such as roads and filled areas.

The 1974 level of the lake (581 ft. A.S.L.) is the highest it has been for some time. Photographs taken in 1926, 1950 and 1963-64 indicate that the level of the lake has been as much as 6 to 7 ft. lower, exposing up to 50 ft. of cobble and sand beach around the point and up to 400 ft.
of grassland and sand beach along the isthmus.

The point itself is a morainic hill composed mainly of a cap of glacial till overlying light brownish sandy clay and pale brown boulder clay. Areas which were not cleared during the historic period or the modern "clean-up" of the site are littered with glacially deposited boulders. A series of concentric Lake Nipissing beach ridges consisting mainly of coarse gravel, cobbles and boulders encircle the point.

The soil which covers the peninsula is generally shallow to non-existent. It has developed on stony, sandy till and contains mainly volcanic rocks. Slightly deeper soils have formed in shallow depressions where some organic material has accumulated and in the transitional area between the drumlin-like hill and the swamplike isthmus where the glacial till is not as thick and the lacustrine clay is closer to the surface.

The point has a relatively high water table and the soil here has very severe limitations for agriculture because of excess water and low fertility (Canada. Department of Regional Economic Expansion 1972: map).

St. Joseph Island lies at the extreme western end of the Huron-Ontario section of the Great Lakes-St. Lawrence Forest Region of Canada (Rowe 1972: 93). This section is characterized by stands of mixed deciduous and coniferous trees with the deciduous trees usually being dominant. Sugar maple (Acer saccharum Marsh.), yellow birch (Betula alleghaniensis Britton), and eastern hemlock (Tsuga canadensis Carr.) occur on well drained, shallow, coarse-textured soils, while eastern white pine (Pinus strobus L.), white spruce (Picea glauca Voss) and balsam fir (Abies balsamea Mill.) predominate on deeper, coarse-textured, well drained soils. Moist, transitional soils generally produce white elm (Ulmus americana L.) and balsam fir and the usual forest cover on wet soils is black
spruce (*Picea mariana* B.S.P.), some tamarack (*Larix laricina* K. Koch) and eastern white cedar (*Thuja occidentalis* L.) (Canada. Department of Regional Economic Expansion 1972: map).

According to Chapman and Putnam (1951: 202), "The forests on [St. Joseph Island] contain mostly hardwoods with sugar maple the dominant species. Yellow birch, white birch (*Betula papyrifera* Marsh.), and beech (*Fagus grandifolia* Ehrh.) are fairly abundant, along with some white and red pine (*Pinus resinosa* Ait.), white spruce, balsam, white cedar and aspen. Limited stands of black spruce are seen in the valleys.... There is some regeneration taking place on abandoned farmland, chiefly hardwoods."

Until 1948, the prominence on which Fort St. Joseph stands supported a heavy growth of trees and scrub. In that year a bulldozer was used to clear the central area of the fort except the blockhouse area which was covered by 78 cedar trees until it was cleared during archaeological excavations in 1963. Now slightly under 50 per cent of the site is treed, eastern white cedar being the dominant species. White birch occurs frequently in association with the stands of cedar. Trees which are of secondary importance and occur mainly in peripheral areas of the site, especially around the shoreline and in wet swampy areas include red ash (*Fraxinus pennsylvanica* Marsh.), white spruce, balsam poplar (*Populus balsamifera* L.), choke cherry (*Prunus virginiana* L.), trembling aspen (*Populus tremuloides* Michx.) and alder (*Alnus spp.*). Species which occur but rarely are apple (*Malus* sp.), dogwood (*Cornus* sp.), hawthorn (*Crataegus* sp.), red maple (*Acer rubrum* L.) and tamarack.

Several species of grass and various small plants and shrubs form the undergrowth in treed areas and the ground cover in open areas. It is very likely that at least some of these plants are not native to this area but were introduced
during the historic period, such as wild parsnip (*Pastinaca sativa* L.) and garden asparagus (*Asparagus officinalis* L.) (Soper 1949: 24, 62).

The climate in the area of St. Joseph Island is classified as maritime (Canada, Department of Environment 1973: 1) because of its location between Lake Huron and Lake Superior. The nearness of these bodies of water has a moderating influence on summer and winter temperatures and increases cloudiness and precipitation (Canada, Department of Environment 1973: 2). The average annual precipitation at Sault Ste. Marie of 39 inches is well distributed throughout the year with an average annual rainfall of 27.6 in. and average annual snowfall of 114 in. Rainfall is highest in September and snowfall is highest in January (Canada, Department of Environment 1973: 3).

The annual mean temperature for Sault Ste. Marie and area is 4.1° C (39.4° F). The coldest month is February with a mean temperature of minus 11.7° C (11° F); the warmest is July with a mean temperature of 17.7° C (64° F). From November to April the average daily mean temperature is below 0° C (32° F). The growing season is 183 days long, lasting from 25 April to 24 October (Canada, Department of Environment 1973: 3).

Many pressure systems pass eastward through this area so weather changes are frequent and often quite sudden. High and often rapidly changing winds are the most noticeable aspect of the weather at Fort St. Joseph because of the fort's exposed location. However, the prevailing wind on St. Joseph Island is from the northwest.

**Archaeological Techniques**

No large scale clearing of trees or undergrowth was necessary before the 1974 excavations began at Fort St. Joseph because
the vegetation which covered the areas to be investigated was primarily grass. Although a grid covering most of the fort area had been set up during the 1963-64 field seasons, none of the "permanent" monuments marking this grid could be found when work began. Hence, since many sections of the walls or wall foundations of the powder magazine and blockhouse were visible above ground, an archaeological grid for each of these two buildings was laid out parallel to their respective walls.

The grid for the blockhouse encompassed the entire interior portion of the building and an area up to five feet wide outside the foundation walls in order to ensure the recovery of any exterior features of the building. The building was divided into 10 large sub-operations (Fig. 3) ranging in size from 19 ft. (northeast-southwest) by 20 ft. (northwest-southeast) to 20 ft. (northeast-southwest) by 25 ft. (northwest-southeast). These large units were used because about two-thirds of the structure had been previously excavated, precluding the need for greater horizontal control. The interior of the blockhouse was excavated to sterile sub-soil (glacial till). Then, in order to expose the foundation and chimney footings for recording and display purposes, an additional 1.5 ft. - 2.0 ft. of glacial till was removed from inside and outside the blockhouse except for a large pedestal of till left in the centre of the building. Small pits were dug in strategic areas along the foundation walls and adjacent to the chimney bases to determine the depth and composition of the footings.

The archaeological unit encompassing the powder magazine was 35 ft. (north-south) by 32 ft. (east-west); an area large enough to take in the entire building. The interior grid was laid out so that it divided the building into quadrants (Fig. 3). This was done in order to obtain a north-south profile through each room and provide horizontal control for
artifacts or features which might indicate room or area usage. To facilitate the recording of the structural components, the powder magazine was excavated to a depth of approximately 0.5 ft. below the top of the footing, and small pits were dug adjacent to the walls in order to determine the nature and depth of their footings.

During the course of the field season, additional information regarding the location of the permanent monuments of the 1963-64 archaeological grid came to light. With this information, the grid was reestablished and expanded to take in areas which are to be investigated in the future, e.g. the fur traders' houses. The orientation of this grid is practically parallel to the foundation walls of the blockhouse (Fig. 3).

Three other structures (the chimney structure, the west bastion and the northwest palisade curtain) were investigated during the 1974 field season. A series of test trenches tied into the master site grid were dug in the respective areas in order to locate various features associated with these structures.

The unidentified chimney structure was tested in an attempt to locate the remains of the building originally associated with the chimney and to provide information concerning the construction of the chimney. Two 3 ft. wide test trenches bisecting the two fireboxes of the chimney, one extending 40 ft. to the northwest of the northwest firebox and the other extending 30 ft. to the southeast of the southeast firebox, were excavated; followed by a 19 ft. (northwest-southeast) by 22 ft. (northeast-southwest) trench encompassing the chimney base (Fig. 3).

In order to test for evidence of a gun platform in the west bastion, a 3 ft. wide (northeast-southwest) by 60 ft. long (northwest-southeast) test trench divided into three sub-operations was excavated in an area appearing to be
within the outlines of the bastion (Fig. 3).

The northwest palisade curtain, visible on the surface as a shallow linear depression, was tested for evidence of a ditch and/or banquette which might have been associated with the palisade curtain. A 30 ft. long trench was laid across the palisade trench, approximately halfway between the north bastion and the west bastion (Fig. 3). As time was short and the necessary information could be obtained from a profile, this trench was excavated using a backhoe. The side was then trowelled down to produce a profile. This profile was photographed but could not be drawn as between the time of digging and the time of recording (two to three days), the 4.5 ft. deep trench was filled with about 3 ft. of water which seeped in from the surrounding clay.

Except for the aforementioned trench, all excavation units were dug stratigraphically in order to vertically segregate recovered artifacts and features. Material occurring in layers inside building walls was kept separate from material from corresponding layers outside building walls. Previously undisturbed cultural material was excavated using hand tools such as trowels, grapefruit knives and brushes. Shovels were used to remove previously excavated and sterile material. The excavated material was not screened because of its coarse nature. Therefore, some small artifacts may have been missed. After excavation, all features were thoroughly recorded. Measurements were taken in feet and tenths of feet in order to facilitate comparison with historical documents and maps.

At the end of the 1974 archaeological field season, all test trenches were backfilled to original ground level. The chimney bases in the blockhouse, the blockhouse foundation walls and the lower portions of the powder magazine walls were covered with polyethylene weighed down with rocks. The chimney bases in the blockhouse were then braced using
plywood and 2 x 4s. These measures were carried out as a means of temporarily stabilizing these structures until such time as a site development concept will dictate how they are to be dealt with. A backhoe was used to remove all remaining backdirt to a landfill area near the parking lot.
The Blockhouse

Historical Sketch
The blockhouse was situated on the highest point of the peninsula and consequently commanded a view of the entire area (Fig. 3). Its construction was begun in the summer of 1797, and although not yet completed, the men were able to move into the blockhouse in the fall of 1798. Work continued on the inside of the building throughout the winter. As green wood had been used in its construction, large cracks soon appeared in the blockhouse walls. In 1800 it was recommended that the blockhouse be clapboarded. However, by August 1801, a report stated that not only had the blockhouse not been clapboarded, but its chimneys were in need of repair as well. A fire which destroyed the old bakery in the winter of 1802 threatened the nearby blockhouse and it was subsequently recommended by Captain Bruyères that the cedar shingled blockhouse roof be covered with roofing tin as protection against fire. Captain Bruyères also stated that the walls still had not been weatherboarded and that the interior of the upper storey which was used as a barracks still needed finishing in the form of lath and plaster on the walls and a ceiling in the officers' quarters.

During the winter of 1803, a fire occurred in a beam under one of the fireplaces in the blockhouse, and another fire in a beam under the other fireplace took place the following winter. Both times the offending beams were cut out.

A great deal of work was done on the blockhouse during
the summer of 1804. The roof was covered with roofing tin and painted, the men's barracks were lathed, and weatherboarding of the outside of the structure was finally begun. The weatherboarding was apparently completed by the summer of 1805. However in 1806, it was reported that the roof needed patching as it leaked badly. It seems that because of hasty construction, the blockhouse was in constant need of repairs throughout its occupation.

When the British from Fort St. Joseph moved to occupy Michilimackinac during the early phases of the War of 1812, it is likely that they took most, if not all, of their belongings with them. Thus, it is probably that the blockhouse was nearly, if not completely empty when Fort St. Joseph was burned by the Americans in the summer of 1814.

The information for the preceding historical sketch of the blockhouse at Fort St. Joseph was extracted from the "Fort St. Joseph Preliminary Historical Report" prepared by Elizabeth Vincent (1975). A more complete description of the plans and the construction chronology of the blockhouse can be found in her report which also lists the materials, such as lumber and building hardware, which were ordered specifically for the blockhouse.

