FORT VANCOUVER EXCAVATIONS - VIII

Fur Store

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I - INTRODUCTION

This is the eighth interim report detailing the findings of the current Fort Vancouver Archeological Project. Purposes and methods of the project were outlined in the initial report of the series (Hoffman and Ross 1972). Briefly, our goals center on the archeological interpretation of the excavation and analysis of major structures within Fort Vancouver that are proposed for historic reconstruction.

This eighth report is concerned with the 1845 period Fur Store. The subject is an excellent example of changing structural functions and appearances during the lifespan of the Fort. A fur store existed somewhere within the Fort by 1834, perhaps earlier (Hussey 1957:140-141), although the Fort began in 1829. According to one witness, the Fur Store and the Indian Trade Store were one and the same building by 1835-36 (Ibid.:141). The building discussed in this report existed by 1841 at the latest. A map of that year shows the building to have been used as an Indian Trade Store, as well as a hospital and dispensary. Furs were kept in another storehouse immediately west (Ibid.:Pl. IJ).

Sometime between 1843-44, or perhaps 1845-46, the principal storehouse of the Fort was replaced or rebuilt (Ibid.:147-148), including, apparently, the building discussed herein. Historic sources make it clear that by 1845 this building was the principal fur store of Fort Vancouver (Hussey 1972:185). Shortly after, a portion of the Store was rented for storage by the incoming U.S. Army. By 1849 this portion was used as a "commissary's store-house" (Cross 1851: 174), a use that continued at least until 1857 (Hussey 1957:186). In early 1850 the Store became headquarters for the 11th Military Department of the U.S. Army (Clark 1974). The USA inventory of Fort Vancouver buildings during June of 1860 listed the "Fur house" as a different structure from that of 1845 (Hussey 1957:156). The 1860 Fur Store was a smaller building known in 1845 as the Indian Trade Store.

Summarily, 3 different buildings functioned or were identified as fur stores at Fort Vancouver. The second of these, located at the south-central sector of the Fort, is the subject of this report (Fig. 1).

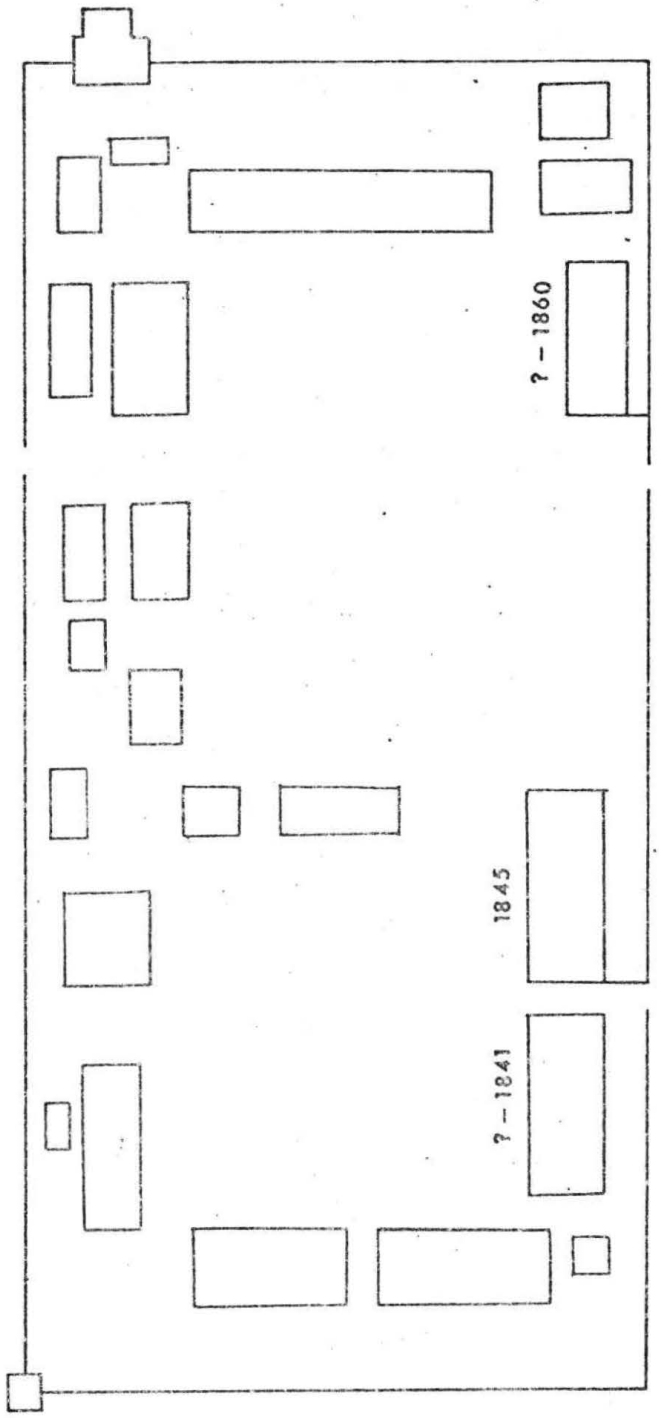


Fig. 1 - Locations of the Fur Stores on the Vavasour map of 1845 (after Hussey 1972:Pl. VIII).

