

Historical and Archaeological Evidence of 19th Century Fever Epidemics and Medicine at Hudson's Bay Company's Fort Vancouver

ABSTRACT

During the Hudson's Bay Company's occupation of Fort Vancouver in the Pacific Northwest, fevers in epidemic proportions occurred intermittently throughout the late 1820s and early 1830s, severely affecting the Company's employees, operations, and aboriginal population.

Evidence of these epidemics has been found in the archaeological record of a little known complex associated with Fort Vancouver. The investigation of 19th century medical beliefs and practices aided in the interpretation of site activities as responses to the epidemics.

Introduction

In the winter of 1824–1825, Hudson's Bay Company established a fur trading post and supply depot on the north bank of the Columbia River, 100 miles inland from its mouth at the Pacific Ocean. This post, Fort Vancouver, was the administrative headquarters for the Company's Columbia Department, which reached from the Rocky Mountains to the Pacific Ocean and included the entire Columbia River watershed. Here, all furs of the trade of the department were gathered and sent to England. Supplies from England arrived at Fort Vancouver on ships navigating the Columbia River and were subsequently dispatched to other HBC posts in the Northwest and to ships participating in the coastal trade. Until 1843, Fort Vancouver was the only major establishment in the vicinity of what is now Vancouver, Washington, an area which was jointly occupied by both British and American citizens. For years the post was

the social, cultural, and economic center of the Oregon Country (Hussey 1957:2).

In addition to the established fort proper, a village for employees, called Kanaka Village, grew up southwest of the stockaded quarters, stores, and warehouses. South of this village, another cluster of structures was established. Referred to today as the Riverside Complex, this group of buildings near the riverbank included boat sheds, a cooper's shop, a hospital, tan pits, and several domestic dwellings.

The Riverside Complex was discovered on a narrow stretch of land between a major state highway and a railroad embankment during excavations of 45CL300 in the summers of 1974, 1975, and 1977. The projects were funded by the Washington State Highway Department, through the Office of Public Archaeology at the University of Washington. The features and artifacts recovered indicated the presence of diverse Hudson's Bay Company activities in the area. A stockade trench and numerous fire pits filled with charcoal were among the more unique features uncovered (Chance 1976, Chance and Chance 1976, Carley n.d.).

Subsequent research located an historical source which referred to a stockade along the riverbank; it enclosed the hospital (Emmons 1841). This hospital was presumably built as a response to fever epidemics which occurred annually for a number of years, severely affecting the Company's operations, employees and the aboriginal population.

The investigation of 19th century concepts of hospitals, epidemics, and the causes and cures of diseases has aided in the interpretation of the archaeological data from the Riverside Complex. A combination of historical and archaeological information had led to an understanding of why the hospital was built at such a distance from the fort, why it was surrounded by a stockade, what archaeological evidence remains from an early 19th century hospital, and how unique features of the site can be explained in terms of period medical concepts and activities.

Intermittent Fever Epidemics

In the late 1820s and early 1830s, fever epidemics spread rapidly throughout the Pacific Northwest, especially in the areas of the Columbia River and its tributaries. The harshest epidemics occurred between the years 1830 and 1834 (Rich 1941:88, 104, 129–130), though the fevers continued to disrupt daily life until at least 1839 (Rich 1943:224), and were mentioned as late as 1841 (Rich 1943:41). The epidemics had a devastating impact upon the aboriginal population of the area, annihilating entire villages and taking the lives of hundreds of individuals. Though deaths among the Euroamerican population of the area were not numerous, these people often were weakened or totally debilitated for weeks or months at a time. It was not unusual for the Company's activities to come to a complete halt when the epidemics peaked seasonally during the late summer and early fall months. At times, everyone at the fort was agitated by the fever, some suffering up to four relapses. The pestilence was usually referred to as "fever and ague" or, more commonly, "intermittent fever," known today as malaria.

Impact on the Natives

Those to suffer most with the coming of the malady each year were the native Americans living near the Columbia River. John Kirk Townsend (1905:333) wrote in 1834, after the initial impact of the epidemics had lowered the native population substantially, that:

The depopulation here has been truly fearful. A gentleman told me, that only four years ago, as he wandered near what had been a thickly peopled village, he counted no less than sixteen dead, men and women, lying unburied and festering in the sun in front of their habitations. Within the houses all were sick; not one had escaped the contagion; upwards of a hundred individuals, men, women, and children, were writhing in agony on the floors of the houses, with no one to render them assistance. Some were in the dying struggle, and clenching with the convulsive grasp of death

their disease-worn companions, shrieked and howled in the last sharp agony.

Chief Factor John McLoughlin estimated that nine-tenths of the native population were swept away by these epidemics (Parker 1967:178). Writing of the fever's ruinous impact upon the aboriginal population Dr. William Fraser Tolmie (1963:183), stated in 1833 that:

. . . on the lower bank and just opposite to Coffin island is the site of an indian village, which a few years ago contained two or three hundred inhabitants, but at present only its superior verdure distinguished the spot from the surrounding country. Intermittent fever which has almost depopulated Columbia R. of the aborigines, committed its fullest ravages and nearly exterminated the villages, the few survivors deserting a spot where the pestilence seemed most terribly to wreck its vengeance.

Sufferings of the Company

Though there are accounts of large numbers of individuals on the sick list at Fort Vancouver, death rarely resulted among the Euroamerican population contracting intermittent fever.

In writing of the early years of the fever, Peter Skene Ogden (1933:139) stated that in the autumn of 1830, upon returning to the fort, he found several servants suffering from the illness. Twenty days after the symptoms first appeared, the whole garrison, comprising 80 servants and 5 gentlemen, with the exception of 2, had been struck by the disease. According to Chief Factor McLoughlin, it was not uncommon for the sick list to be comprised of 75 individuals and for work about the fort to halt substantially (Rich 1941:94). In 1830, there were 104 males employed at Fort Vancouver (Kardas 1971:169), thus 75 men on the sick list at once was a large portion of the population at the fort and included most of the working force.