After the fort was destroyed, a thicket of cedar trees gradually covered the blockhouse ruins which lay dormant until 1926. In that year some "excavation" was carried out in the southeast end of the blockhouse by the Sault Ste. Marie Historical Society in conjunction with the repointing work that was done on the powder magazine, new bakery and standing chimney. More than 20 years passed before the fort again became the focus of activity. The bulldozing operations of 1948-50 removed some topsoil and artifacts from around the outside of the blockhouse but did not disturb the building itself. It was not until 1963 that the archaeological investigation of the blockhouse was begun.
During the 1963-64 archaeological excavations at Fort St. Joseph, approximately two-thirds of the blockhouse was uncovered, the work mostly concentrating on the northwest end of the building (Emerson, Devereux and Ashworth 1966: Map 14). The grid for these excavations was laid out at a 45 degree angle to the building walls in order to ensure that interior features such as partitions would not be missed. Unfortunately, 1.0 ft. wide balks were left between most of the excavation units, making it impossible to completely record and interpret the remains of the blockhouse. These excavated units were partially backfilled by a maintenance crew following the 1964 field season.

Description of Features

Finally in 1974, the blockhouse remains (Fig. 5) were completely excavated and now a complete description can be given.

The foundation of the blockhouse has exterior dimensions of 28 ft. (northeast-southwest) by 98 ft. (northwest-southeast) (Fig. 6). It is 2.3 ft. wide and stands to a height of 1.34 ft. to 2.34 ft. with an average of 1.83 ft. The foundation is composed of semi-coursed, horizontally oriented, unaltered to roughly dressed limestone slabs, and glacially rounded cobbles and boulders of volcanic rock (granite, gneiss, gabbro, etc.). These stones, up to 2.2 ft. long and 0.85 ft. thick, are mortared together with white (10YR 8/1) lime-sand mortar. The interstices are filled with cobbles and angular limestone fragments.

A "leveling course" of thin limestone slabs is situated 1.65 ft. to 1.85 ft. above the base of the foundation wall. This course was intended to bring the wall to a level surface before placing other stones on it during construction.

The foundation wall rests on a footing composed of
irregular, undressed limestone slabs and glacially rounded cobbles and boulders up to 3 ft. long and 1.4 ft. high loosely mortared together with white lime-sand mortar. The footing is 3 to 5 courses high, standing to a height of 1.8 ft. to 2.4 ft. The top course of the footing consists of flat limestone slabs which produce a level surface for the foundation wall. Unlike the foundation wall, the footing is irregular in width; ranging from 3.0 ft. to 3.5 ft. with an average of 3.2 ft. The foundation wall is primarily situated in the centre of the footing so that, on the average, 0.45 ft. of footing borders the base of the foundation wall on either side. However, in one instance, for a distance of about 21 ft. along the northeast side, the exterior face of the foundation wall is flush with the exterior face of the footing.

The footing and foundation wall were constructed in a builder's trench dug into the glacial till which forms the sub-soil in the area. After the footing and foundation wall had been constructed, the trench was filled in to the level of the surrounding ground surface. The top of the undisturbed glacial till inside the building is 1.3 ft. - 1.8 ft. above the top of the footing. It was almost impossible to discern the trench because there was practically no colour contrast between trench fill and undisturbed till. Where it was discernible, the trench was 4.0 ft. to 4.5 ft. wide and 2.2 ft. to 2.9 ft. deep. Its sides sloped in gradually towards a flat bottom.

The two chimney bases which stand inside the blockhouse foundation walls were partially excavated and recorded during the 1963-64 field seasons. However, complete excavation in 1974 has revealed a few details of construction which were not previously uncovered. These include a footing beneath both the northwest and southeast chimney foundations and two beam passages through the southeast chimney base. Rather
than just presenting new findings, a complete description of the two chimney bases will be given for the sake of clarity.

The fireplace foundation in the northwest end of the building (Fig. 7) is situated 19.75 ft. from the northwest foundation wall, 9.24 ft. from the southwest wall, and 6.75 ft. from the northeast wall. The foundation is 7.1 ft. square and stands to a height of 4.1 ft. It rests on a footing which is roughly 10 ft. square and approximately 2.0 ft. high.

The chimney base is not located in the centre of the footing but is closest to the footing's east corner. Hence, the ledge formed by the footing is a maximum of 2.65 ft. wide adjacent to the southwest face of the fireplace; a maximum of 2.15 ft. adjacent to the northwest face; a maximum of 0.53 ft. wide adjacent to the northeast face; and a maximum of 0.85 ft. wide adjacent to the southeast face.

The footing, unlike the fireplace base, is roughly centred between the building's northeast and southwest walls; being 6.2 ft. from the northeast wall and 6.65 ft. from the southwest wall. It is 17.7 ft. from the northwest end wall. While the sides of the fireplace base are parallel to the adjacent walls of the building, the sides of the footing are slightly skewed. Thus, the faces of the two fireplace components are not parallel or perpendicular to each other.

The northwest fireplace base is composed primarily of undressed and partially dressed slabs of limestone, and occasional cobbles and boulders of glacially rounded volcanic rock. The stones, up to 1.9 ft. long and 0.78 ft. thick, are semi-coursed and horizontally oriented, with the interstices filled with small vertical or horizontal pieces of angular limestone. The stones are held together with white (5YR 8/1) lime and sand mortar. Most of the stones are fire-cracked as a result of the fire which destroyed the building.

The footing of the northwest fireplace is composed of
three to four courses of massive boulders and limestone slabs up to 2.2 ft. long and 0.9 ft. thick. The limestone slabs are used primarily to form the relatively flat surface of the footing. The stones are held together with white sand and lime mortar. The top of the fireplace footing is approximately 1.25 ft. above the level of the top of the adjacent wall footings of the buildings.

The footing and lower part of the foundation of the fireplace was constructed in a hole dug into sterile sub-soil. While the outline of this hole could not be located, the presence of undisturbed till on all sides of the footing indicates that a hole was dug. After the footing and at least the bottom one foot of the fireplace base had been built, the hole was backfilled covering the footing with an approximately 0.42 ft. thick layer of till so that the original level of the till around the fireplace base was reestablished. A layer of mortar was then placed on the till adjacent to all four sides of the fireplace base. This mortar "cap" was approximately 0.1 ft. to 0.2 ft. thick and 0.6 ft. wide, and was apparently intended to stabilize the till around the foundation.

Excavations during the 1963 field season uncovered two beam recesses in the northwest fireplace, one in the northeast face and one in the southwest face. These recesses were opposite one another but at that time, the excavators were unable to determine whether the recesses were two separate holes or one single beam passage which had extended through the fireplace base (Emerson, Devereux and Ashworth 1966: 29, 30). However, the 1974 excavations proved conclusively that there is one semi-cylindrical hole which passes through the fireplace base in a northeast-southwest direction. The hole is semi-cylindrical in that while most of it is circular in outline, the top is flat (Fig. 8). Apparently, a log with a flattened upper surface was situated.
in the hole and extended from the northeast building to the southwest building wall, and probably acted as a sleeper or summer. This corresponds with the historical documents which state that "...twenty pieces of cedar or hemlock 29 ft. long, 13 in. in diameter, hewn on one side..." were ordered to be used as sleepers in the blockhouse (Vincent 1975: 36).

The bottom of the beam passage is on the same level as the tops of the two corresponding building foundation walls. Thus, it is not known how the beam was anchored in the two walls. If the sill beam rested on the existing foundation, i.e. if the existing foundation surface has not lost any courses, the beam may have been anchored in the sill plate. If not, the beam may have been set in the foundation walls.

The hole is located off-centre in the fireplace base, 2.3 ft. from the southeast face and 3.65 ft. from the northwest face. The hole is 1.15 ft. across and 1.0 ft. high. It is situated 0.95 ft. above the level of the footing on the northeast side of the fireplace and 1.2 ft. above the footing on the southwest side.

The fireplace base in the southeast end of the building (Fig. 9) is situated 32 ft. to the southeast of the other fireplace; 25 ft. from the building's southeast wall, 6.6 ft. from the southwest wall, and 6.9 ft. from the northeast wall. The foundation is very decrepit since almost all the rocks are severely fire-cracked and the mortar has crumbled. However, enough intact rocks remained at the bottom of the fireplace base to indicate its size.

The base is approximately 9.0 ft. square and stands to a height of 4.1 ft. It is composed of undressed limestone slabs, and cobbles and massive builders cemented together with white mortar. The stones are up to 2.1 ft. long and 1.4 ft. thick. As with the other fireplace base, the sides are vertical and at right angles to each other; the corners, where extant, are sharp.
A flat area on top of the southeast fireplace base suggests that this may have been the original hearth surface. If this is in fact the case, the hearth would have been located approximately 4.5 ft. or 5.0 ft. above the fireplace footing or 0.4 ft. or 0.9 ft. above the existing top of the fireplace base.

The fireplace base rests on a poorly constructed footing which is only slightly larger than the base. The footing projects past the plane of the base faces for a maximum distance of 0.65 ft. In most cases, however, the sides of the footing are flush with the sides of the base.

The footing is 1.8 ft. to 2.2 ft. high and composed of three to four courses of poorly fitted, mortared boulders of approximately the same size as those in the northwest fireplace footing. The top course consists of thin limestone slabs which form a flat surface for the fireplace base to rest on. The top of the fireplace footing is 0.2 ft. above the top of the adjacent foundation wall footings.

The southeast fireplace base was perforated by two semi-cylindrical beam holes or passages which ran northeast-southwest. The upper portion of the fireplace had collapsed into one of these holes, but enough remained to indicate its size.

One hole was situated approximately 3.2 ft. to the northwest of the southeast face of the fireplace (Fig. 10). It was 1.1 ft. wide and 1.0 ft. high. The bottom of the hole was situated 1.7 ft. above the top of the footing. The other beam passage was located 4.0 ft. to the northwest of the former and had the same elevation. Since the northwest face of the fireplace base had collapsed, the exact dimensions of this hole could not be determined. However, the curvature of what remained suggests that it was the same size as the other one (Fig. 11). The sides of this hole were burned, indicating the presence of a wooden beam; apparently a summer
or sleeper. The distance between the two beam passages indicates that the beams were spaced approximately 4.0 ft. apart along the whole length of the building.

The surface of the undisturbed glacial till within the confines of the building's foundation walls is approximately 1.1 ft. above the top of the footing of the southeast fireplace base. Apparently a hole was dug (whose edges could not be located), the footing and at least the bottom 2 ft. of the fireplace base were built, and the hole was subsequently refilled with till. A mortar cap extending around the fireplace base (as found associated with the northwest fireplace base) was not located; probably because it crumbled when the fireplace began to deteriorate.

The presence of the one beam passage at the very edge of the fireplace base suggests that after the fireplace footings were constructed, the sleepers or summers were set in place and the rest of the fireplace bases built around them. If this were not the case, it would have been easier to lay the one beam along the northwest side of the southeast fireplace base rather than imbed it in the base itself.

As with the other fireplace, the bottoms of the semi-cylindrical holes were level with the tops of the adjacent foundation walls of the building so it could not be determined how the beams were anchored in place.

A concentration of brick to the northwest of the northwest fireplace base and alternating concentrations of brick and stone in the area between the two fireplace bases represent part of the collapsed superstructure of the blockhouse. Two such areas of collapsed, coursed stone and brick were partially uncovered during the 1963 and 64 excavations of the blockhouse. According to Emerson, Devereux and Ashworth (1966: 44); "These bricks are associated with limestone slabs and concentrations of mortar which may well have provided masonry footings for brick
partition walls on the main floor." However, the total excavation of these features in 1974 led to the conclusion that these collapsed building components likely represent chimney remains rather than partition walls.

a) An area of collapsed, mortared bricks - still maintaining their original relative positions - was situated 7.4 ft. to the northwest of the fireplace in the northwest end of the blockhouse (Fig. 12). This area was approximately 6.25 ft. wide (northeast-southwest) and 10.25 ft. long (northwest-southeast). The bricks were predominantly "siders" except for those along the northeast edge of the brick concentrations which were all "headers". The latter bricks were in a relatively straight northwest-southeast line and apparently represent a corner of the chimney stack of the northwest fireplace. The spaces between the brick concentration and the adjacent building walls were filled with broken, scattered bricks which were apparently deposited when the chimney collapsed and shattered on impact.