II - EXCAVATIONS

Archeological work on the Fur Store began in Spring of 1972. Comprehensive excavations were designed to: 1) expose remains of the Fur Store; 2) locate a flagstaff historically known to have been in the vicinity; and 3) test critical areas of the nearby stockades. All 3 points were satisfied by a large-scale stripping operation (Figs. 2, 4a). The Flagstaff is discussed in a previous report (Hoffman and Ross 1973c), and stockades near the Fur Store are incorporated into the seventh report of this series (Hoffman 1974).

The Components

A large number of archeological features were exposed in the area. These were attributable to 3 historically differing occupations: National Park Service, Vancouver Barracks (U.S. Army) and the Hudson's Bay Company (Table 1). Widespread evidence of NPS activity was noted as a series of exploratory pits and trenches. Several stake casts and driven wooden pegs in the south-central sector of the Store appeared to be recent but they failed to form angles or alignments suggestive of archeological explorations (Fig. 2.2). The only labeled NPS feature was F328, a concentration of angular stone found in a stockade trench (Table 1).

Vancouver Barracks features were also widespread and, for the most part, readily identifiable. Waterline trenches F319 and 332 were previously mentioned in our reports on the stockade system as well as the Sales Shop and Magazine (Hoffman 1974; Hoffman and Ross 1974).

A large log containing a long eyebolt was found near the HBC Flagstaff (Fig. 2.3). Examination of the eyebolt indicated a USA affiliation. The piece appeared to have been a "deadman" or subsurface anchor for some aboveground structure. The hole containing the deadman was almost identical to a USA hole noted in the Sales Shop (Hoffman and Ross 1974:Fig. 2). Several intrusive trash deposits were found. An extensive one overlay the southwest corner of the Store, and a rather deep one was found along the Store's south wall (Figs. 2.1, 2.2). A 6-lb. solid shot cannonball was recovered from the extensive deposit; excavation of the deep deposit was halted once its affiliation was recognized.

A line of rectangular posts set in round holes was found outside of the Store's west wall. The posts were set at 8-ft. intervals roughly parallel to the wall (Fig. 2.1). The line appeared to be remains of a USA horse or mule picket similar to that found during excavation of the Chief Factor's Kitchen (Hoffman and Ross 1973b:6). Photographic archives of Fort Vancouver National Historic Site contain an aerial photo (H-3.V, VB-15) that shows a "pre-1941" encampment south of the