By 1834, the fever subsided somewhat and McLoughlin reported that it was not as prevalent that summer as previously ". . . but it is a fact that since it first began in 1830 it so

much weakened our people that it was with the greatest difficulty we got through our work" (Rich 1941:130).

Fewer cases of intermittent fever appeared in 1836, but in 1839, the epidemics appeared again with enough rage to inhibit ongoing work at the post (Rich 1941:158). As James Douglas wrote from Fort Vancouver in that year:

At this moment and for the last month, we have been so severely afflicted by the prevailing fevers of the country as to render it a matter of difficulty to carry on our work. A fourth or upwards of our effective force, are now in hospital, and fresh cases appearing every-day [Rich 1943:224].

Intermittent fever recurred annually, taking the lives of hundreds, weakening as many, and bringing commerce to a standstill.

Etiology in the Early 19th Century

To understand how those living at and in the vicinity of Fort Vancouver may have responded to the fever epidemics, an examination of their concepts concerning the causes of disease, especially such a disease as intermittent fever, is necessary.

Upon reading the medical literature of the late 18th and early 19th centuries, it becomes readily apparent that explanations for poor health were much different than those commonly used today. A concept of contagion in fever-related illnesses was unknown by some and disregarded by others. The etiology which dominated the literature of the period was that of miasma or miasmata, which was put forth strongly and continuously by the medical profession.

Miasma or miasmata was believed to be a vaporous exhalation which caused illnesses, especially fevers. There was something in the air, in the atmosphere, which was responsible for such ailments.

The atmosphere which surrounds the globe we inhabit, for many miles in height, is the most heterogeneous fluid in nature. Every species of substance, whether

animal, vegetable or mineral; dispersed over the surface of the earth, and which is capable of being dissolved by water, consumed by fire, or volatilized by heat, is diffused in endless variety and proportion through the different strata of air. When, therefore, we consider that at every inspiration this fluid is applied to an expanded tissue of the most delicate blood vessels in the lungs we cannot but conclude that its every varying properties, temperature, density, and impregnations, must have a predominant influence on the health of the human race [Johnson 1820:1].

In 1822, after much research and observation, John Armstrong concluded that intermittent, remittent, and typhus fevers were modifications of the same disease and attributed the causes of fever to a poisonous miasma. Here we find a more specific explanation of the conditions of the atmosphere. The primary source of such fevers, according to Armstrong (1822:412), was "what the Italians vaguely call *mal aria*, and the English, as vaguely, *marsh effluvium*." He defined *mal aria* as a morbid exhalation of the soil which produced intermittent and continued typhus. "A certain degree of warmth, moisture, and the decomposition of vegetable matter, have appeared to me essential for the generation of *mal aria* . . ." (Armstrong 1822:424).

As late as 1846, the common cause of intermittent fever was thought to be marsh miasmata or malaria arising from the exhalations of marshy grounds (Eastman 1846:52). In 1851, a result of a meeting of physicians at a Sanitary Conference of Paris was the determination that epidemics were always the result of cosmic conditions which could not be produced by individuals or transmitted from person to person, but were produced by certain ". . . 'state of affairs', unknown meteorological conditions, invisible and unfathomable" (Winslow 1943:54-55).

The medical philosophy at Fort Vancouver appears to have followed closely that of the medical profession at large, attributing intermittent fever to miasmata or *mal aria* (Tolmie 1963:112, 163). Ogden (1933:145) cites miasmata as the cause of the fever epidemics in the Northwest.

To suppose it contagious from personal contact would be very erroneous, since it doubtless proceeds from miasmata pervading the atmosphere, whose virulent qualities are elicited only by certain coincident circumstances of local origin.

After all, perhaps the most plausible mode of accounting for the generation of this malady is to attribute it entirely to foul exhalations from low and humid situations; though even to this supposition there are objections which it is difficult to overcome, and which tend to subvert every preconceived theory on the subject.

The native Americans of the area, at least in part, attributed the debilitating disease to Americans and Europeans. There is some evidence which suggests that the natives held the Euroamericans in general, and at times the Hudson's Bay Company in particular, responsible for and the cause of the epidemics which released such havoc among them (Kardas 1971:74-75, Larsell 1947:602, Tolmie 1963:289, Chance 1973:74).

Treatments and Preventions of Fevers and Epidemics

In the early 19th century, symptoms of various fevers were not known specifically, and it was often difficult to distinguish one kind of fever from another, particularly in the early stages of illness. Intermittent fevers were, according to one author, frequently inconsistent with what one might naturally expect in such cases, and assumed so much the characteristics of other diseases, that they were sometimes quite difficult to detect (Saunders 1782:47). Consequently, many of these ailments were treated in a more or less similar manner.

During this period, most people "continued to view illness primarily as a misfortune to be met after it had occurred. Medical men were expected to restore health rather than preserve it . . ." (Shryock 1960:104). Though some preventive measures were called for, such as avoiding night air and easterly winds (Eastman 1846:50) or cleaning up areas of filth

and decay (Armstrong 1822:424), the major treatment of intermittent fever was to cure it by bleeding and administering cinchona bark, and later, quinine. Quinine was isolated from cinchona bark in the 1820s by French chemists and by the 1840s large doses of quinine were providing more effective control of malaria than had been possible before (Shryock 1960:131).

In addition to purging and the infusion of a number of tonics, another practice noted in the early literature may also represent a common response to intermittent fever epidemics, Burning and smoking in various ways was a means of purifying contaminated air and preventing the spread of fevers. Evidence of such practices comes largely from accounts of yellow fever and cholera epidemics. Given the general theory of miasmata as a cause of fevers, it is assumed that such practices could have applied to fever epidemics of any kind.