The bricks in the concentration were red (2.5YR 4-5/8) and had a contorted, laminated paste. The bricks were poorly shaped for the most part and were somewhat irregular in outline. They were an average of 0.69 ft. long, 0.35 ft. wide and 0.15 ft. thick (8-1/4 in. long, 4-1/4 in. wide and 1-3/4 in. thick).

b) To the southeast of the northwest fireplace was a jumble of limestone slabs, some of which rested on their sides next to each other, which had fallen from the fireplace. The stones which still retained their relative positions were oriented parallel to the southeast face of the fireplace. The stone debris extended from the fireplace to a point 7.1 ft. southeast of the fireplace; laterally, the stone occupied practically the entire width of the building. However, near the building walls, the stones were scattered.

c) The southeast edge of the stone concentration was
bordered by a layer of coursed, mortared bricks resting on their sides. The bricks were the same size and colour as those to the northwest of the northwest fireplace and were also oriented parallel to the southeast face of the fireplace. The area of coursed bricks was 5.4 ft. wide (northeast-southwest) and 5.5 ft. long (northwest-southeast). To the northeast and southwest of the brick concentration was a jumble of stone and broken bricks which became scattered toward the foundation walls. The stones and bricks were underlain by sheets of roofing tin, indicating that the rubble was deposited after the roof collapsed.

The coursed nature of the bricks and the fact that they abut the rocks which apparently originally formed the upper portion of the northwest fireplace suggest that the bricks represent a portion of the chimney leading from the first floor fireplace to the fireplace on the second floor.

d) The southeast edge of the brick concentration was bordered by another concentration of jumbled limestone slabs (Fig. 13). The stones were also coursed, on their sides, and parallel to the southeast face of the fireplace. The stone extended for a distance of 6.3 ft. to the southeast of the bricks, and to the side walls of the building. Apparently, these stones originally formed a part of the second storey fireplace in the northwest end of the blockhouse.

e) The stone concentration was bounded on its southeast side by stone and brick rubble. Some of the bricks were still in their original, relative, coursed positions. The rubble occupied the entire width of the building, although it was sparse adjacent to the foundation walls. The bricks found in this area were red (2.5YR 4-5/8) and had a contorted, laminated internal structure. They were irregular in shape and of two sizes, based on thickness. The thin bricks were of basically the same size as the ones in the area closer to the fireplace; they were approximately 0.68
ft. to 0.69 ft. long, 0.34 ft. wide and 0.15 ft. thick. The thick bricks were typically 0.68 ft. long, 0.34 ft. wide, and 0.2 ft. thick. They were otherwise identical to the thin ones.

The brick and stone concentration extended to within approximately 7.0 ft. of the southeast fireplace where it abutted a jumble of stone collapsed from the southeast fireplace (Fig. 14).

The relative position of the stone and bricks in areas b-d suggests that the first floor fireplace complex was stone all the way up to the second floor fireplace and that only the flues were lined with bricks. This would explain why only a narrow area of coursed brick was found which was bordered by jumbled stone. However, the brick concentration to the northwest of the northwest fireplace base suggests that the chimney stack of the second storey fireplace was composed entirely of bricks.

While it appears that the major portion of the northwest fireplace complex fell due southeast and a lesser portion fell northwestward; the southeast fireplace complex apparently collapsed westward. This is indicated by a concentration of fireplace rubble which extends for a distance of 16 ft. to the west of the southeast fireplace, and by a paucity of collapsed material elsewhere (except directly adjacent to the fireplace). However, the lack of any rubble in the southeast end of the building may be due to the fact that this portion of the structure was investigated in 1925 or 1926 by the Sault Ste. Marie Historical Society.

The floors in the building were primarily represented by minute charcoal particles. However, two charred fragments of what appear to have been floorboards were uncovered adjacent to the base of the northwest chimney. The fragments indicate that the boards were 0.07 ft. to 0.075 ft. thick and had rectangular cross-sections. However, it is also possible that these boards comprised the roof of the building since
roofing tin fragments were recovered from the same charcoal layer.

No other measurable wood fragments were uncovered anywhere else in the blockhouse.

Stratigraphy
The stratigraphy within the blockhouse was represented by four layers, excluding the material used to back fill the 1963 and 1964 excavation units.

Layer 1. The uppermost layer in the blockhouse was a sod layer which was formed as a result of plant growth since the destruction of the building in 1814. It was composed of grass roots and humus, and ranged in thickness from a minimum of 0.05 ft. in the southeast end of the building to a maximum of 0.35 ft. near the southeast fireplace base. The average thickness of the sod layer inside the building was 0.19 ft. The corresponding sod layer in areas excavated outside the building was somewhat thinner, ranging in thickness from 0.04 ft. to 0.14 ft., with an average of 0.08 ft. The relative thinness of the sod outside the building and in the southeast end of the building is most likely due to these areas having been disturbed by bulldozing in 1948 and "excavation" in 1926, respectively.

Layer 2. A layer of building rubble was situated below the sod layer inside the blockhouse foundation. The rubble, deposited with the blockhouse collapsed, consisted of limestone slabs, beach boulders and cobbles, light red (2.5YR 6/8) bricks and white (5YR 8/1) lime/sand mortar. This material was stained in several areas by humus which had percolated down from the sod layer. This layer contained numerous artifacts, nails and roofing tin being the most common.

As might be expected, the rubble was thickest adjacent
to the two chimney bases, achieving a maximum depth of 2.3 ft. adjacent to the southeast chimney base. The layer was thinnest in the disturbed area in the southeast end of the building, being represented here by scattered, tiny particles of mortar and bricks. The average thickness of the second layer was 1.22 ft.

The corresponding material outside the building was composed of dark brown sandy loam and collapsed building material. This material ranged from being scattered and of indeterminate thickness 5 ft. from the southeast end of the building (probably because of the proximity of the road) to a thickness of 0.78 ft. adjacent to the foundation wall at the northwest end of the building. The average thickness of the building rubble outside the building was only 0.36 ft. This is due to the fact that the bulldozing activity of 1948-50 removed an unknown quantity of soil from the area around the blockhouse.

**Layer 3.** The next stratigraphic unit within the blockhouse foundations was a very thin layer of charcoal which represents the burned superstructure of the blockhouse. As with two layers above it, the charcoal was scattered and of indeterminate thickness in the southeast end of the building. The charcoal layer was 0.01 ft. to 0.09 ft. thick with an average thickness of 0.04 ft. The intensity of the fire which consumed the blockhouse is manifested in the thinness of the charcoal layer and by the fact that some of the cast iron stove pieces recovered from this layer were melted (the melting temperature of cast iron is 1200° C) (Turner 1895: 189).

**Layer 4.** Beneath the charcoal layer lies sterile glacial till which forms the sub-soil in the area and into which the builder's trenches were dug. The upper surface of this till has been scorched and blackened by fire in many areas inside the blockhouse foundation.
Discussion
Because of the complete destruction of the blockhouse superstructure by fire, little information can be provided regarding the construction or appearance of this portion of the building. The superstructure was represented by an approximately 0.25 ft. thick layer of charcoal containing nails, roofing tin and other artifacts. Thus no information concerning the size or appearance of joists, walls, roofing components, doors, or other structural components, can be provided. The archaeological data must, therefore, be supplemented to a large extent by historical information, especially that provided by the 1800 "Plan and Elevation of an Ordnance Storehouse and Blockhouse erected at Fort George, Amherstburg and St. Joseph 1796," by J.B. Duberger (Fig. 15). It should be pointed out that this drawing of the blockhouse was a general plan and could have been altered to meet the unique conditions of each particular fort.

As the drawing of the blockhouse is a general plan, the orientation of the building is not shown. Ashworth (1964: 97-8) compares the Duberger plan of the blockhouse to the actual ruins. His findings indicate that the front of the building (the side with the two doors) faces southwest, that is, toward the stores building and the water gate. This agrees with the 1974 findings.

"The Fort St. Joseph Interim Feasibility Study" by Weil, Pratt and Randev (see Appendix A) contains a summary of the 1963-64 archaeological findings concerning the blockhouse extracted from Emerson, Devereux and Ashworth (1966). Although this description of the blockhouse is generally correct, some of the statements are contradicted by the 1974 findings.

Emerson, Devereux and Ashworth give the dimensions of the blockhouse foundations as 27.4 ft. (northeast-southwest) by 96.4 ft. (northwest-southeast). However, the foundation
is, in fact, 28.0 ft. by 98.0 ft. This corresponds fairly closely to the measurements of the blockhouse in the Duberger drawing which are approximately 27.5 ft. by 98.75 ft.

Emerson et al's report also describes the foundation as consisting of a 2.0 ft. wide foundation wall resting on a 3.0 ft. wide footing with a combined height of 3.5 ft. However, the 1974 excavations revealed that the footing was actually 3.0 ft. to 3.5 ft. wide and 1.8 ft. to 2.4 ft. high and supported a 2.3 ft. wide, and 1.34 ft. to 2.34 ft. high foundation wall. Although a ledge was formed at the junction of the footing and foundation wall, it was not uniform in width and could not have supported any large beams of the superstructure because the top of the footing was situated below the level of the undisturbed soil inside the blockhouse. The floor beams would have been supported by the tops of the foundation walls, as indicated by the level of the beam passages in the chimney bases.

No trace of the sills of the blockhouse superstructure was found. It is, therefore, impossible to provide information concerning the placement of the sills on the foundation walls, that is, whether the sills were centred on the foundation walls, or were flush with either their inner or outer faces. Thus exact dimensions of the ground floor cannot be provided. However it is possible to infer from the Duberger plan that the sills may have been placed near the outside edge of the stone foundation, leaving an exterior ledge of approximately 4 in. The sills ordered for the blockhouse were to have been 9 in. by 12 in. (Vincent 1975: Appendix 1).

While the actual sleepers which supported the ground floor of the blockhouse were missing, the beam passages in the two chimney bases which the sleepers had passed through provided a good indication of their size, shape and spacing. The sleepers were oriented northeast-southwest and spaced
approximately 4 ft. apart (or with 5 ft. centres as stated in Emerson et al) throughout the length of the blockhouse. The sleepers were 13 in. in diameter and had flattened upper surfaces.

A flat surface on top of the southeast fireplace probably provided a level area on which the hearth for this chimney would have been constructed. This surface is approximately 1.0 ft. above the top of the beam passage. However, although there is no longer a flat surface on the top of the northwest chimney base, the top of its highest stone is approximately 1.5 ft. above the top of its beam passage (which is at the same elevation as the beam passage in the southeast fireplace). This would indicate that the hearths of the two chimneys were located at least 1.5 ft. above the top of the beam passages or approximately 2.5 ft. above the top of the existing foundation wall. Since the hearths would presumably have been higher than the surrounding floor, it is likely that the floor was at a level of something less than 1.5 ft. above the tops of the sleepers. As the size of the joists used to support the floor is not known, it is not possible to estimate the exact level of the floor.

The only available information concerning the locations and sizes of the doors in the blockhouse is contained in the Duberger plan of 1800. The door locations in this drawing have been thoroughly discussed by Ashworth (1964: 93-5). The doors shown in the drawing appear to be 4.5 ft. wide and 8 ft. high. Given the height of the floor above the level of the extant foundation walls, it is likely that access to the doors was by means of steps. However, neither historical nor archaeological evidence exists for such features.

Although various historical sources indicate that the exterior of the blockhouse was weatherboarded and painted, no archaeological evidence of the weatherboarding was found.

The 1800 Duberger plan of the blockhouse and the 1804
Walsh watercolour of Fort St. Joseph (Fig. 4) provide documentary evidence for the locations of windows in the blockhouse. While the Duberger drawing shows all walls of both floors of the building, only the southeast and northeast walls of the upper storey of the blockhouse are shown in the Walsh painting. Ashworth (1964: 94-5) compared the locations of the windows in these two drawings and found that the only difference was that the painting did not show a window in the southeast wall of the upper storey. He suggested that the window had been omitted in the painting because the end of the building was in shadow. However, this is by no means certain as the southeast end of the blockhouse can be clearly seen in the painting, even though it is in shadow.

According to the Duberger plan, the upper storey of the blockhouse had six evenly spaced windows in its southwest and northeast walls, and one window in either end wall in the area above the ground floor doorway. The ground floor had only four windows which, along with the two doors, were evenly spaced along the southwest wall. No windows were shown to be located in the end walls or the northeast wall of the ground floor.