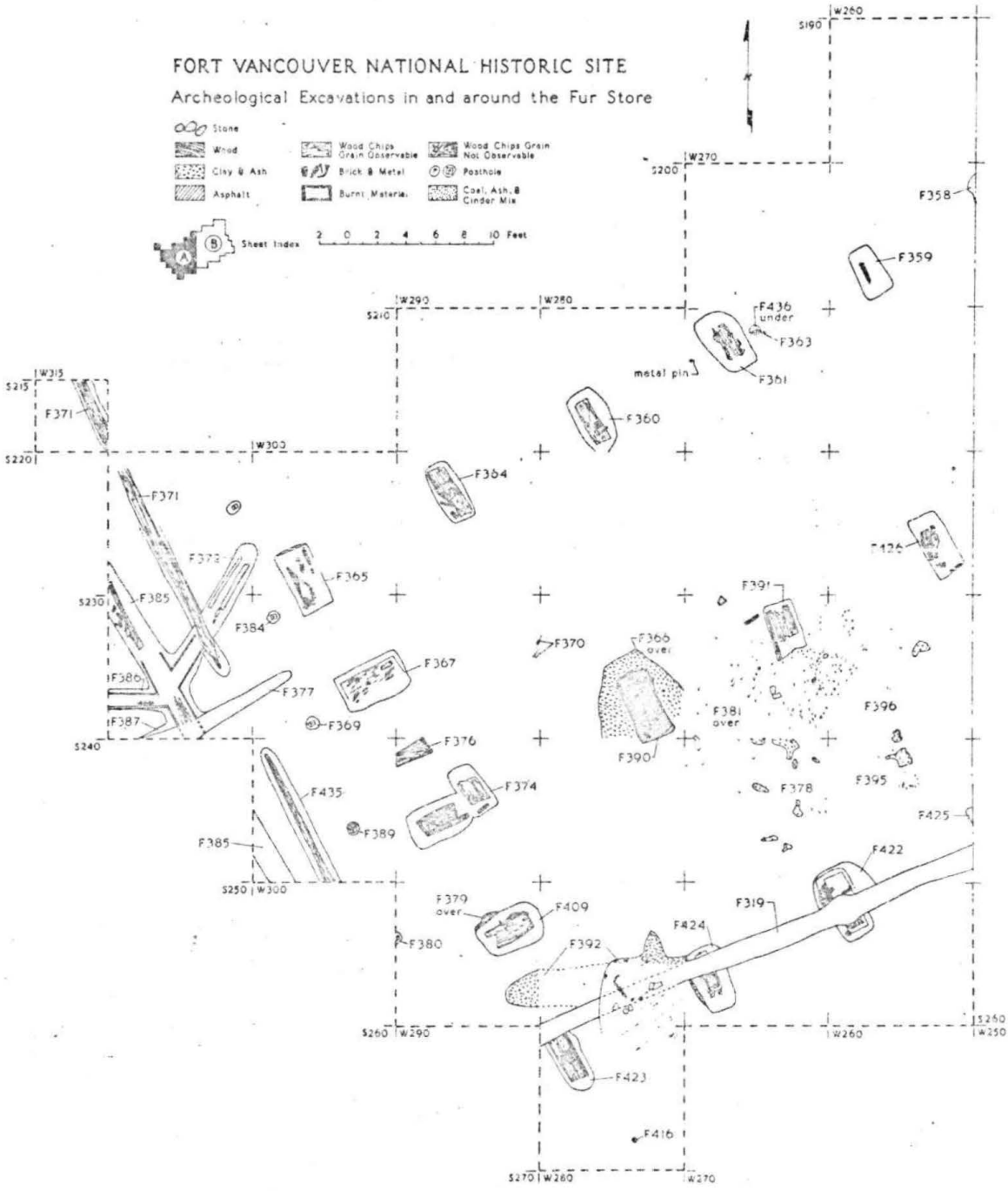

FORT VANCOUVER NATIONAL HISTORIC SITE
Archeological Excavations in and around the Fur Store
Stone
Wood
Clay & Ash
Asphalt
Wood Chips Grain Observable
Brick & Metal
Burnt Materials
Wood Chips Grain Not Observable
Posthole
Coal, Ash, & Cinder Mix
Sheet Index
2 0 2 4 6 8 10 Feet
W260
S190
W270
S200
W290
W280
S210
W315
S215
W300
S220
S230
S240
S250
W300
S260
W290
W260
S260
W250
S270
W280
W270
F358
F359
F436 under
F363
F361
metal pin
F360
F364
F371
F373
F365
F385
F384
F386
F387
F367
F377
F369
F376
F435
F374
F389
F385
F379 over
F409
F380
F392
F424
F319
F422
F423
F416
F426
F391
F370
F366 over
F381 over
F390
F396
F395
F378
F425