This practice of burning and issuing smoke to purify the air has a long history. In Colonial America, residents of Charleston, South Carolina, attributed an absence of malaria in their town "to the air being minded by the Number of Fires in Town . . ." (Duffy 1953:212-213). By impregnating the air with effluvia, the miasmata could be destroyed or neutralized. In Philadelphia in the late 18th century, Dr. Benjamin Rush suggested temporary measures for prevention of the epidemic of yellow fever, among which were the burning of gun powder in the streets and the smoking of tobacco (Wain 1970:317). He was certain that fire, or the smoke or heat which issued from it, destroyed the effects of marsh miasmata and recommended the building of large fires every evening (Winslow 1943:51). During this time, citizens in Philadelphia lit fires on street corners to purify the rain-soaked air, and, in one case it was proposed that a cannon be discharged through the streets to clear the air of miasmata (Powell 1949:51). During the cholera epidemic in New York in 1832, "harsh smoke from burning clothes and bedding filled the air, mingling

with the acrid fumes of burning tar, pitch and other time-tested preventives" and "on one Louisiana plantation, the main house was fumigated morning and evening with burning sugar and vinegar, while its inhabitants were enveloped at all times in clouds of dense smoke from tar burning in the yard" (Rosenberg (1971:32, 38). As late as 1855, during a cholera epidemic on the frontier, a physician at Fort Riley, Kansas "frantically burned barrels of pine tar beneath open hospital windows because he didn't know what else to do" (Karolevitz 1977:71).

At Fort Vancouver blood-letting and administering quinine, or a locally available substitute, were treatments used for intermittent fever. An examination of Hudson's Bay Company's inventories of supplies on hand at the fort indicate that cinchona, or Peruvian, bark was also used.

In 1833, Dr. Tolmie treated Chief Factor McLoughlin for intermittent fever by bleeding during the 'cold stage' of the illness (Tolmie 1963:180). Written accounts show that quinine was the medicine preferred for treatment of the malady, but was often in short supply. There are several references to the use of the local substitute, *Cornus nuttalli*, (Allen 1878) which was given in "doses of 3½ dram of dried root in powder and succeeded in subduing diseases without cinchona etc" (Tolmie 1963:171).

Among the native Americans in the area a common treatment of disease as described by Townsend (1905:212) in 1834 was that of sweating in a lodge, then cooling themselves by jumping into cold water. An 1838 account ascribed their great mortality to this mode of treatment. Plunging into the river during the burning stage of the fever, until the heat was allayed, these people rarely survived the cold stage which followed. "So many and so sudden were the deaths which occurred, that the shores were strewed with the unburied dead" (Parker 1967:179). It was recently suggested that these people died more commonly of pneumonia, which resulted from this means of

treating the ailment, than from the actual disease of malaria (Boyd 1975:151).

When their own remedies failed the natives sought aid from the Hudson's Bay Company. It was Company policy to give medical aid to employees and Indians free of charge (Hussey 1976:69). Governor Simpson of the Company wrote of the HBC trading establishments as Indian hospitals which were "the resort of refuge of many of the natives, who . . . have benefit of the care and attention, free of expense, of our medical men . . ." (Merk 1931: 337). In 1837 a number of Klickitats had been vaccinated by a medical officer of the Company at Fort Vancouver (Jesset 1959:58) and it is known that vaccinations and dispensation of medicines took place at other posts in the Northwest (Chance 1973:123).

Though it was their policy to give medical assistance to the natives at all times, the Company often did not have sufficient medication for their own sick, so those who appeared at the fort for help were sometimes turned away. In November 1830, Dr. McLoughlin wrote:

. . . the indians . . . frightened at the mortality amongst them came in numbers to camp alongside of us giving as a reason that if they died they knew we would bury them, most reluctantly on our part we were obliged to drive them away . . . [Rich 1941:96].

One month later, McLoughlin again wrote:

. . . we were obliged to drive the Indians away instead of affording them the assistance they implored by us having as many of our people on the sick list as we could possibly attend to [Rich 1941:175].

Medical Facilities at Fort Vancouver

The Hospital

The construction of a hospital at Fort Vancouver, along the river bank southwest of the fort, is postulated as an immediate consequence of the epidemics, built for certain members of the Hudson's Bay Company community. Presumably, had the fevers not prevailed, the hospital would not have been necessary.

Little historical documentation of the hospital exists and it is difficult to determine exactly when it was built. From the written records, one may conclude that it was a structure measuring 32 × 22 feet built on the river bank southwest of the fort and just south of the employees village in the early 1830s (Hussey 1957: 221).

A small dispensary, sometimes referred to as a hospital, was located within the fort walls and shared a building with the Indian Trade Store (Hussey 1957:146). Archaeologically, it was discovered that, over the years this structure, which changed locations several times, varied in size from 65 × 30 feet, 40 × 100 feet, to 35 × 80 feet (Hoffman and Ross 1976:29–30).

When the intermittent fever struck Fort Vancouver, a large number of employees were often ill at one time. During the autumn months, when the fever was harshest, it was not unusual to find 40 to 50 people on the sick list and accounts indicate that this number increased to as many as 75 at one time. It is quite likely that the small dispensary or hospital within the fort walls would not have been adequate enough to care for, or even to examine or dispense medicines to, a large number of people. Therefore, when it became obvious that the fever returned seasonally, year after year, affecting so many people each time, a hospital became a necessity.

Hospitals in the late 18th century and early 19th century were usually referred to as fever hospitals and built only as needed, most often during epidemics. The poor and homeless were generally housed in them, while the well-to-do were cared for at home (Foster and Anderson 1978:165).

The location of the additional hospital at Fort Vancouver was away from the fort, but near the village where the Company employees lived. Because 19th century hospitals were constructed during fever epidemics and for the less fortunate, the construction of a hospital in addition to a dispensary and its location at a distance from the fort is under-

standable. It has also been suggested that the difficulty of feeding a large number of patients may have been a factor in locating the hospital close to the employee quarters. Nearby residents of the village could more easily provide food, and perhaps other services, to relatives who were occupying the hospital (David Chance 1979, pers. comm.)

Medical Apparatus

In order to understand the extent of medical activity at Fort Vancouver in the 1830s, the medicines and medical apparatus available to those at the fort are discussed briefly. Knowledge of just what medical artifacts could remain in the archaeological record was helpful in determining the existence of a hospital in the area.

Medical apparatus at this time consisted of a limited number of metal, glass, and ceramic items. Metal instruments were used for such surgery as removing abscesses from the skin, stones from the abdomen, particles from the eyes, or limbs from the body. Metal and glass apparatus were used for bleeding, and ceramic and glass containers were used for the preparation and storage of medicines. These were measured in glass cylinders, weighed in copper scales, and ground with ceramic mortars and pestles prior to their dispensation. Medicines were stored in ceramic jars and glass vessels and dispensed to patients in small glass bottles.