Of the 947 pane glass fragments recovered from the blockhouse during the 1974 excavations, 79 per cent of the sherds were found along the northeast wall of the building, while the remaining 21 per cent came from the southwest wall. Due to previous excavations and disturbance at either end of the blockhouse, artifacts from the ends of the structure were not segregated from those found along the sides. It is, therefore, not possible to speculate on the locations of windows in the ends of the building. However, the distributional pattern of the pane glass fragments suggests that there may have been more windows along the northeast side of the blockhouse. However, this is in contradiction with the Duberger plan which shows a total of 10 windows.
along the southwest side of the building and only 6 windows along the northeast side. Furthermore, the paucity of pane glass fragments along the southeast wall of the blockhouse may be due to the fact that a large volume of earth was removed from this area by the bulldozing activities of 1948-50.

Although the Duberger drawing showed the blockhouse windows to have dimensions of 3 ft. by 5 ft., no indication of the number or size of the lights or panes comprising each window was provided. Nor could pane size be determined from the recovered window glass fragments because of the extremely fragmentary nature of the specimens. However, it can be said that the panes were composed of transparent glass which had a green (10G) to green yellow (10GY) tint (with green predominating), had rippled surfaces and contained frequent elongated bubbles. The pane fragments ranged in thickness from 1.0 mm (0.039 in.) to 2.1 mm (0.083 in.) with an average of 1.47 mm (0.058 in.) and a mode of 1.4 mm (0.055 in.).

Several heavy cast iron stove fragments were recovered from the blockhouse. These may have been used in the masonry fireplaces or they may have formed part of the stoves which were used to supplement the fireplaces as is mentioned in the historical record (Vincent 1975: Appendix 1).

Numerous fragments of the metal sheets which originally covered the blockhouse roof were recovered. Unfortunately, their fragmentary, crumpled and corroded nature made it impossible to provide a comprehensive description of the sheets. However, as much information as could be derived from the available material is presented here.

Sheet metal samples subjected to analysis showed no evidence of zinc or tin; it appears that the metal was simple sheet iron. Analysis further revealed that the sheets had been covered with a red, iron oxide (hematite) paint (McCawley: pers. comm.). The paint was present on both the
upper and lower surfaces of the fragments. However, the layer of paint on one side of the sheet, presumably the upper side, was approximately four times thicker than that on the other side (McCawley: pers. comm.). This corresponds with the instructions for installing roofing tin quoted by Waite (1971: 24) which state that before laying the sheet metal, it must have one coat of paint on its underside. Then, after the sheet metal has been installed on the roof, the upper side should be covered with at least two or three coats of the same paint which should be "of pure metallic brown iron oxide, or Venetian red as a pigment, mixed with pure linseed oil." Although the paint was probably oil based, only the iron oxide remained, the oil probably having volatized when the blockhouse burned.

The gauge of the sheet iron was difficult to determine because of corrosion. However, the thickness ranged from 0.4 mm to 0.8 mm, with an average of 0.5 mm (0.016 in. to 0.032 in.; 0.02 in. average).

The two historical methods of installing sheet metal on a roof involve the use of two different types of seams: flat seams and standing seams. The sheets of iron covering the blockhouse roof were joined together with flat seams. In installing a flat seam metal roof, the sheets were placed on the roof with their long sides oriented horizontally (Waite 1971: 19). The seam between the contiguous long side of two such sheets was formed in the following manner. The bottom or lower sheet was placed on the roof with its upper edge folded over. The edge of the second sheet was then slid into the fold made by the first sheet and nails were driven through the fold into the roof. The second sheet was then folded up over the seam and laid in place on the roof to form a component of the next row of sheets. Thus the nails were protected from the rain. The folds of the seams on the blockhouse roof ranged from 1-1/2 in. to 1-7/8 in. in width.
with 1-11/16 in. being the most common. Although the use of cleats (small strips of metal which were hooked into the folds of the metal sheets and nailed to the roof) was recommended in Waite (1971: 20), these were not used in the covering of the blockhouse roof.

The presence of amorphous lead fragments in close proximity to the sheet metal fragments suggests that lead may have been inserted between the folds of the seams to seal them against water as described in Waite (1971: 18).

One piece of sheet metal, although extremely crumpled, was sufficiently intact so that a measurement of the length of the sheet parallel to the folded edge could be obtained. This length was 24 in. from one cut edge to the other. Unfortunately, the other dimension of the sheets could not be determined. However, it is most likely that the indeterminate dimension of the sheets would have been less than 24 in., as the folded edge would have been the longest side.

According to Waite (1971: 18-20) different size sheets were preferred by roofers for the two different methods of laying roofing tin. Sheets 20 in. by 14 in. were apparently preferred for a flat seam roof and larger, 28 in. by 20 in. sheets were preferred for a standing seam roof. The blockhouse roof appears to have been covered with sheets of a size halfway between the two preferred sizes.

The nails which attached the sheet iron to the blockhouse roof were situated at either end and in the centre of the fold of each sheet. Two nails were used at each end in some cases, while in other cases only one nail was situated at either end of the fold. In cases where one nail was used, it had been centred between the edges of the fold, 1/2 in. to 3/4 in. from the end of the sheet. Where two nails were used, the first nail was located as described above, while the second nail, also centred between the edges
of the fold, was positioned a further 3/4 in. to 7/8 in. along the fold.

Both rose head and flat head wrought iron nails were used in the installation of the sheet iron. The latter had irregularly circular heads and rectangular-square shanks which tapered to sharp points. They ranged from 1-3/16 in. to 1-1/2 in. in length and their heads were approximately 3/8 in. to 7/16 in. in diameter. A rose head nail found in situ in one of the sheets had its tip broken off but its length would probably have been approximately the same as that of the flat head nails. The head of the rose head nail was roughly 5/16 in. in diameter and had four facets on it. Flat head nails are more suitable for sheeting because they do not tend to perforate the sheeting which covers them the way rose head nails do. It is therefore likely that flat head nails were predominately used for installing the sheet iron on the blockhouse roof and roseheads were only used when a shortage of flat head nails occurred.

This concludes the presentation of information which can be gleaned from the archaeological findings concerning the blockhouse. Any further information will have to be obtained from historic documents and plans.
The Powder Magazine

**Historical Sketch**

Until 1804, the powder magazine at Fort St. Joseph was a makeshift structure composed of "a few logs placed to form a kind of temporary cover, with Earth on the sides in a very insecure and improper situation" (Vincent 1975: n.p.). This stood near the blockhouse and the old bakery and was considered a fire hazard. In 1802 Captain Bruyères included in his appraisal of Fort St. Joseph a recommendation for the construction of a masonry powder magazine in the "northeast" bastion of the fort. It was to be 30 ft. long and 15 ft. wide with the side walls 2 ft. thick and 8 ft. high above the footings. The footing was to be 2 ft. below and 1.0 ft. above ground level and 2.5 ft. wide, making a ledge 0.5 ft. wide for the floor joists or sleepers to rest on inside the building. It was to be divided into two rooms, one 17 ft. long for an ordnance storeroom and one 12 ft. long for a powder magazine. The partition between the two rooms was to be 1.0 ft. thick. The building was to have a fire-proofed ceiling and a roof covered with sheet iron (Vincent 1975: n.p.). However, the cost estimate for the construction of the powder magazine which was approved early in 1804 stated that the magazine was to be 35 ft. long and 21 ft. wide rather than 30 ft. by 15 ft.

Construction of the powder magazine was begun in the early summer of 1804, and by the fall everything had been completed except for the flooring and doors. These were installed the following summer after the necessary copper
building hardware had been sent from Quebec (Vincent 1975: Appendix 6).

The powder magazine was burned when Fort St. Joseph was put to the torch by the Americans in 1814. However, the masonry walls remained standing and the building was again used as a powder magazine while the British were at the post on Drummond Island from 1815 until 1828. Most of the powder magazine walls were still standing in 1926 when they were repointed by the Sault Ste. Marie Historical Society.

Although one trench was excavated near the east side of the powder magazine during excavation of the angles of the north bastion in 1964, no attempt was made to excavate the magazine itself until the 1974 field season.

**Description of Features**

The powder magazine (Fig. 16) is located in the north bastion of the fort's palisade approximately 100 ft. to the north of the blockhouse and 75 ft. to the north-northeast of the old bakery. The powder magazine, whose long axis has a north-south orientation is 21.5 ft. wide (east-west) and 35.7 ft. long (north-south) and is divided into two rooms (Fig. 17). Its walls are constructed of semi-coursed, undressed but relatively flat-faced limestone slabs and infrequent cobbles and boulders of volcanic rock held together with white (5YR 8/1) lime/sand mortar. The stones are up to 2.3 ft. long and 1.6 ft. high. The interstices are filled with small, angular limestone fragments.

The exterior walls are 2.0 ft. thick with the exception of the north wall. Although splayed due to collapse to the north, the north wall appears to be 2.5 ft. wide. This is probably so it would be more suitable for anchoring the north end of the north room's brick vault ceiling. This also corresponds with the 2.5 ft. thickness of the interior wall
of the powder magazine which would have supported the other end of the vaulted ceiling. The walls, both interior and exterior, rest on a footing of the same type of construction as the walls.

Three to five courses of stone up to 1.95 ft. long and 1.45 ft. thick compose the footing. The top course is composed of thin limestone flags used to form a flat surface for the building walls to rest on. The top course stones were capped with a thin layer of mortar to further reinforce the footings.

The footings are not uniform in width as are the walls. This is apparently due to buckling and splaying of the footings as the mortar deteriorated and the walls pressed down on them. The footings range from 2.9 ft. to 3.8 ft. in width (3.2 ft. average) and 1.45 ft. to 1.85 ft. in height (1.5 ft. average).

The footings were constructed in a builder's trench which was only slightly wider than the footings. The trench had a flat bottom and vertical walls.

The exterior footing ledge varies considerably in width because the walls were usually not centred on their footings but were often closer to the inside edge (Fig. 17). Along the east wall the footing ledge ranges from 0.57 ft. to 2.0 ft. in width with an average of 1.02 ft. The west wall's footing ledge is from 0.7 ft. to 1.75 ft. wide and averages 0.98 ft. wide. The footing ledge along the south wall averages 1.08 ft. wide with a range from 0.8 ft. to 1.45 ft. wide, while the ledge along the north wall is 0.4 ft. wide where it is not obscured by slumped wall stones.

The northern 5.0 ft. of the exterior footing ledge of the east and west walls was wider than elsewhere throughout the building. At the northwest corner of the powder magazine it is 1.75 ft. wide and at the northeast corner it is 2.0 ft. wide. This extra width was apparently intended to give
additional support to the thicker (2.5 ft. rather than 2.0 ft. thick) north wall which supported the north end of the north room's vaulted ceiling. The footing ledge was 1.05 ft. wide to the south of the wider area at the northwest corner and 1.3 ft. wide adjacent to the northeast corner's wider footing.

The south room of the powder magazine (Fig. 18) has interior dimensions of 17.5 ft. east-west by 16.2 ft. north-south. These dimensions match fairly closely the specifications given for the ordnance storeroom. This, coupled with the fact that the north room fits the description of the room which was to be used as the powder magazine, makes the identification of the south room as the ordnance storeroom fairly certain. The majority of the artifacts recovered from the south room are wrought iron nails. At least some of these nails were probably used in the construction of the wooden interior of the room but, unfortunately, no wooden remains were recovered from the south room.

The footing ledge along the room's north wall was a uniform 0.3 ft. wide throughout, while it was non-existent (i.e. flush with the wall) to 0.7 ft. wide along the south wall. The footings along the east and west walls were flanked by sleeper supports or pads which are 0.75 ft. to 0.85 ft. high. These sleeper pads were of the same construction as the footings and their tops were on the same level. There was often no distinct line of demarcation between the sleeper supports and the adjacent footings making it difficult to ascertain where one stopped and the other began. The sleeper pads rested on a thin bed of mortar laid on the surface of the undisturbed glacial till inside the structure.