Fig. 2.1

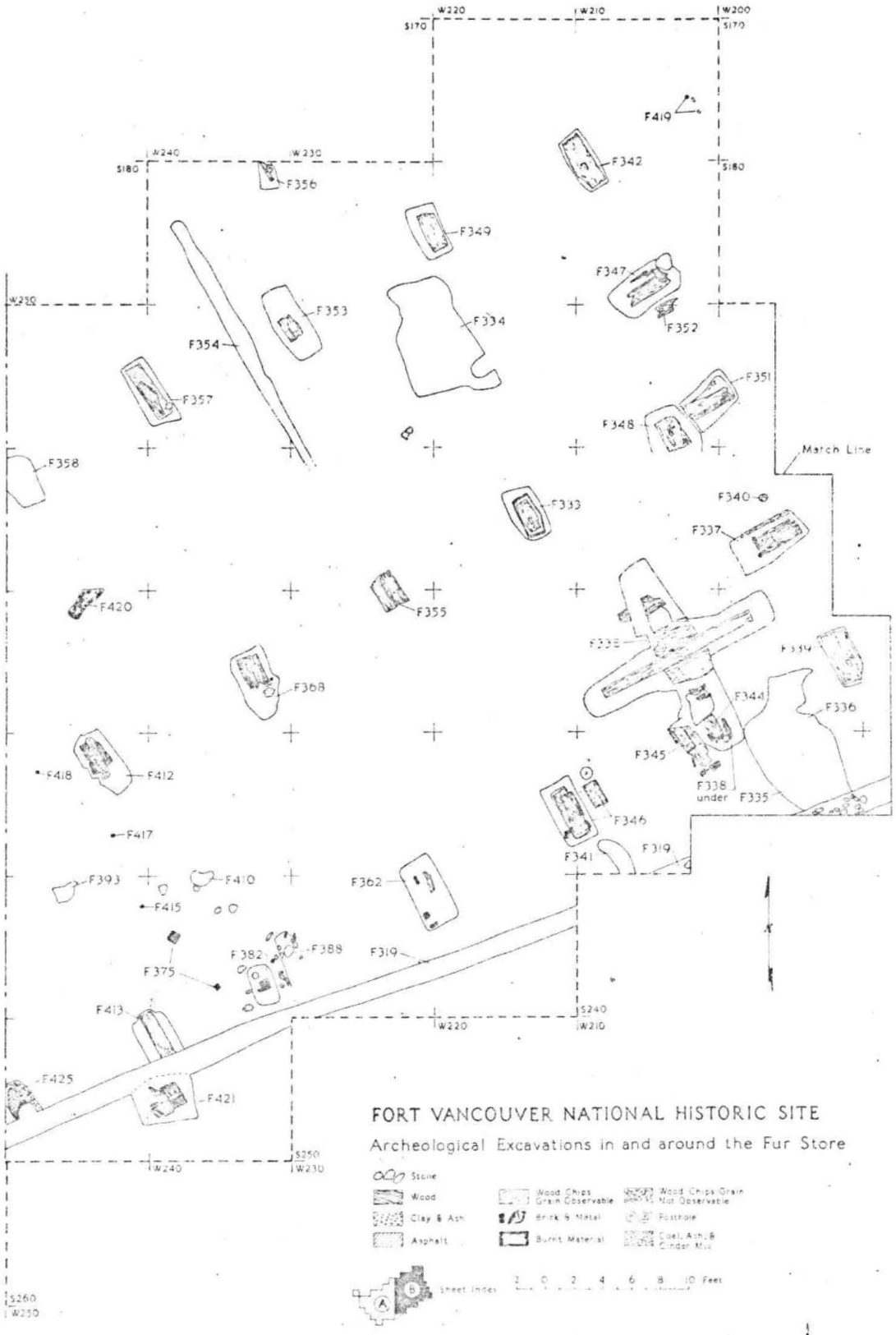

W220
W210
W200
S170
S180
S240
S250
S260
W240
W230
W250
F419
F342
F356
F349
F347
F353
F334
F352
F354
F357
F351
F348
F358
Match Line
F333
F340
F337
F420
F355
F338
F339
F368
F344
F336
F345
F418
F412
F338
under
F335
F346
F417
F341
F319
F393
F410
F362
F415
F382
F388
F375
F413
F425
F421
FORT VANCOUVER NATIONAL HISTORIC SITE
Archeological Excavations in and around the Fur Store
Stone
Wood
Wood Chips Grain Observable
Wood Chips Grain Not Observable
Clay & Ash
Brick & Metal
Posthole
Asphalt
Burnt Material
Coal, Ash & Cinder Mix
Sheet Index
0 2 4 6 8 10 Feet