According to one fort physician, the apparatus at the post was relatively extensive for the period. Of the medical supplies available in 1833 he wrote:

There is a very excellent supply of surgical instruments—an amputating, two trephining, two eye instruments, a lithotomy and cupping case, besides two midwifery forceps and a multitude of catheters, flexible and silver sounds bougies, probangs, tooth forceps etc, not yet put in order [Tolmie 1963:173].

The following list of apparatus on hand in 1839 represents the instruments and con-

tainers the physicians worked with at Fort Vancouver.	8	green bottles
	24	glass stoppered Phials
Medical Apparatus on hand at Fort Vancouver Depot 1st June 1839:	16	com. glass Phials
	1	surgical pocket Book, old
	2	Cupping Glasses
<i>Apparatus</i>	2	Enema Syringes
3	6	Assd. tin Kettles
3	3	bed pans
1	2	round dishes
10	1	4 oz. graduated glass measure
10	1	graduated glass minim Measure
3 Gro	7	japd. pint pots
¼ Gro	8	sml tin dishes
20	3	Ointment Spatulas
6	1	Tea spoon
2 Gro	3	Forks
4	8	Ointment Boxes
3	2	wine Glasses
1 Case	2	Tumblers
1 Case	1	Ointment Slab
3 Doz	2	bleeding Cups
	11	Beds and Pillows
2	20	old Blankets
½ Doz	15	new Blankets
18 Lb		Lint
1		Glass Mortar and Pestle
1		Wedgewood Mortar and Pestle
6		Aneurism Needles
2 Doz		Glass stopd Phials 1 oz 8 oz
1		Anels Probe and Syringe
2		Glasses minim Measures
2		Glasses 2 oz Measures
2		Glasses 4 oz Measures
1		Stomaie Pump
2½ Doz		Pewter Uretha Syringes
1		large Clyster Uretha Syringes
2		Tourniquets
9		Trusses (5)-Right (4)-Left

[HBC Archives B.239/aa/20:217-218].

The following items were listed in HBC's 1845 inventory of "articles in use" at the hospital of the fort (Hussey 1976:110).

Hospital

11 black bottles

Although the medical apparatus was somewhat extensive at Fort Vancouver, some items were more likely to be discarded than were others. Items such as amputating instruments, or a stomach pump, undoubtedly scarce and expensive, would not have been broken, lost, or replaced often. Since they were durable and undoubtedly precious, their inclusion in the archaeological record would not be expected as a common occurrence. While other items, such as paper pill boxes, lint, or cat gut bougies were expendable and commonly discarded, they would not, under normal conditions, survive the 150 years in the ground. Thus, those items which could be expected in the archaeological record are objects that came in large quantities, were relatively common, used often, preserve well, and breakable. Vials or phials, glass measures, cupping glasses funnels, black bottles, green bottles, and earthenware jars fall into such a category.

The Archaeological Record

A wide variety of artifacts—industrial, medical, and domestic—were found during work at the Riverside Complex and a large numbers of features were excavated at this site. The features included a stockade trench and assumed gate; small shallow pits filled with charcoal and termed fire pits; and large pits stratigraphically filled with burned bone debris, ash, and artifacts. Small pits, presumably post holes, were common, but no definite structures were identified. The archaeological data are reported in detail elsewhere (Carley n.d.).

As mentioned previously, this area had been identified from historical documents as the location of several structures, among which were boat sheds, cooper's shop, hospital, and domestic quarters. Though structural remains were evident, no definite building boundaries could be discerned from the archaeological data. The understanding of the activities of the site and the presumed associated structures are based on artifacts and features with characteristics suggesting specific kinds of activities. The following discussion is concerned with those artifacts and features which directly aided in the interpretation of the site as an area of medical activity. This will include such artifacts as medicine bottles, cupping glasses, glass cylinders, and such features as the stockade trench, fire pits, and large stratified pits.

Medical Artifacts

Artifacts frequently found in the archaeological record were small, clear glass bottles which are presumed to be vials (Figures 1–3). Vials were often mentioned in the literature of the period (Tolmie 1963:173, 326; Allen:1878) and were used for dispensing medicines to patients. Given the large number of glass vials listed on medical apparatus inventories and the repeated reference to them, it is not surprising that these artifacts were the most com-

mon medical artifact recovered at the site. Graduated cylinder or glass measure fragments were also recovered. one fragment is cut or etched with the numbers "4" and "6," while another fragment is marked with the number "11." Unusually shaped glass vessel fragments were found within the stockaded area and are believed to be cupping glass fragments (Figure 4). Reconstruction of these fragments is based on several such vessels recovered from Fort Vancouver excavations (Ross and others 1975:308) and identification is based on illustrations and discussions of such apparatus (Brougher 1959). These vessels would have been used as bleeding cups during blood-letting.

The diagnostic vessel glass fragments re-

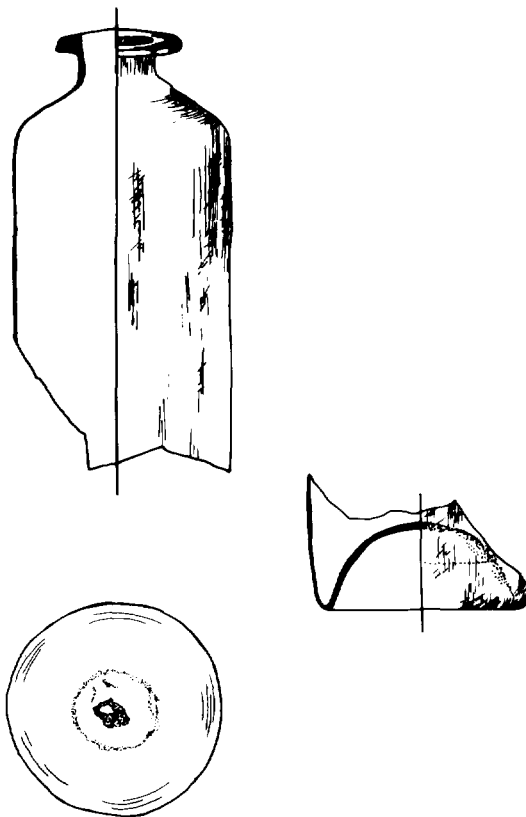


FIGURE 1. Clear drug bottle from the Riverside Complex, Fort Vancouver.