The width of the footing/sleeper support (Fig. 17) along the east wall is 1.9 ft. to 2.25 ft. with an average of
2.0 ft., and 0.5 ft. to 1.1 ft. with an average of 0.7 ft. along the west wall.

The sleeper pads probably supported sleepers or summers which ran north-south. On these would have rested east-west joists which supported north-south floorboards. The size of these components is unknown as no fragments of sleepers, joists or floorboards were found.

The level of the undisturbed soil within the room was 0.07 ft. to 0.7 ft. below the top of the footings, with an average of 0.45 ft. In other words, no more soil than necessary was removed from the room's interior during construction.

Two pits which were apparently dug in 1926 by the Sault Ste. Marie Historical Society were encountered in the south room. One was located in the northwest corner of the room; the other in the northeast corner. These pits had been dug through the footings to an undetermined depth (these pits were not excavated by the archaeological crew). The pit in the northwest corner extended for 5.0 ft. to the south and 9.0 ft. to the east of the corner. The other pit extended 4.2 ft. to the west and 3.3 ft. to the south of the room's northeast corner.

The west wall of the south room is the highest, ranging in height from 2.5 ft. to 10.9 ft. above its footing. The east wall is next with a height of 9.9 ft. to 10.6 ft. The height of the south wall ranges from 4.5 ft. to 9.9 ft. above the footing, and the north, interior wall is the lowest with a height of 6.2 ft. to 7.0 ft.

All the walls of the south room bulge inward at the centre. The north wall bulges inward for a distance of 0.25 ft., the east wall for 0.15 ft., the south wall 0.4 ft., and the west wall for 0.3 ft. from the original plane of the respective walls.

Two horizontal recesses extend around the walls of the
south room. The lowest of these is located 2.5 ft. above the top of the footing. The recess is 0.3 ft. square in cross-section. Intact mortared areas in the recess which exhibit wood grain impressions indicate that a 0.21 ft. thick timber was mortared in the recess, and probably served as a nailing strip to which were affixed boards or planks which covered the stone walls. The air space between the stone wall and the board facing would prevent moisture from infiltrating the room as the stone walls sweated. In addition, storage shelves could then be nailed to the walls.

The upper recess is located at two different elevations in the north and east, and south and west walls, respectively. In the north and east walls, the recess is situated 6.8 ft. above the wall footing, or 4.0 ft. above the lower recess. In the south and west walls, the recess is 7.1 ft. above the footing or 4.3 ft. above the lower recess. The reason for this difference in elevation of the upper recess is not known.

The upper recess was also squared. It ranged in size from 0.3 ft. to 0.5 ft. high (averaging 0.39 ft.), and 0.25 ft. to 0.45 ft. deep (averaging 0.34 ft.). The size of the nailing strip in the upper recess could not be determined. However, it is possible that it was the same size as that in the lower recess.

Several sections of both the upper and lower recess contained stones, usually in room corners or beneath large, loose rocks. These are not original but were inserted in the recesses in 1926 by the Sault Ste. Marie Historical Society to prevent wall collapse. This is indicated by the fact that the stones are the same size as the recesses and are enclosed by modern cement. In other words, the recesses were originally continuous so as to accommodate one-piece nailing strips in each wall.

A 3.5 ft. wide doorway (Fig. 19) was situated in the
south room's west wall, 8.0 ft. to the south of the northwest corner and 4.7 ft. to the north of the southwest corner. The sill was situated approximately 0.5 ft. above the adjacent wall footings. The surface of the sill was composed of thin limestone flags set in mortar to form a flat surface. The wall faces forming the sides of the doorway were vertical and flat, i.e. they did not contain recesses which might have accommodated the door jambs. The north side of the doorway was vertical for 7.5 ft. above the sill, indicating that the doorway was at least this high originally. No remains of the door were found except for a broken pintle.

Another opening was encountered in the south wall of the room (Fig. 20). Although this opening had been interpreted as the door to the south room by the archaeological field party in 1963, the 1974 excavations revealed that this could not be the case.

The opening was located in the approximate centre of the wall, 7.0 ft. from the southeast corner and 8.2 ft. from the southwest corner. The opening is 2.0 ft. to 2.3 ft. wide and its "sill" is uneven. The top of the highest stone in the "sill" is 2.95 ft. above the footing of the wall.

The opening has parallel, vertical sides but both sides were partially built up by the Sault Ste. Marie Historical Society. The east side of the opening was vertical for a distance of 3.25 ft. above the base of the opening prior to 1926. Then, in 1926, the east side was built up to a height of 4.4 ft. At the same time, the vertical west face was constructed. Prior to this, the opening was 3.75 ft. wide at the base and had an irregular, jagged west side.

The purpose of this feature is not certain. That a vertical east face existed prior to 1926 indicates that an opening was located in the south wall at one time. However, it is not known whether the opening was in the form of a vent or a window. While a window in the powder magazine does not
seem very practical, pane glass fragments found in the vicinity of the opening tend to support this identification. It is, however, possible that the window was constructed after the fort was abandoned in 1815 and the magazine served as a storage area for "an assortment of ammunition" (Devereux 1965: n.p.).

The north room of the powder magazine is 17.5 ft. east-west by 12.5 ft. north-south (Fig. 21). This corresponds fairly closely to the 1802 specifications for the room destined to serve as the "powder magazine." This room, unlike the south room, had had a vaulted brick ceiling which was a common feature of powder magazines at this time. Also unlike the south room, the north room's interior had not been partially "excavated" by the Sault Ste. Marie Historical Society in 1926 and its collapsed remains were undisturbed.

The interior footing ledge along the room's north wall ranged from non-existent (flush with the wall) to 0.55 ft. in width, while the one along the south wall was 0.1 ft. to 0.6 ft. wide. As in the south room, sleeper supports were located adjacent to the east and west wall footings (Fig. 17). These supports were 0.6 ft. to 0.85 ft. thick along the east wall and 0.6 ft. thick along the west wall. The footing/sleeper support pad along the east wall was 0.95 ft. to 1.35 ft. wide, with an average of 1.1 ft. Along the west wall it ranged from 0.55 ft. to 0.75 ft. in width, with a 0.67 ft. average.

A portion of a north-south sleeper was uncovered on the west footing/sleeper support pad. The fragment was 5.2 ft. long, 0.33 ft. wide and 0.18 ft. thick. The wood was charred but appeared to be cedar.

In addition to the two sleeper pads mentioned above, a third sleeper pad extends across the centre of the room from the south wall to the north wall. The pad is 1.1 ft. to 1.4 ft. wide (1.25 ft. average) and 0.6 ft. to 0.75 ft. thick.
(0.67 ft. average). It is composed of two to three courses of limestone slabs set in a bed of mortar placed on the undisturbed glacial till forming the "floor" of the room. The top of the pad is on the same level as the sleeper supports along the east and west walls. The upper surfaces of the footings and pads are 0.16 ft. to 1.13 ft. above the level of the till inside the room.

The west wall of the north room stands the highest, ranging from 1.5 ft. to 9.5 ft. in height. The east wall is next with a height of from 2.2 ft. to 8.5 ft. above the top of the footing. The south wall is 6.2 ft. to 7.0 ft. high. The north wall is the lowest with a height of only 0.55 ft. to 1.15 ft. above its footing. The rest of the north wall fell due north in such a way that it still retains its coursed nature.

As in the south room, there were two horizontal recesses in the walls which extended around the room (Fig. 21). The lower recess was situated 0.25 ft. above the top of the wall footings and was 0.3 ft. square. The upper recess was 5.0 ft. above the wall footings and 2.2 ft. above the lower recess. The upper recess was also squared but was 0.4 ft. high and 0.3 ft. deep. The upper recess was lower in this room because the room had a vaulted ceiling whose ends were situated 6.0 ft. above the footings. Although the north wall is missing for the most part, it is more than likely that the two recesses were present in this wall as well.

A doorway was situated in the centre of the room's west wall, 4.2 ft. from the northwest corner and 4.15 ft. from the southwest corner. The opening is 4.15 ft. wide (Fig. 22). The sill, composed of thin limestone flags, is situated 0.5 ft. to 0.6 ft. above the adjacent footing of the wall.

The south side of the doorway presently extends to a height of 7.45 ft. above the door sill. However, most of it was apparently "constructed" in 1926 by filling in the spaces
between the stones which had formed the original doorway. The north side of the opening is ill-defined and represented by only one stone which extends approximately 0.3 ft. above the sill of the doorway. In that this stone was skewed when the west wall collapsed, it is quite possible that this stone (or perhaps another) was situated further to the south. It is, therefore, possible that the door was slightly narrower; possibly the same width as the south room's door which was 3.5 ft. wide.

The north room had a vaulted, brick ceiling which curved from north to south. This is indicated by a sloped "springer" area located 6.0 ft. above the footing in the north side of the interior wall, as well as curved recesses in the east and west walls which emanate from the ends of the sloped "springer" surface in the interior wall. The recessed areas are 1.3 ft. wide as is the springer surface, indicating that the vaulted ceiling was 1.3 ft. thick (Fig. 23). The recessed areas are presently 0.4 ft. to 0.7 ft. deep and accommodated the sides of the vaulted ceiling.

Impressions of bricks laid on their faces were found at the base of the arch recess in the west wall. Their long axes were oriented east-west.

The arched ceiling of the north room was represented by a layer of bricks and mortar in the room fill. The bricks were red (10R 4/6-8) and had a contorted, laminated paste. They had been shaped in forms without tops or bottoms. One side of the bricks exhibited brush marks created by smoothing the top side while in the form; the other side exhibited straw or grass impressions - material placed under the forms so that the clay would not stick to the underlying surface during brick forming.

The bricks were of two sizes. The larger size was typically 0.73 ft. long, 0.35 ft. wide and 0.18 ft. thick (ranging from 0.7 ft. to 0.74 ft. in length, 0.33 ft. to
The smaller bricks were typically 0.65 ft. long, 0.34 ft. wide and 0.15 ft. thick (ranging from 0.64 ft. to 0.67 ft. in length, 0.32 ft. to 0.35 ft. in width and 0.15 ft. to 0.16 ft. in thickness). The larger bricks were by far the most common.

Artifacts of note which were found in the north room include an iron lock found adjacent to the footing at the south, interior edge of the door opening. This may have been used to lock the powder room door. In addition, numerous pieces of sheet copper, some apparently corrugated, were found in, but primarily under, the brick/mortar fill inside the room. This suggests that the sheeting did not come from the roof of the building, but was used inside the room. As this sheeting was found scattered about the room, its exact function is not clear. Perhaps it covered the door or the walls or the floor, or all three.

A strap hinge was located to the east of the building, adjacent to the centre of the east wall of the north room. Its presence here is a mystery since no doors or windows were apparently located in this wall of the powder room.

**Stratigraphy**

Because there are significant differences in the fill of the powder magazine's south room, north room, and the area outside the building, the stratigraphic sequence of the layers uncovered in these three areas will be discussed separately (Fig. 24).

**South Room**

Three stratigraphic layers were encountered in the fill of the south room.
Layer 1. Sod formed the uppermost layer in the south room except in two areas where recently collapsed building stone and mortar formed the existing ground surface. The largest of these areas was along the room's north wall; the other was in the southeast corner of the room. Where the sod existed, it ranged from 0.07 ft. to 0.3 ft. in thickness, with an average of 0.15 ft.

Layer 2. Beneath and protruding through the sod in several areas was a layer of dark reddish brown (5YR 2.5/2) to very dark gray (10YR 3/1) sandy loam mixed together with collapsed broken limestone slabs, white (5YR 8/1) lime mortar and infrequent red brick fragments, as well as scattered charcoal fragments. This layer consisted of collapsed wall and roof components. Unfortunately, this material had been considerably disturbed and contained intrusive artifacts, such as a wire nail, a machine cut nail, and a brass shotgun shell base which dates to after 1948 (White and Munhall 1963: 83), which were found within 0.3 ft. of the bottom of layer 2. It is likely that the major disturbance of this room's fill took place during the 1926 repointing of the powder magazine and at some time after 1948. Unfortunately, photographs of the powder magazine taken before and after the 1926 consolidation do not show the extent of digging carried on inside the south room. The layer ranged in thickness from 0.68 ft. to 1.72 ft., with an average of 1.19 ft., and contained period artifacts such as white clay pipe fragments and hand wrought nails, as well as intrusive modern artifacts.