Fig. 2.2

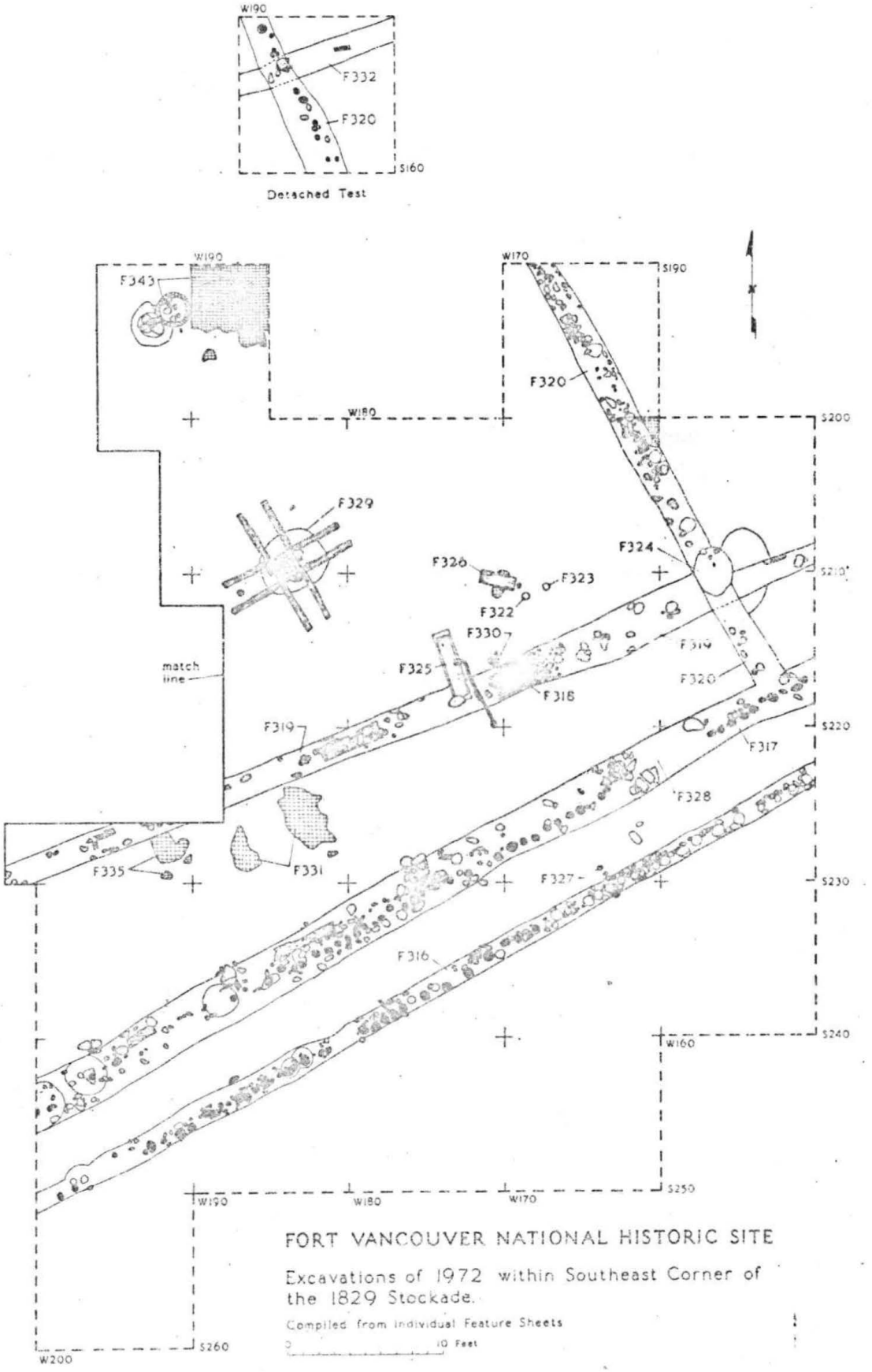

W190
F332
F320
S160
Detached Test
W190
F343
W170
S190
F320
W180
S200
F329
F326
F323
F322
F324
S210
F330
F325
F319
F320
F318
match line
F319
S220
F317
F328
F335
F331
F327
S230
F316
W160
S240
W190
W180
W170
S250
W200
S260
FORT VANCOUVER NATIONAL HISTORIC SITE
Excavations of 1972 within Southeast Corner of the 1829 Stockade.
Compiled from Individual Feature Sheets
0
10 Feet

Fig. 2.3

Table 1 - Archeological features exposed in and around the 1845 period Fur Store.

Feature	Description	Comp.
316	South wall of Phase V stockade	HBC
317	South walls of Phases I-IV stockades	HBC
318	Posthole intrusive to modern waterline trench	USA
319	Modern waterline trench; not fully excavated	USA
320	East wall of Phase I stockade	HBC
321, 331 334-336 341, 420	Concentrations of coal fragments and dust, ashes and other forging debris; some appear to have been redeposited or eroded	HBC
322, 323	2 adjacent postholes paralleling the south stockade walls	HBC?
324	Straight-sided hole and portion of a basin; intrusive to east wall of Phase I stockade	USA
325	Wooden deadman with large eyebolt	USA
326	Wooden board over coal concentration, and a driven stake	HBC
327	2 small rectangular posts, one intrusive to F316	USA?
328	Concentration of large angular stone in F317; backfill from previous excavations	NPS
329	Remains of wooden flagstaff and support	HBC
330, 340	Small post butts braced by driven stakes; possible auxiliary support for flagstaff	HBC
332	Modern waterline trench; not fully excavated	USA
333, 348 355, 368 390, 391 412, 426	Wooden footings for the medial foundation line of the Fur Store; see Table 2	HBC
337, 347 351, 352	Wooden footings for the east wall foundation of the Fur Store; see Table 3	HBC

Table 1 (cont'd.)

Feature	Description	Comp.
338	Large wooden footings in SE corner of Fur Store; base of a baling press	HBC
339	Wooden footing at SE corner of Fur Store; see Table 3	HBC
342	Wooden footing at NE corner of Fur Store see Table 3	HBC
343	Subsurface forge cut by cleanout hole of aboveground forge	HBC
344-346 362, 388 413, 422 424, 425	Wooden footings for the south wall foundation of the Fur Store; see Table 4	HBC
349, 353 357-361 364	Wooden footings for the north wall foundation of the Fur Store; see Table 5	HBC
354	Narrow trench under north wall of Fur Store	HBC
356	Intrusion of Vancouver Barracks trash	USA
363	Large metal pin adjacent to footing F361	HBC
365	Wooden footing for NW corner of Fur Store; see Table 6	HBC
366	Clay and ash deposit over footing F390	-
367, 374 376, 409	Wooden footings for west wall foundation of Fur Store; see Table 6	HBC
369, 380 383, 384 389	Rectangular posts set in prepared circular holes; putative horse or mule picket of Vancouver Barracks	USA
370, 378 381, 395 396	Concentrations of asphalt and wooden fragments coated with asphalt; remains of Fur Store floor	HBC
371, 372 377, 385- 387, 435	Trenches and puncheons of drainage system and covering plank road west of the Fur Store	HBC

Table 1 (cont'd.)

Feature	Description	Comp.
373	Rock splashed with red paint	HBC?
375	Concentration of rock, brick and stovepipe	HBC
379	Clay and ash deposit over footing F409	-
382	Rectangular post set in prepared hole and associated with 3 wooden insulator arms; remains of utility pole	USA
392	Intrusive trash deposit	USA
393, 410	Small holes below Fur Store	-
414, 415 417-419	Stake casts and driven wooden pegs	?
416	Solid shot cannonball	USA
421	Vancouver Barracks trashpit; not fully excavated	USA
436	Posthole under north wall of Fur Store	HBC

Fort site. The encampment includes north-south oriented horse pickets whose posts appear to be about 8 ft. apart. Remains of a rectangular post with 3 insulator arms were found along the south wall of the Fur Store (Fig. 2.2). A 1918 photo of Vancouver Barracks facilities overlaying the general Fort site illustrates the use of rectangular utility poles that were rigged and insulated to carry 3 lines (113th Squadron /1919?/:41).