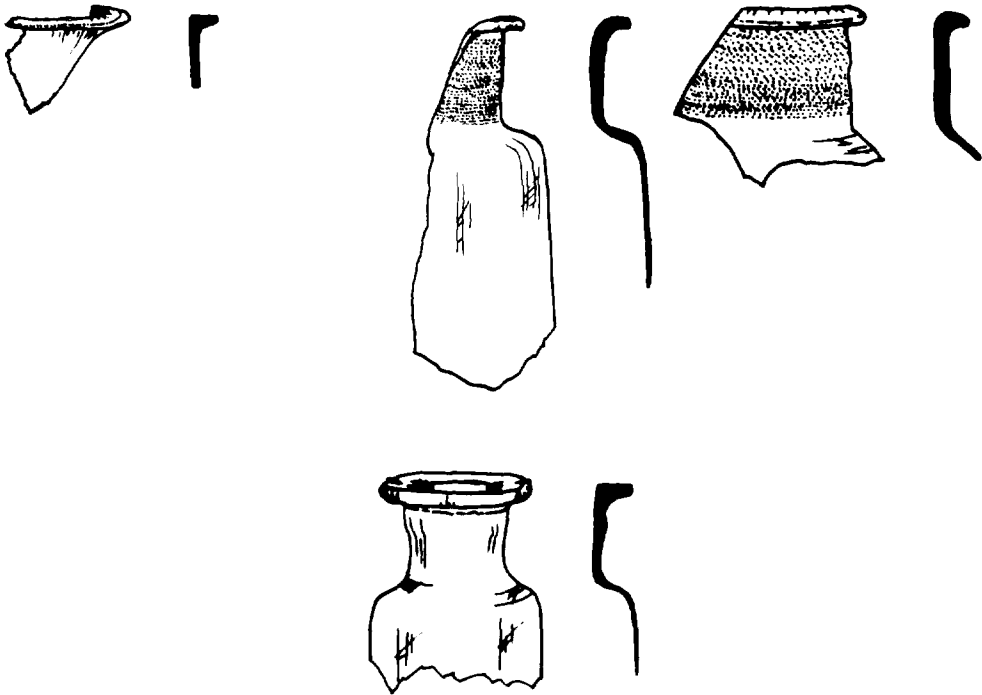


FIGURE 2. Clear drug bottle rims from the Riverside Complex, Fort Vancouver.

covered from the excavations were almost entirely those of liquor and drug bottles and the distributions of these fragments reveal distinct patterns. With a single exception, the diagnostic drug bottle fragments are found only within the stockaded area and near the large pit features. The liquor bottle fragments, in contrast, are scattered throughout the site and are found both inside and outside of the stockade (Figure 5). This pattern of distribution of drug bottles suggests that medical activity was concentrated within the stockaded area. As liquor could also have served as medicine, this medical activity may have extended to outside of the stockade as well. The presence of medicine bottle fragments in the large pit features, and in the lower strata, suggests the use of these pits during medical activities.

There was a significant number of diag-

nostic drug bottles recovered from within the stockade. In previous excavations of a nearby Hudson's Bay Company dump, few medicine bottles were recovered (Chance and Chance 1976:142), though Company inventories suggest that glass vessels were used for medical activities. This suggests that the quantity of diagnostic fragments recovered from the Riverside Complex is directly correlated with the presence of a hospital. The frequency of medicine bottle fragments, and their horizontal distribution, suggest medical activities which were generally restricted to the inner boundaries of the stockade.

The stockade

The archaeological discovery of a stratigraphically early stockade at the Riverside Complex, and the distribution of medical