Layer 3. The glacial till forming the undisturbed sub-soil directly beneath layer 2 in the south room is composed of yellowish brown (10YR 5/4) sand mixed with light brownish gray (10YR 6/2) sandy clay and gravel, cobbles and boulders. The depth below surface of this sub-soil ranged from 0.6 ft. to 2.0 ft.
North Room

Five stratigraphic layers were encountered in the excavation of the north room of the powder magazine.

Layer 1. As in the south room, sod formed the uppermost layer in the north room except for a 3 ft. to 5 ft. wide area along the room's south wall which was covered with building rubble. The sod layer ranged in thickness from a minimum of 0.05 ft. in the approximate centre of the room to a maximum of 0.2 ft. adjacent to the room's north wall. The average thickness of the sod was 0.13 ft.

Layer 2. Beneath the sod was a layer of sandy loam and collapsed limestone slab fragments and mortar which was deposited subsequent to the collapse of the room's vaulted arch ceiling and the north wall. The layer ranged in thickness from 1.6 ft. adjacent to the south wall to 0.6 ft. adjacent to the north wall, with an average thickness of 0.7 ft.

Layer 3. A continuous layer of whole and broken bricks, and mortar comprised the layer directly beneath layer 2. This material represents the collapsed vaulted brick ceiling of the room, apparently deposited sometime after 1829 (Vincent 1975: n.p.). The brick/mortar layer was 1.3 ft. thick adjacent to the south wall, 0.4 ft. thick in the approximate centre of the room, and 1.05 ft. thick adjacent to the north wall. The average thickness was 0.89 ft. Artifacts recovered from this layer consisted mainly of building hardware such as wrought iron nails, cast brass nails and fragments of sheet copper.

Layer 4. Immediately below layer 3 was a continuous layer of charcoal and light brown ash which represented the burned wooden components of the room. This layer was 0.2 ft. to 0.75 ft. thick, with an average of 0.42 ft., and was probably deposited when the building burned in 1814. The same kinds of artifacts were recovered from layer 4 as from layer 3.
Layer 5. Glacial till composed of yellowish brown (10YR 5/4) sand mixed with light brownish gray (10YR 6/2) sandy clay, gravel and numerous cobbles and boulders formed the undisturbed sub-soil directly beneath layer 4 in the north room. The surface of layer 5 which was from 2.1 ft. to 3.1 ft. below the top of the room's fill had been scorched and blackened by fire.

Area Outside Building
Three stratigraphic layers were uncovered in the area excavated around the outside of the powder magazine.
Layer 1. Sod formed the uppermost layer in all the units excavated outside the building. The sod ranged in thickness from 0.05 ft. to 0.17 ft., with an average thickness of 0.11 ft.
Layer 2. Beneath the sod was a layer of black sandy loam containing glacial till and building rubble. Collapsed building stone formed the major portion of this layer in areas where the magazine's walls had experienced major collapse. This was especially evident at the building's north end where the wall had collapsed as a unit and still retains its original coursed pattern. Layer 2 ranged from 0.5 ft. in thickness 5 ft. to the southeast of the building's southeast corner to 2.25 ft. in thickness adjacent to the middle of both the north wall and the south wall. The average thickness of the layer was 1.19 ft. Wrought iron nails, cast brass nails and strap and sheet iron and copper fragments formed the majority of the artifacts recovered from this layer. Ceramics which date to the early part of the 19th century, some of which predate and some of which postdate the burning of the fort, were also present (R. Whate: pers. comm.).
Layer 3. The undisturbed sub-soil which underlies layer 2 is
composed of glacial till with a high black sandy loam content, overlying yellowish brown sand mixed with light brownish gray sandy clay and gravel, cobbles and boulders. The high black sandy loam content was not present in the sub-soil underlying the interior of the building probably because it had been removed prior to construction of the magazine, in order to prepare a level area on which to build. The undisturbed sub-soil outside the powder magazine was from 0.57 ft. to 2.45 ft. below the ground surface which existed before excavation.

Discussion
Although no excavations were conducted inside the powder magazine during the 1963-64 seasons, a brief description of the building, as found drawings and an inferred plan and elevation were included in the report by Emerson et al. (1966: 140-141). However, complete excavation in 1974 revealed that some of the measurements and interpretations of the powder magazine as found in 1964 were in error. These are listed below:
1) The correct dimensions of the building are 35.7 ft. (north-south) by 21.5 ft. (east-west), not 43.3 ft. (north-south) by 20 ft. (east-west) as stated in Emerson et al. (1966: 140).
2) The correct length of the north room is 12.5 ft. (north-south), not 21 ft. (north-south) as previously stated.
3) The doorway in the west wall of the south room was not "constructed" in 1926 as stated in Emerson et al. but was the original and only door in the south room.
4) As discussed earlier in this report, the opening in the south wall of the south room was not a door as described in Emerson, but was possibly a window or an air vent.
5) The inferred plan and elevation of the powder magazine
drawn in 1966 shows the vaulted brick ceiling of the north
room curving from east to west, with its long axis running
north-south, when in fact the arch curved from north to
south.

A description of the powder magazine as it would
probably have appeared between the completion of its
construction in 1805 and the burning of the fort in 1814 is
presented here, although information concerning the interiors
of the rooms is scanty.

The powder magazine was a 35.7 ft. (north-south) by 21.5
ft. (east-west) stone building covered with a gabled, cedar
shingled roof. The structure was divided into two rooms: the
north room for storing powder and the south room for storing
ordnance. Entrance to each of the rooms was gained through a
doorway in the west wall of either room. Although the floors
were missing from both rooms, it is likely that they were
composed of north-south floorboards resting on east-west
joists supported by north-south sleepers. The sleepers were
supported by stone pads. Although no remains of wooden wall
components were recovered from either room, it is likely that
the interior walls were covered with vertical boards nailed
to nailing strips set in the recesses in the room walls.

While the ceiling of the south room was probably formed by
the gabled, shingled roof, the north room had a vaulted brick
ceiling.

The door of the north room or "magazine" was apparently
covered with sheet copper. Evidence for this was in the form
of fragments of sheet copper and cast brass nails recovered
from the fill of the room. It is likely that the brass nails
were used to attach the sheet copper to the door, as similar
nails were found in situ holding copper sheathing in place on
the outside of the door of the powder magazine in the
Octagonal Blockhouse (1813-37) at Coteau du Lac, Quebec (Priess 1972: 320-25).

Pane glass fragments found in the vicinity of the opening in the south wall of the south room tend to support the identification of this feature as a window. Of the 160 fragments of pane glass recovered from the powder magazine excavations, approximately 75 per cent were found outside the southwest corner of the southwest room. Unfortunately, there is no mention in the historical record of whether the powder magazine contained a window. However, other powder magazines of the same general time period had windows, such as Fort George (pers. obs.).

It was obvious that both rooms of the powder magazine had been burned, as evidenced by scattered charcoal fragments in the south room and a continuous 0.2 ft. to 0.72 ft. thick charcoal/ash layer in the north room. The only recorded instance of a major fire at Fort St. Joseph after the construction of the powder magazine was the burning of the fort by the Americans in 1814. It is most likely that both rooms of the powder magazine were burned at this time, as an officer who saw the fort in 1815 stated that "the Americans had entirely destroyed the fort...the barracks and several of the houses..." (Vincent 1975: n.p.).

However, in 1815, the powder magazine, one of the two structures which remained standing at the fort, was cleaned out to be used as a magazine for the British fort on Drummond Island. According to various letters concerning the state of affairs at Fort St. Joseph from 1815 to 1828, the north room and its ceiling were still standing in 1825, although badly cracked (Vincent 1975: n.p.).

As most of the burned debris from the 1814 fire in the powder magazine would have been cleared out in 1815, it is most likely that the charcoal and ash encountered in the excavation of the structure was the result of another, later
fire, probably sometime after 1829. Evidence exists that some burning must have taken place at Fort St. Joseph after 1829 in that the new bakehouse's ancillary room, which was constructed after 1816 and used as a barracks until 1829, was completely burned. It was probably sometime after this second fire that the arch and north wall of the north room of the powder magazine collapsed.
Historical Sketch

The chimney structure, so called because no associated structural components have been uncovered, is situated at an elevation of 609 ft. A.S.L., roughly 80 ft. to the southwest of the blockhouse, 30 ft. to the west of the guardhouse, 40 ft. to the southeast of the stores building, 10 ft. to 15 ft. inside the southwest curtain wall and 10 ft. southwest of the main water gate (Emerson, Devereux and Ashworth 1966: 191).

It cannot be determined from the historical record when exactly the chimney structure was built or what its historical purpose was. Although photographs taken in 1925 by the Sault Ste. Marie Historical Society clearly indicate that the chimney was already badly cracked by this date (Fig. 25), there is no indication of any building or chimney in the area between the water gate and the guardhouse on any of the historical maps drawn of Fort St. Joseph during its occupation. Although the site was surveyed by Molesworth in 1854, his maps only show the outline of the fort's palisade, and nothing of any buildings or ruins which may have existed inside the fort. It was not until 1925 that the chimney structure showed up on any maps. It can, therefore, only be said that the chimney and associated building were constructed at some time between 1823 and the 1920s.

However, given the decrepit state of the chimney in 1925, it is likely that it was constructed during the earlier portion of the proposed date range.

Excavations around the chimney were carried out during
the 1964 field season. Test trenches were excavated to the northeast and southwest of the chimney in order to locate any remaining building walls or foundations, but none were found. A small pit was also excavated in the hearth of the southeast fireplace.

Description of Features
More excavations around the chimney were carried out in 1974. Two test trenches were dug to find evidence of the structure that was originally associated with the chimney; one extending for 26.5 ft. to the northwest of the chimney's northwest firebox back (Fig. 26) and the other for 30 ft. to the southeast of the back of the southeast firebox. Subsequently, a 19 ft. (northwest-southeast) by 22 ft. (northeast-southwest) pit was dug around the chimney to determine the nature of its base and associated features (Fig. 27).

The test trenches revealed no foundation remains. While bulldozing activities in 1948 removed up to 1.6 ft. of soil from around the chimney, remnants of a foundation would have been expected considering the depth of the other foundations at the site. Since none were found, it is assumed that the building associated with the chimney had either a wooden or a low masonry foundation which had rested directly on the original ground surface which was removed in 1948. Thus no description of the size, shape or general appearance of the building can be presented. Since the building foundation was not a substantial stone one (as were all other fort structure foundations) it is likely that the structure was not a fort structure but was erected after the fort was destroyed in 1814. However, as the structure does not appear on the map of the fort drawn in 1823, it is probable that the building was constructed even later.
The chimney itself has fared much better, being one of the three structures repointed in 1926 by the Sault Ste. Marie Historical Society. However, the work done by the Society did alter the appearance of the chimney slightly.

The chimney is composed of semi-dressed limestone slabs and occasional volcanic stones mortared together with white lime-sand mortar. The stones are up to 2.5 ft. long and 1.5 ft. thick. While the majority of the stones are horizontally oriented, some of the stones in the cheeks of the firebox have been laid on their edges. Spaces between the stones are chinked with angular limestone fragments.

While stone comprised the major portion of the chimney, the lower flue and upper firebox areas were constructed using broken bricks and stones, while the upper flue areas and chimney stack interior were constructed primarily of broken bricks. The bricks may have been robbed from the blockhouse after the latter was destroyed; their colour and thickness is in keeping with that of the blockhouse and magazine bricks. The interiors of the fireboxes and flues were faced with mortar.

The chimney has two fireboxes; one facing northwest, the other southeast. Each firebox has an offset flue. The flue of the northwest firebox occupies the west corner of the chimney stack; the other flue occupies the east corner (Fig. 28).

The chimney stands to a maximum height of 15.7 ft. At present it has three distinct sections; each narrower than the one below it. The bottom-most section, the fireplace segment, is the widest. Above it is the flue area segment which is crowned by the chimney stack. The fireplace does not rest on a footing as do those in the blockhouse.