Several other items recorded as features appeared to have been natural rather than cultural. These consisted of rodent (?) holes below the Fur Store as well as erosional deposits of mixed clay and ash over several Store footings (Table 1). Balance of recorded features were identified as Hudson's Bay Company in origin.

Pre-Fur Store

Widespread evidence of blacksmithing activities was found in the eastern sector of the excavated area. This consisted of tools, partial manufactures and general smithing debris. Several concentrations of coal fragments, ashes and forging debris were identified inside and outside of the Store's east wall (Figs. 2.2, 2.3). In addition to coal and ash, the debris consisted of sulfide clinkers and minute metal flakes derived from the hammering of hot iron and steel. Not all concentrations were identical in composition; likewise, the debris was so generally scattered along the HBC surface that identification of concentrations was somewhat arbitrary. While no structural remains of a blacksmith shop were present, the extensive debris clearly indicated the former presence of smithing activity in the area.

Actual forge remains were found in the northeast sector of excavations (Figs. 2.3, 4b). These consisted of a subsurface forge mouth abutted by a basin that may have been the cleanout hole of a regular forge, or the base of a quenching barrel. A small passage under the basin led into the forge and may have been an air hole for a bellows. Unfortunately, the passage was not distinct since it was cut by the basin which also intruded into the forge mouth (Fig. 5). A small, rectangular post cast found east of the forge may have represented a "helper" or prop used to hold large pieces of metal in the fire. Such items were noted around a forge of the 1845 period Blacksmith Shop. The conical throat of the forge was filled with slag and minute metal flakes; charcoal, slag and metal flakes filled the upper mouth. The same materials were deposited as a ring within the abutting basin (Fig. 5).

The small subsurface forge seemed to have been an impromptu facility at best. Certainly it would not account for the extensive forging debris noted in the area. It may have been a temporary device used only until a more substantial forge was built. Presumably, the