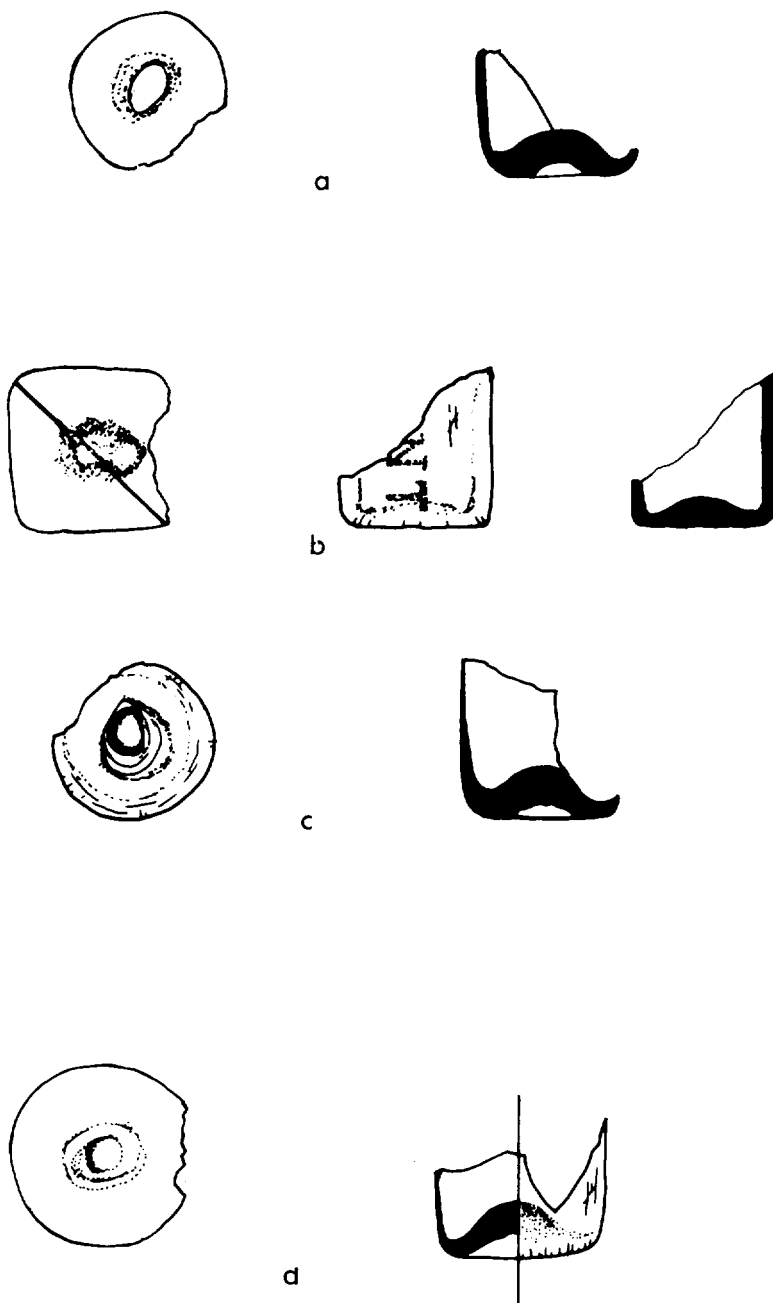


FIGURE 3. Drug bottle bases from the Riverside Complex, Fort Vancouver. Aqua (a) and clear (b-d).

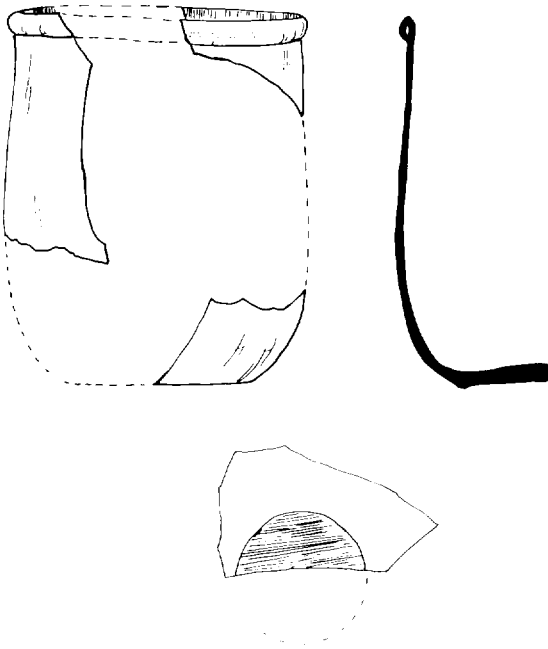


FIGURE 4. Clear cupping glass from the Riverside Complex, Fort Vancouver. Reconstruction based on Ross and others (1975:308).

artifacts within the stockade, along with a written account describing Fort Vancouver which stated that independent of the fort was “. . . a hospital near the riverbank, also stockaded . . .” (Emmons 1841), strongly suggested a stockaded hospital at the site. One of the first questions which came forth from this suggestion was, why stockade a hospital? Only when viewed within the context of the known archaeological and historical data could this question be answered.

Comparison of the archaeological remains of the stockade at the Riverside Complex with those documented at the fort led to the conclusion that, based on structural details, these barriers could have served similar purposes (Carley 1979:58–62). According to Ross (1976:28), “stockades at Fort Vancouver were erected for three basic purposes—defense against attack, security against theft and as a barrier against an ‘outside fire . . . thus, the

stockades were regulatory devices intended to impede the movement of fire and people.”

It is unlikely that the hospital was stockaded to ward off thieves. Fear of fire may have warranted enclosing the hospital, as patients could not have escaped easily. Defense against attack early in the Company’s occupation of the area may also have prompted such an endeavor. Given that the Company built stockades at Fort Vancouver to impede movement, it is likely that the stockade near the river was built for the same purpose. Given the assumption that the hospital was built during and because of the raging fever epidemics, and at some point early in its history a stockade was constructed around it, it is probable that there is a correlation between the epidemics and the stockade.

From the review of the beliefs of the causes of disease, it is clear that the concept of contagion did not play a significant part in the minds of those concerned with the intermittent fever epidemics. Therefore, the possibility of a stockade built around the hospital for quarantine can be dismissed.

A stockade may have been built around the hospital to impede movement of the natives into the area. When their own cures for intermittent fever failed, the Indians turned to the Hudson’s Bay Company at the fort for help. Here, they found that large numbers of the Company’s servants were also sick with the malady. Supplies of medicine were low and local substitutes were resorted to. The Indians were turned away from the fort without medical aid. Since it was Company policy to give the natives medical attention, it undoubtedly came as a surprise to both parties when it was impossible to administer help. If the natives persisted or became desperate, it may have become necessary to build a stockade around the hospital to discourage them from insisting upon aid.