At present, the basal section measures 8.5 ft. to 9.0 ft. (northeast-southwest) by 7.0 ft. (northwest-southeast), and is 6.2 ft. to 6.9 ft. high. The flue section measures
6.0 ft. to 6.5 ft. (northeast-southwest) by 6.0 ft. (northwest-southeast), and is 3.6 ft. to 3.9 ft. high. The stack measures 4.5 ft. (northeast-southwest) by 3.5 ft. to 4.3 ft. (northwest-southeast), and is 4.7 ft. to 5.2 ft. high. The junctures of the sections are capped with cement and sloped so that they will shed water.

However, a comparison of what exists today with what appears in pre-consolidation photographs taken in 1925 suggests that the chimney structure had a slightly different configuration before stabilization (Fig. 25). Originally, the basal section was 8.5 ft. (northeast-southwest) by 7.0 ft. (northwest-southeast) by 7.5 ft. high. The flue section was 6.0 ft. square, and 2.5 ft. high. The stack was 4.5 ft. square, and 5.0 ft. high. The junctures between sections were 90 degree angles, as were the corners. Total chimney height was approximately 15 ft.

The two fireboxes are practically identical in construction. The fireboxes constrict in width towards the flues. In addition, the interior faces of the cheeks flare outward towards the mouth of the firebox. Thus, the base of the firebox is 5 ft. wide at the back and 6 ft. wide at the mouth. The firebox is 3.0 ft. deep here. At a point 7.0 ft. above the hearth, the firebox is 3.5 ft. wide at the back and 4.0 ft. wide at the mouth. The top or lintel of the firebox is located at this elevation. The lintel is composed of several stones rather than a single stone.

The cheeks are 1.3 ft. to 1.5 ft. wide at the base. They then widen gradually towards the lintel achieving a maximum width of approximately 2.25 ft. at the juncture of the lintel and cheeks.

The flues begin at a point 9.0 ft. above the hearth in the northwest fireplace and 11.0 ft. above the hearth in the southeast fireplace. The flues are 1.2 ft. square up to the point where they merge near the top of the chimney stack.
The hearths of the fireboxes are composed of flat limestone flags approximately 0.3 ft. thick. The tops of the hearths are 1.5 ft. to 1.6 ft. above the bottom of the fireplace base.

The hearth stones of the northwest firebox rest on an approximately 0.6 ft. thick pad of packed clay which extends out of the firebox and fronts the entire fireplace. The clay apron is rectangular in outline and 8.9 ft. long (northeast-southwest) and 2.5 ft. to 2.7 ft. wide (northwest-southeast). The apron is enclosed on its three exterior sides by a low (0.5 ft. to 0.6 ft. high), dry-laid retaining wall (Fig. 29). The wall is of crude construction and composed of limestone slabs and fragments 1.7 ft. long, 1.6 ft. wide and up to 0.6 ft. thick. The sides of the retaining wall are 4.0 ft. long; the front is 11.3 ft. long (Fig. 27).

The retaining wall, as well as the chimney itself, rested on the surface of the undisturbed glacial till which forms the sub-soil in this area. Apparently, only the sod had been removed from the building site and the chimney was constructed without further ado. Thus, there is no builder's trench.

After the fireplace had been built - an action which resulted in the deposition of a thin layer of mortar and stone rubble - the retaining wall was constructed. The area enclosed by the wall and the firebox base was then filled with rubble and glacial till to a height approximately in line with the top of the retaining wall. The same was apparently done on the outside of the wall, probably in order to stabilize it. Unfortunately, the extent of the fill could not be determined because the 1948-50 bulldozing operations had removed this material from around the chimney to within 2 ft. of the retaining wall.

Clay was then laid on the surface of the fill. The clay
was 0.6 ft. thick inside the firebox, but only 0.4 ft. thick at the wall, probably due to erosion. The clay extended onto the wall in some areas. Once the clay had been put in place, the stones comprising the floor of the hearth were installed.

A similar apron and retaining wall had apparently fronted the southeast fireplace. Unfortunately, most of this apron complex had been removed by the 1964 archaeological field party. However, most of the northeast side of the retaining wall remained, as did a portion of the front wall. In addition, clay of the same colour and texture as that forming the northwest apron was encountered in the fill of the 1964 trench on the southeast side of the chimney. Thus, it is almost certain that an apron existed on this side as well. The existing side of the retaining wall was 4.5 ft. long; the existing portion of the front wall was 5.2 ft. long.

A single stone projected to the northeast from the base of the chimney's east corner and to the northeast from the base of the north corner. The function of these two stones is not known. However, it may be that they were intended to brace the cheeks of the fireplaces.

**Stratigraphy**

Seven stratigraphic layers were encountered during the excavation of the chimney structure. These layers were only found in association with the northwest fireplace (Fig. 4) and in areas outside the chimney, since the stratigraphic sequence of layers associated with the southeast fireplace was destroyed as a result of the 1964 excavations.

**Layer 1.** Sod formed the uppermost layer in the areas excavated around the chimney structure, except inside and directly in front of the firebox, where hearth stones and recently deposited rubble formed the surface. The sod ranged
in thickness from 0.08 ft. to 0.15 ft., with an average of 0.11 ft. Artifacts found in the sod layer included both wrought iron (historic period) and modern wire nails.

Layer 2. A layer of mortar (cement) and building stone fragments extended from the mouth of the northwest firebox to a point 4.5 ft. to the northwest of it. This material formed the ground surface directly in front of the firebox and was overgrown with sod elsewhere. The thickness of this layer ranged from 0.1 ft. to 0.3 ft., with an average of 0.2 ft. The layer contained modern (post-1920s) artifacts and was apparently deposited during the 1926 repointing of the chimney.

Layer 3. The clay apron fronting the northwest firebox was situated directly beneath layer 2. The apron, composed of sterile yellowish brown (10YR 5/4) clay, ranged from 0.1 ft. to 0.6 ft. in thickness, with an average of 0.43 ft. The clay was thickest inside the firebox and thinnest where it overlapped the top stones of the dry laid retaining wall which enclosed the apron.

Layer 4. A 0.3 ft. to 0.58 ft. thick (0.48 ft. average) layer of building rubble mixed with glacial till was located beneath the northwest apron. This material was laid down in order to provide a level and more elevated surface on which to lay the clay apron after the chimney and the associated retaining wall had been constructed. Rubble mixed with till was also apparently placed against the outside of the retaining wall in order to reinforce it. Artifacts recovered from this layer included wrought iron nails and other metal items with probably date to the military occupation of the fort (1796-1829).

Layer 5. A sterile layer of mortar and stone rubble deposited during the construction of the chimney was encountered beneath layer 4. This layer ranged in thickness from 0.25 ft. to 0.4 ft., with an average thickness of 0.32 ft.
Layer 6. Glacial till containing scattered building rubble was situated beneath the sod layer in the area around the chimney complex. This material, deposited during the construction and occupation of Fort St. Joseph, was present in the area at the time that the chimney structure was constructed. An indeterminate quantity of this layer was removed during the bulldozing activities of 1948-50; the remainder ranges in thickness from 0.15 ft. to 0.8 ft. Cultural material recovered from this layer included artifacts which date to the military occupation of the fort, as well as more recent artifacts.

Layer 7. Sterile glacial till formed the sub-soil in the vicinity of the chimney structure. It was located beneath layer 5 in front of the northwest firebox and beneath layer 6 in all other areas excavated around the chimney structure. Its depth below surface ranged from 1.55 ft. adjacent to the northwest firebox to 0.1 ft. on the southwest side of the chimney.

Discussion
Following the 1974 field season, an analysis of the ceramics recovered from the chimney structure excavations was carried out. The majority of this material can be attributed to the period of the fort's occupation: the late 18th and early 19th centuries. However, all the ceramics were recovered from areas which had been previously disturbed, either by bulldozing in 1948 or by archaeological excavation in 1964. This is reflected in the extremely fragmentary nature of the material, its mixture with post-occupation material and its distribution. The only previously undisturbed layers which were definitely deposited during the construction of the chimney were the clay apron in front of the northwest fireplace and the fill beneath the clay. Unfortunately, the
clay forming the apron was devoid of artifacts, while the fill layer beneath it contained no ceramic material. Hence, the recovered ceramics are of little use in dating the chimney structure.

Two other artifacts provide some insight as to the time period during which the structure was probably occupied. A George II copper halfpenny was found wedged between two stones in the retaining wall in front of the northwest fireplace. This coin was so badly worn that its exact date could not be distinguished but it is known to have been made some time between 1740 and 1754 (Reinfeld 1956: 108). Although coins are not particularly good time indicators as they tend to be used and kept long after their date of manufacture, the vintage of this coin does tend to indicate a relatively early construction date for the chimney structure, possibly not long after 1823.

Another datable artifact, a pewter spoon handle, was recovered from just outside the northwest retaining wall. The handle had the hallmark of Townsend & Compton, London, stamped near its broad end. The mark is similar to No. 4800 in Old Pewter, Its Makers and Marks and was in use from 1801 to 1811 (Cotterell 1963: 324). Although this spoon handle was recovered from a disturbed layer, it was found near enough to the retaining wall to suggest that it could possibly have been deposited during the construction or occupation of the chimney structure. If this was the case, the spoon handle, like the coin would tend to indicate a fairly early construction date for the chimney structure, possibly not long after 1823. However, it is also possible that the spoon handle was deposited during the military occupation of Fort St. Joseph and was already present in the ground when the chimney and associated building were constructed.

Thus none of the artifacts recovered from the chimney structure excavations can be used to determine the exact date
or function of the structure. It is likely, however, given the advanced stage of decay of the chimney in 1925 and the presence of the 1740-54 period coin in the retaining wall, that the construction date for this building was relatively early, possibly even before the abandonment of the fort in 1829.
West Bastion Gun Platform

Historical Sketch
The west bastion of the palisade which surrounded Fort St. Joseph is located approximately 175 ft. to the southwest of the southwest corner of the powder magazine which stands in the north bastion and about 115 ft. to the west of the blockhouse which is located in the approximate centre of the fort.

In January of 1798, an estimate was made for the expense of enclosing Fort St. Joseph with picketing but by March of 1799, construction of a palisade had not yet begun (Lee 1966: 3). Another estimate was made in April of 1799 which included materials and labour necessary "To erect four raised Platforms for Guns to Fire over the Picketing" (Vincent 1975: n.p.). These gun platforms were to be located in the four bastions of the palisade. The construction of the palisade at Fort St. Joseph was begun in the summer of 1799. By the summer of 1802, Captain Bruyères was able to report that the palisade was complete. He also stated that although the timber for building the gun platforms was ready, no work had been done on them, and recommended that only the gun platforms for the "southwest" and "southeast" bastions needed to be built as these would be adequate to protect the fort. Again in 1806, it was reported that there were still no gun platforms (Vincent 1975: n.p.). Indeed, there is no mention in the historical record of the gun platforms ever having been built at Fort St. Joseph.

Although all the angles of each of the four bastions
were located during the 1963-64 excavations of Fort St. Joseph, no digging was carried out within the bastions where the gun platforms would have been located.

Description of Archaeological Findings
Only the east, south and west bastions could have contained gun platforms as the north bastion was occupied by the powder magazine. Since the 1802 recommendations for the platforms' construction had included only the south and west bastions, it was decided to test the undisturbed west bastion in 1974; the south bastion having been levelled by bulldozing in 1948.

Three connecting trenches located 197 ft. to the southwest of the southwest corner of the powder magazine and covering an area 60 ft. long and 3.0 ft. wide were dug inside the west bastion (Fig. 3) in an attempt to locate remains of a gun platform which may have existed there. The trenches ran northwest-southeast, and began just to the southeast of the northwest bastion wall. The trenches extended to a point in line with the bastion's south re-entrant angle.

Unfortunately, no structural remains or any soil stains which might indicate structural remains were uncovered. Furthermore, the scarcity of nails and the absence of other hardware which might represent a decayed gun platform suggests that such a platform never existed in the west bastion.

Stratigraphy
Three stratigraphic layers were uncovered in the west bastion excavations.
Layer 1. Sod formed the uppermost layer in the west bastion, and ranged in thickness from 0.05 ft. to 0.2 ft., with an average of 0.12 ft. Several modern artifacts were
encountered.