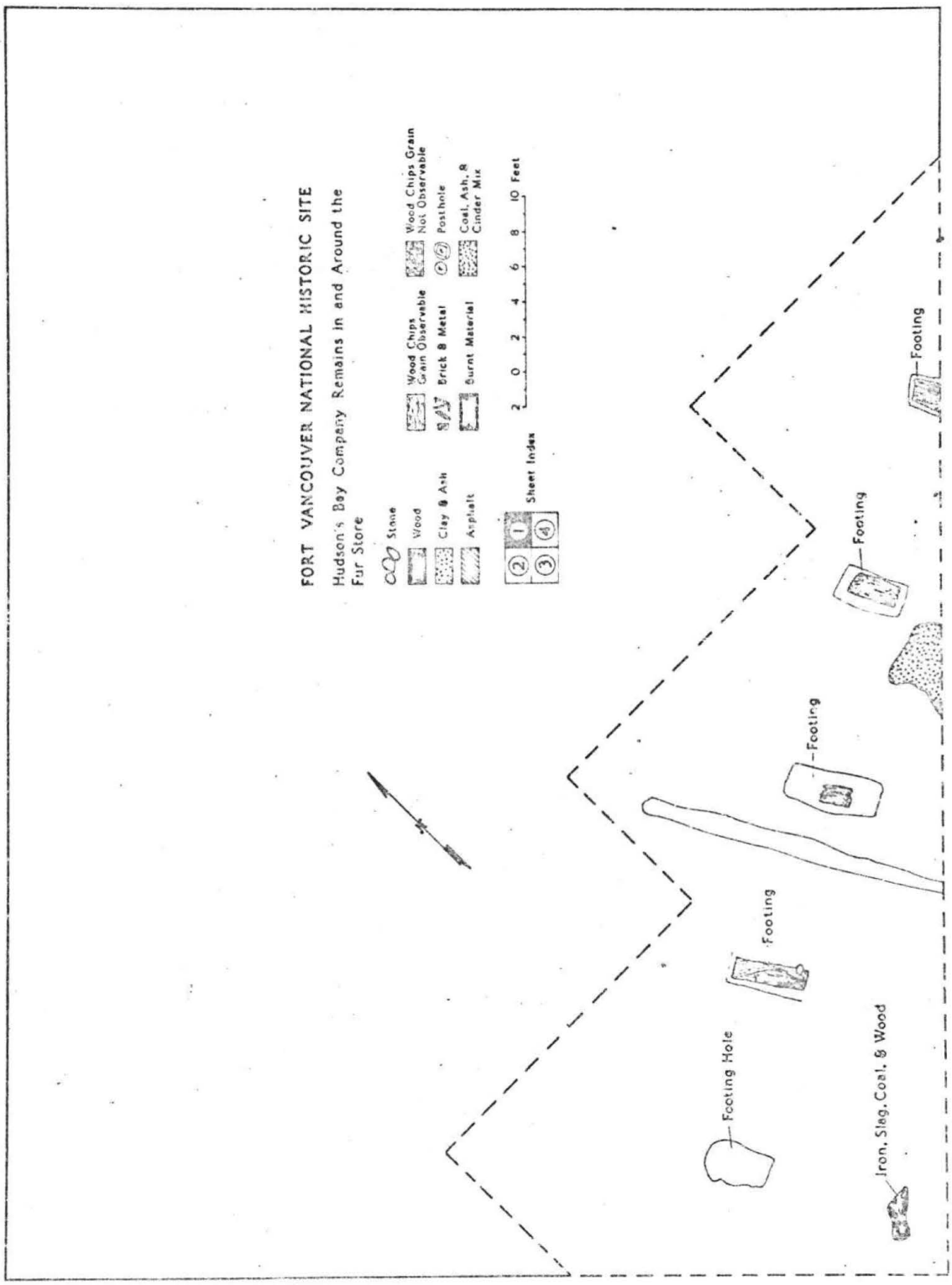

FORT VANCOUVER NATIONAL HISTORIC SITE
Hudson's Bay Company Remains in and Around the Fur Store
Stone
Wood
Clay & Ash
Asphalt
Wood Chips Grain Observable
Brick & Metal
Burnt Material
Wood Chips Grain Not Observable
Posthole
Coal, Ash, & Cinder Mix
Sheet Index
0 2 4 6 8 10 Feet
Footing
Footing
Footing
Footing
Footing Hole
Iron, Slag, Coal, & Wood

Fig. 3.1

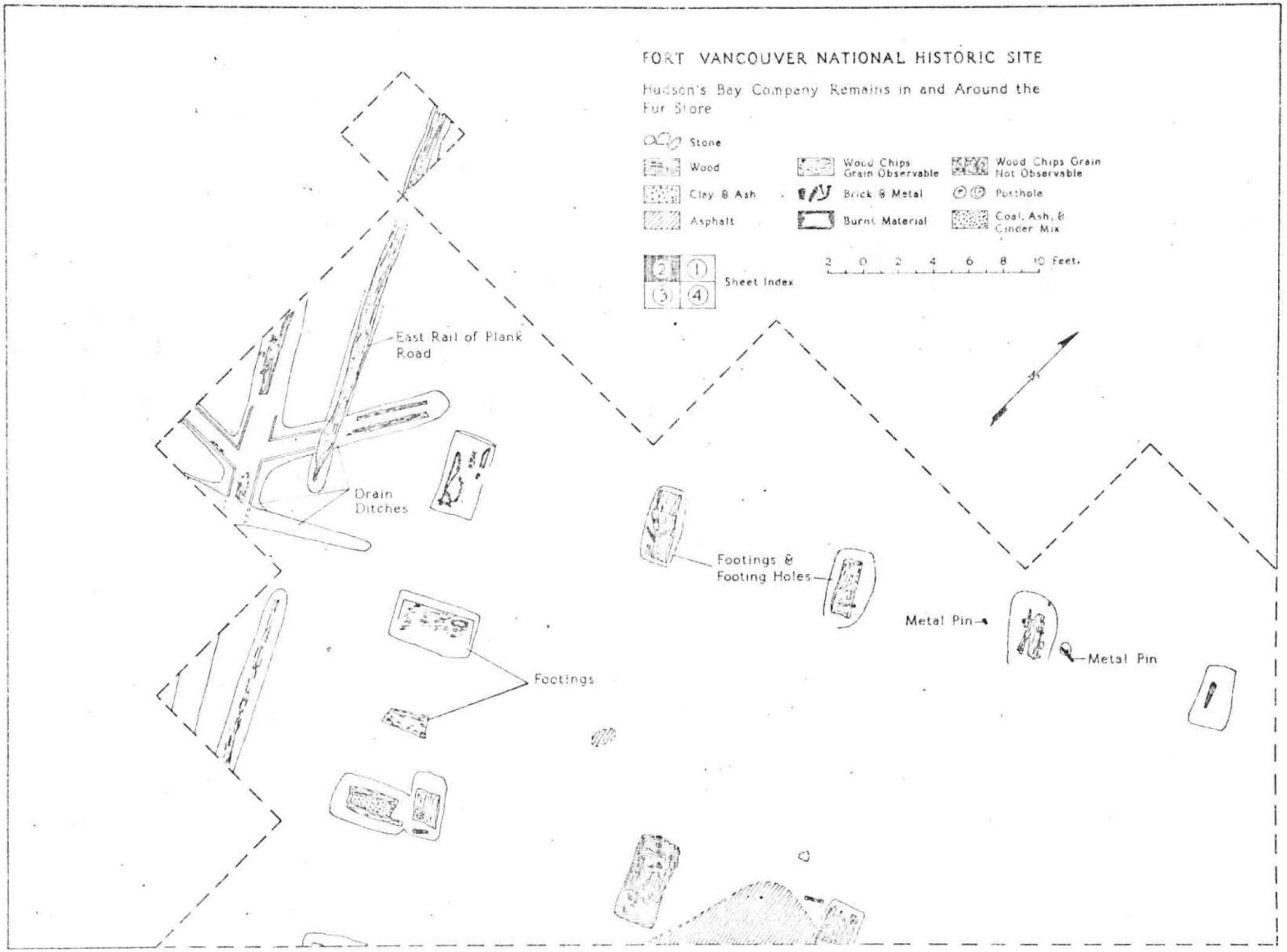

FORT VANCOUVER NATIONAL HISTORIC SITE
Hudson's Bay Company Remains in and Around the Fur Store
Stone
Wood
Clay & Ash
Asphalt
Wood Chips Grain Observable
Brick & Metal
Burnt Material
Wood Chips Grain Not Observable
Posthole
Coal, Ash, & Cinder Mix
Sheet Index
2 0 2 4 6 8 10 Feet.
East Rail of Plank Road
Drain Ditches
Footings & Footing Holes
Metal Pin
Metal Pin
Footings