The fire pits

Small charcoal filled fire pits were com-

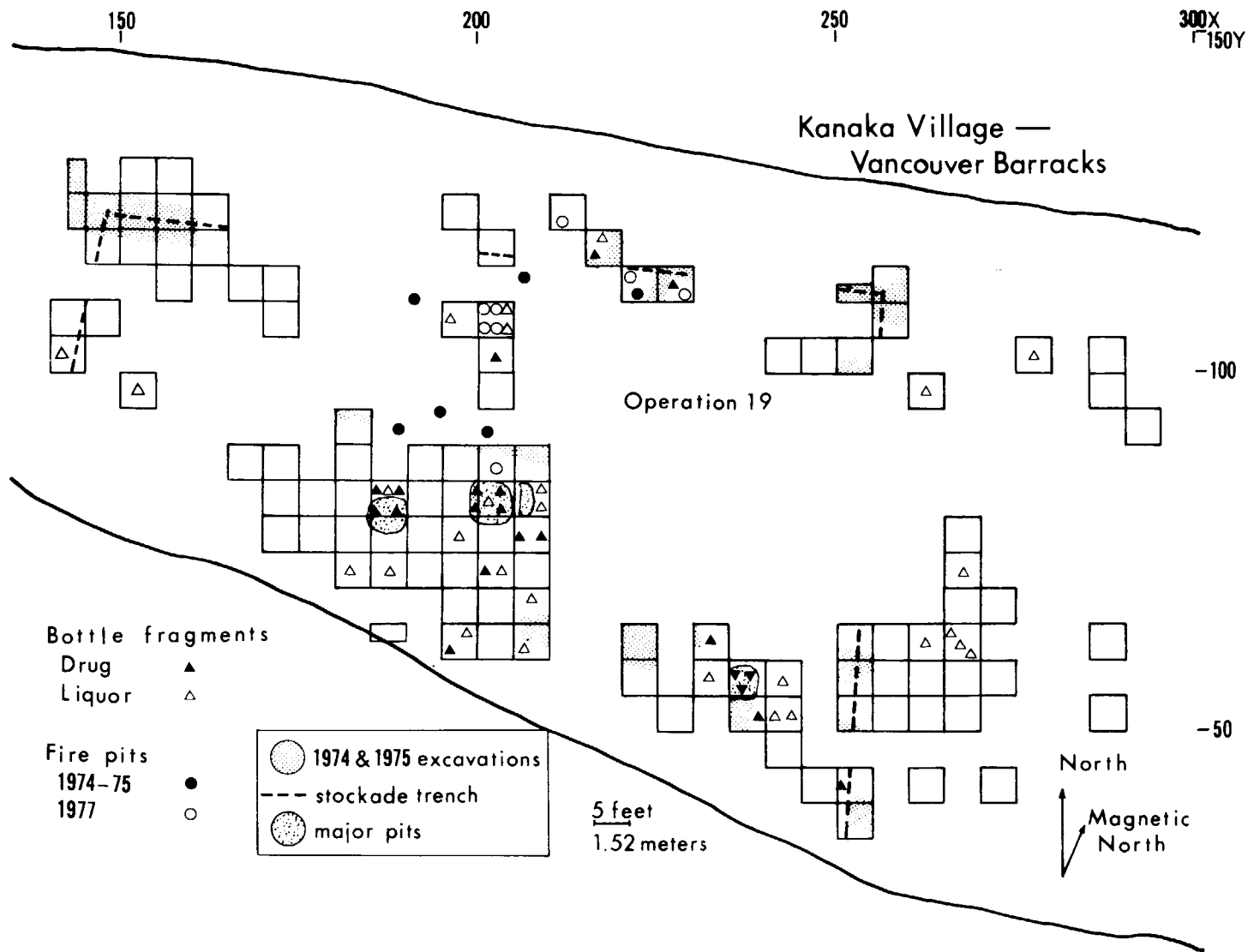


FIGURE 5. Distribution of diagnostic drug and liquor fragments, fire pits, and other features at the Riverside Complex, Fort Vancouver.

monly encountered during excavations. Their stratigraphic location indicated an early appearance at the site. Those fire pits for which were obtained complete dimensions ranged in size from 15 to 34 inches in length; 17 to 19 inches in width, and 3 to 6 inches in depth. The fill of the pits varied somewhat but all contained horizontally placed wood which was burned to differing degrees. The upper fill of the pits was usually loose brown soil, which, when excavated, exposed a layer of charcoal. Generally, the lowermost part of the wood was unburned and only occasionally did a fire pit contain ash, firecracked rock, or burned soil. The walls were generally straight and the bottoms of the pits were flat.

The distribution of the fire pits was especially interesting. With one exception, the fire pits were all found within the stockaded area (Figure 5). A cluster of four closely spaced pits was exposed in which one pit was superimposed upon another, indicating use of the same area at a subsequent time.

A number of pits similar to these were discovered during excavations at the fort. It was concluded, based upon horizontal and vertical locations, that "without a doubt they represent an 1829-1834/ 1836 cultural activity" (Ross and others 1975:430). At the time of their use they were located outside and approximately 150 to 300 feet east of the fort's stockade. The nearest structure to the fire pits was the dispensary. The Fort Vancouver pits were comparable in size and shape to those at the Riverside Complex. All contained charcoal of varying amounts and were located in an HBC deposit. In the initial group of 20 pits excavated, 5 contained charred corn cobs and 10 contained HBC cultural material. Due to a shared single size and depth, and the remains in several of charred corn cobs, these pits were identified as smudge pits (Hoffman and Ross 1975:20) for the smoking of hides (Binford 1967:1-12).

Though smudge pits are described archaeologically and ethnographically by Binford as an exercise in analogy, their characteristics

and functions are important here in demonstrating the uniqueness of these features. Binford (1967:8) defined smudge pits as:

a class of archaeological features sharing (a) small size, (b) contents composed diagnostically of carbonized corncobs, lacking kernels, and (c) contents exhibiting a primary depositional context.

These are described as generally similar in size, shape, and fill. Slightly oval, they have a mean length of 30.37 cm, mean width of 27.40 cm, and mean depth of 33.53 cm below surface. They are straight sided with flat bottoms and are filled with charred and carbonized corn cobs, twigs, bark, vegetable matter with occasional oxidation of soil near the mouth of the pit. The upper part may be partially filled with grayish loam soil which was characteristic of the soil on the surface of the site. "The invariable presence of the grayish loam soil in the upper fill demonstrates intentional covering of the pit contents, rather than an accumulative filling with midden and surface debris" (Binford 1967:6). Furthermore, the conditions of combustion within these pits which would have resulted in the carbonization of the plant materials suggests that large quantities of smoke would have been produced while the pits were in use (Binford 1967:5).

Binford postulated that the pits were smudge pits for smoking animal hides, which ethnographically, required a certain sized hole and a smokey fire. The depth was limited by a "need for them to be deep enough to provide for an oxygen-starved environment and shallow enough to contain only a limited amount of fuel," while "the diameter was limited by the circumference of a deer skin when sewn into a 'bag'" (Binford 1967:5)

Hoffman and Ross concluded that the fire pits at the fort were also smudge pits used for this purpose. If they were viewed singularly, a logical conclusion for the function of these pits could be smudge pits for smoking animal hides, especially as there is historical reference to such activity at Fort Vancouver

(Emmons 1841). However, when their context is considered in relation to other data, this explanation of these features is not sufficient. An alternative explanation, based on the following facts and assumptions, is offered.