Layer 2. Beneath the sod was a layer of black sandy loam mixed with glacial till. This soil contained a few scattered artifacts, (white clay pipe stems, wrought iron nails, and small sheet iron and ceramic fragments) which were deposited during the construction and occupation of the fort. The thickness of this layer ranged from 0.7 ft. to 1.45 ft., with an average of 1.11 ft.

Layer 3. The sterile sub-soil which underlay layer 2 was composed of glacial till with a high sand content. The depth below surface of the till ranged from 0.87 ft. to 1.75 ft.
The Northwest Palisade Curtain Wall

**Historical Sketch**

Estimates were made in January of 1798 and April of 1799 for the construction of a palisade to enclose Fort St. Joseph. Construction began during the summer of 1799 but proceeded slowly due to problems in clearing the site of large rocks and in digging a ditch in which the pickets could be set. By the summer of 1800, 413 ft. of the post still remained to be enclosed. A plan of the fort drawn in 1800 includes a drawing of a section through the picketing which shows a banquette built up along the inside of the palisade and a ditch dug around the outside. It appears that this plan was not strictly followed, however, for Bruyères report of 1802 stated that although the stockade had been completed, the loopholes were useless as no banquette had been raised inside the palisade and no ditch dug outside (Vincent 1975: n.p.). Again in 1806 it was reported that a banquette still had not been formed inside the stockade (Lee 1966: Encl. 6). In fact, no documentary evidence of the actual construction of the earthworks associated with the palisade at any time during the fort's occupation can be found. In 1814 the palisade was burned along with the rest of the fort.

Investigations which were carried out on the palisade during the 1963 and 1964 field seasons concentrated mainly on determining how the palisade was constructed. All four curtain walls were tested and one trench was excavated specifically to search for evidence of a ditch adjacent to the outside of the palisade (Emerson, Devereux and Ashworth
1966: 100). However, no conclusive evidence of the existence of a banquette was uncovered.

**Description of Archaeological Findings**

As it had been suggested that a palisade might be reconstructed in the future, the northwest curtain wall a previously undisturbed section of the palisade, was tested in 1974 in order to obtain conclusive proof of the presence or absence of any earthworks associated with the palisade.

The northwest palisade curtain wall is roughly 170 ft. long and its palisade trench still shows up on the ground surface as a shallow linear depression running between the west bastion and the north bastion.

A 3 ft. wide (northeast-southwest) trench was laid out across the northwest curtain wall 70 ft. southwest of the southwest corner of the powder magazine (Fig. 3). This trench was made 30 ft. long (northwest-southeast) in order to encompass the distance which the banquette, palisade trench and ditch would have occupied if constructed as shown on the Duberger plan of 1800. To save time, the trench was dug to a depth of approximately 4 ft. using a backhoe, as the necessary evidence could be gained from a profile. Subsequently, the topsoil, which had been removed separately from the sub-soil, was trowelled for artifacts. An inspection of the soil profiles revealed no evidence of anything but the palisade trench. The latter was 2.1 ft. wide and had very slightly sloped walls. The bottom was slightly concave. The depth of the palisade trench could not be accurately determined since the excavated area had filled with 3 ft. of seeping ground water before a profile could be drawn. The palisade trench was approximately 2 ft. deep, which corresponds with the findings of the 1963-64 investigations (Emerson, Devereux and Ashworth 1966: 86, 87).
Stratigraphy

Four stratigraphic layers were encountered in the northwest palisade excavation.

Layer 1. Sod formed the uppermost layer in the area of the northwest palisade curtain wall, and ranged in thickness from 0.05 ft. to 0.1 ft., with an average of 0.08.

Layer 2. Beneath the sod a 0.65 ft. to 1.15 ft. thick (0.91 ft. average) layer of black sandy loam was encountered. Artifacts dating to the military occupation of Fort St. Joseph (1796-1829) were recovered from this layer.

Layer 3. The palisade trench fill constituted layer 3, which was dug into sterile sub-soil beneath layer 2. The palisade trench was filled with black to dark brown sandy loam and clay containing artifacts, brick fragments and decayed wooden palisade components. The artifacts recovered from this layer were deposited during the construction and occupation of the fort, particularly during the construction of the palisade (1799-1802). The thickness of this layer was approximately 2 ft.

Layer 4. Layer 2 and layer 3 were underlain by sterile sub-soil composed of a thin layer of glacial till over pale brown (10YR 6/3) tenacious clay which retained a great deal of water. The depth below surface of layer 4 ranged from 0.75 ft. at the west corner of the excavation unit to approximately 3 ft. beneath the palisade trench.

The following is a collation of data from both documentary and archaeological sources extracted from the archaeological report to act as a summary of the structure of the Blockhouse:

"The Blockhouse was a rectangular two-storey building, located centrally in the fort enclosure. Its long axis lay along a north-west-southeast line. The ground floor measured 27.4 ft. by 96.4 ft. It may be inferred that the upper storey measured 100 ft. by 30 ft. to provide the usual overhand for gun slits 1.5 ft. in width. The roof was peaked.

The building rested on foundations of semi-dressed and mortared slabs of dolomitic limestone from nearby Lime Island. Foundations consisted of a footing 3.0 ft. in width and 1.5 ft. in elevation and a superimposed foundation wall, 2.0 ft. wide and 3.5 or more ft. high. The differential in width of these two elements provided a 6 in. ledge or set-off at the level of conjuncture. Such a ledge served to support large beams of the substructure.

The superstructure of the building rested upon beams 12 in. in diameter and rounded in
cross-section. These beams had five ft. centres, were supported on the set-off ledge of the footing and spanned the short axis of the building. It is presumed that stringers were laid across the beams and floor planking was superimposed upon the stringers.

Limestone slabs were also used in the construction of the two interior chimneys. The chimneys differed in size, orientation and location within the building. The foundation of the smaller one at the northwest end of the building accommodated a large beam or beams. The general structure of the chimney consisted of limestone slabs, but there is some evidence for red ceramic brick chimney or perhaps chimney or hearth linings. The hearths in this chimney faced towards the northeast and southwest long walls of the building.

In the second and larger chimney, the foundation and at least part of the superstructure were of limestone. No beams passed through its foundation. Hearths in this chimney faced toward the northwest and southeast short walls of the building.

The building was of wood, either hewn timbers or round log. These were eventually covered on the exterior with weatherboarding and painted. It is possible that the corners were dovetailed in a fashion commonly used in English forts of the period.
In the upper storey, six rectangular glass windows may have been spaced along both long walls. Windows in the southwest wall of the lower storey match those above, except that doors were substituted on the southwest long wall for the second and fifth windows. It is not clear whether there were any windows in the northeast long wall. On the ground floor, doors appear at the northeast end of the northwest short wall and northeast end of the southeast wall. These doors give access to the two stairways to the second storey.

The lower storey was partitioned into four rooms with the above-mentioned interior stairways in the north and northeast corners of the building. The partition walls may have been of wood, although there is some suggestion that they may have been of red ceramic brick. The upper storey accommodated five rooms and two hallways divided by wood partitions. Fragments of plaster with lath impressions indicate the interior, perhaps of the officers' rooms, bore this refinement.

The roof of the building was peaked and originally shingled with cedar. When sheet iron became available, this material was used to cover the roof as a precaution against the hazard of fire". 
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Map of the Great Lakes Area around 1800. (Emerson, Devereux and Ashworth 1966; Line drawing No. 1.)
2 Contour map of Old Fort St. Joe Point. The water level shown is that recorded in 1964. (Drawing by Kenting Ltd.)
3 Site plan showing the master grid established in 1974 and the limits of the 1974 excavations. (Drawing by D. Kappler.)
4 Detail of a watercolour of Fort St. Joseph painted in 1804. (Painting by Lieutenant Walsh.)
5 Overall view of the blockhouse foundations looking north-northwest. The powder magazine ruins appear in the background. (Photo by K. Karklins; 1H-179 M.)
6 Plan view of the blockhouse. (Drawing by W. Peck.)
The northwest chimney base in the blockhouse. Looking north. (Photo by K. Karklins; 1H-140 M.)
8 The northeast side of the northwest chimney base showing the beam passage. Looking southwest. (Photo by K. Karklins; 1H-149 M.)
The southeast chimney base in the blockhouse. Looking east. (Photo by K. Karklins; 1H-197 M.)
The southwest face of the southeast chimney base in the blockhouse. Looking northeast. Note the collapsed beam passage filled with rubble just to the right of the centre of the base. (Photo by K. Karklins; 1H-126 M.)
11 Looking south-southeast at the remnant of the beam passage in the northwest face of the southeast chimney base in the blockhouse. (Photo by K. Karklins; 1H-200 M.)
12 The coursed brick concentration in the northwest end of the blockhouse which represents the collapsed chimney stack of the northwest chimney. Looking southeast. (Photo by K. Karklins; 1H-48 M.)
The coursed brick and stone collapsed to the southeast from the northwest chimney base in the blockhouse. Looking southwest. (Photo by K. Karklins; 1H-68 M.)
The coursed brick and stone collapsed to the northwest from the southeast chimney base in the blockhouse. Looking southeast. The brick and stone in the foreground has collapsed from the northwest chimney base and is that illustrated in Fig. 13. (Photo by K. Karklins; IH-65 M.)
The 1800 Duberger plan of the blockhouse to be constructed at Fort St. Joseph. (Public Archives of Canada, Neg. No. C63121.)
The powder magazine at Fort St. Joseph. Looking northeast. (Photo by K. Karklins; 1H-400 M.)
17 The floor plan of the powder magazine. (Drawing by W. Peck.)
18 The south room of the powder magazine. Looking east-northeast. Note the horizontal "nailing strip" recesses in the interior walls. (Photo by K. Karklins; 1H-317 M.)
19 The sill of the doorway in the west wall of the powder magazine's south room. Looking west. (Photo by K. Karklins; 1H-296 M.)
The possible window opening in the approximate centre of the powder magazine's south wall. Looking north. (Photo by K. Karklins; 1H-311 M.)
The north room of the powder magazine. Looking southeast. Note the horizontal "nailing strip" recesses in the east and south walls of the room. (Photo by K. Karklins; 1H-375 M.)
22 The sill of the doorway in the west wall of the powder magazine's north room. Looking west. Note the sleeper remnant resting on the footing. (Photo by K. Karklins; 1H-351 M.)
A pre-stabilization photograph of the interior southwest corner of the powder magazine's north room taken in 1925. Looking west. Note the sloped springer surface in the south wall and the brick arch recess in the west wall. (Photo by A. Pinard; NHP&S Neg. No. 2672.)
24 A north-south section through the approximate centre of the powder magazine showing the soil layers. Looking west. (Drawing by D. Kappler.)

Legend:  
1) Sod layer  
2) Mortar/rubble concentration  
3) Black sandy loam containing glacial till and building rubble  
4) Sterile glacial till with a high black sandy loam content  
5) Sterile glacial till composed of yellowish brown sand mixed with light brownish gray sandy clay  
6) Dark reddish brown to very dark gray sandy loam mixed with limestone slabs, white lime mortar, and scattered red brick fragments  
7) Sandy loam containing limestone and mortar fragments  
8) Whole and broken bricks and mortar  
9) Charcoal and light brown ash
A pre-stabilization photograph of the southeast side of the chimney structure at Fort St. Joseph taken in 1925. Looking northwest. (Photo by A. Pinard; NHP&S Neg. No. 2677.)
The northeast profile of the northwest test trench which bisects the northwest firebox of the chimney structure. Looking northeast. (Drawing by D. Kappler.)

Legend: 1) Sod layer
2) Modern mortar and building stone fragments
3) Clay apron composed of sterile yellowish brown clay
4) Building rubble mixed with glacial till
5) Sterile layer of mortar and stone rubble
6) Glacial till containing scattered building rubble
7) Sterile glacial till
8) Modern gravel roadbed
Floor plan of the chimney structure showing the limits of the 1974 excavations. (Drawing by W. Duguay.)
Vertical sections and elevations of the chimney structure. Note the differences in shape as compared with the original chimney shown in Fig. 25. (Drawing by W. Duguay.)
29 The fireplace apron/retaining wall complex on the northwest side of the chimney structure. Looking southwest. (Photo by K. Karklins; 1H-410 M.)