At the fort, the pits were dated to an early 1829–1836 component. Stratigraphy at the Riverside Complex also suggested that the pits were early in the HBC occupation of the area. The fire pits at the Complex, with one exception, were found only inside of the stockade, which is documented historically and archaeologically as enclosing a hospital. At the fort, the fire pits were found to the east of what was at that time the dispensary. The unique size and fill of these pits indicates that their function or consequence was to produce an abundant amount of smoke. The similarity of the features exhibited by those at the fort and those at the complex suggests that the fire pits in both areas served the same purpose. It is concluded, therefore, that the fire pits existed early in the Company's occupation. By their similar attributes, they served a similar function, which seems to have been to create smoke. Their locations were adjacent to the hospital and the dispensary, areas associated with medical activity.

A search of 19th century medical literature and accounts of fever epidemics led to an explanation of these unique features. As demonstrated earlier, during the early 19th century, many people believed that the cause of intermittent fever existed in the air, in the atmosphere. In various fever epidemics the air was purified with smoke and other preventives through the medium of smoke. It is quite probable that these small fire pits which would have created a smokey atmosphere served to "purify" the contaminated air of the miasmata which was thought to cause intermittent fever.

The large pits

Several large, stratified pits dominated the excavations of the Riverside Complex. Due to their artifact depositions, horizontal distri-

bution, and vertical location, these are believed to be associated with the hospital.

All of the large pits were located within the stockade. Three of the four pits were highly stratified and yielded numerous artifacts of medicine bottles, bleeding cup fragments, ceramic transfer printed wares, stoneware bottle fragments, and a variety of personal items. Small artifacts, such as buttons and beads and fragmented glass and ceramic made up most of the artifact assemblage. Strata of burned bone and ash debris were common and appeared to be debris of fireplace or stove cleanings and floor sweepings. The largest pit (F 127) measured 6½ feet in length, 6 feet in width, and 3 feet in depth. The others, though somewhat smaller, were of the same shape and relative size.

These features resembled several large pits found during excavations of the southeast area of the fort which were dated to the 1829–1836 component (Ross and others 1975:26). This is the same area and same component to which the small fire pits belonged. Similarly, at the Riverside Complex all the pits shared the same vertical stratigraphic location. There also appeared to be a comparable horizontal relationship. The fire pits at the fort were located north of the large, stratified pits. This same horizontal relationship was apparent at the complex.

The general characteristics which the large pits at the fort and those at the complex shared were lower deposits of loose brown soil, ash, and charcoal; upper deposits of clay and clay-like deposits with ash and charcoal inclusions; bone debris; small personal artifacts; and a similarity of size and shape. (Ross and others 1975:31, 50, 54; Carley 1979:70–80). The conclusions drawn from the Fort Vancouver excavations concerning the large pits were that the "charred remains in the large pits apparently represent general personal trash which was disposed of by burning" (Ross and others 1975:520).

Due to their association with the small fire pits, their distribution within the stockade,

and the recovery of some medical artifacts from these large pits, they are assumed to be associated with the hospital. Furthermore, the stockade was found to measure at least 110 × 75 feet. The hospital was to have measured 22 × 32 feet, but was not located archaeologically, indicating that part of it may be located under the nearby railroad embankment. The large size of the stockade, relative to the small size of the hospital, suggests that the stockade enclosed more than just a hospital. It was demonstrated that it enclosed fire pits used for purifying the contaminated air of miasmata. The large pits, too, may have had an unusual function peculiar to epidemics of intermittent fever and 19th century medical practices.

An interesting suggestion has been made for the interpretation of these large features. One consequence of malaria is diarrhea. This symptom, combined with a weakened constitution, would result in the frequent use of chamber pots and soiled bed clothes and bedding. A large number of bedridden people with intermittent fever would necessitate a nearby place for those attending them to dispose of such waste. Large pits, near the hospital, would serve this purpose (David Chance 1979, pers. comm.). Such an explanation would account for the number of small personal items such as beads and buttons and the fragmented glass and ceramic. The deposits of bone and ash could be explained as debris resulting from cooking for large numbers of people at the hospital.

Conclusions

Based upon what is known of the state of the medical art in the early 19th century, the beliefs and practices of the times, and those materials available to the physicians and their patients, it is suggested that the artifacts and features of the site presented herein may be interpreted as archaeological reflections of 19th century medicine and responses to fever epidemics.

Intermittent fever raged throughout the area

in the late 1820s and early 1830s, occurring annually. Hundreds of natives were stricken and villages decimated and large numbers of Company employees were sick and incapacitated for days and weeks at a time. These epidemics forced the Company to build a hospital for patients, as was common practice during this time. Although a small dispensary or hospital existed within the Fort, it could not have accommodated all of the individuals who fell ill during the epidemics. Therefore, another hospital was built for the fever patients. While the small dispensary in the fort was a refuge for special guests or the more important members of the Company, the hospital along the riverbank, near the village, would have housed and cared for the Company's servants.

The natives in the vicinity attempted to rid themselves of the malady in the same way as they cured themselves of other diseases. Sweating in lodges and plunging into the cold river water only complicated the illness. When their treatment failed the survivors went to the fort in search of medical aid. The Company, however, with medicine scarce and numerous individuals weakened by the fever, could not afford to aid the natives, though it was their usual policy to do so. At this time a stockade to enclose the hospital became imperative to separate those who received medical attention from those who could not.

The concentration of medical artifacts within the stockaded area and the examination of the possible medical apparatus which could have been recovered by the archaeologist on an early 19th century site documents medical practices of a fairly large scale within this area.

The individuals associated with the Company recovered from the pernicious illness within the walls of the stockaded hospital. They were purged of the disease by bleeding and rehabilitated with cinchona or quinine, when it was available. The belief that disease was a result of something in the air, which could be purified by creating a smoky atmos-

phere, is reflected by the small fire pits found within the stockade. Pits filled with ash, burned bone, and various artifacts were associated with the activities of the hospital. It has been postulated that they may have served as receptacles for quickly accumulated waste and debris.

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