Fig. 3.2

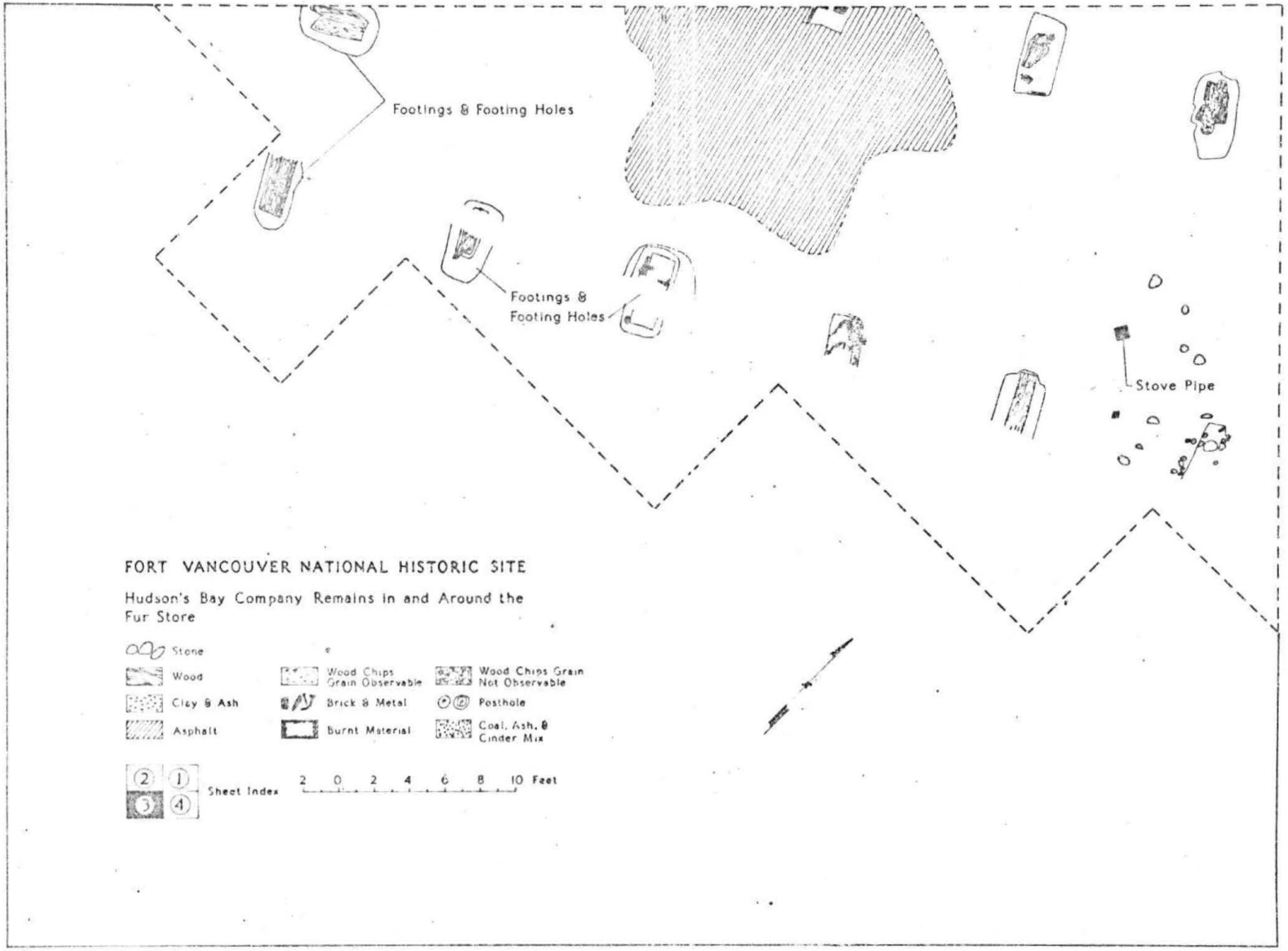

Footings & Footing Holes
Footings & Footing Holes
Stove Pipe
FORT VANCOUVER NATIONAL HISTORIC SITE
Hudson's Bay Company Remains in and Around the Fur Store
Stone
Wood
Clay & Ash
Asphalt
Wood Chips Grain Observable
Brick & Metal
Burnt Material
Wood Chips Grain Not Observable
Posthole
Coal, Ash, & Cinder Mix
Sheet Index
2 0 2 4 6 8 10 Feet

Fig. 3.3

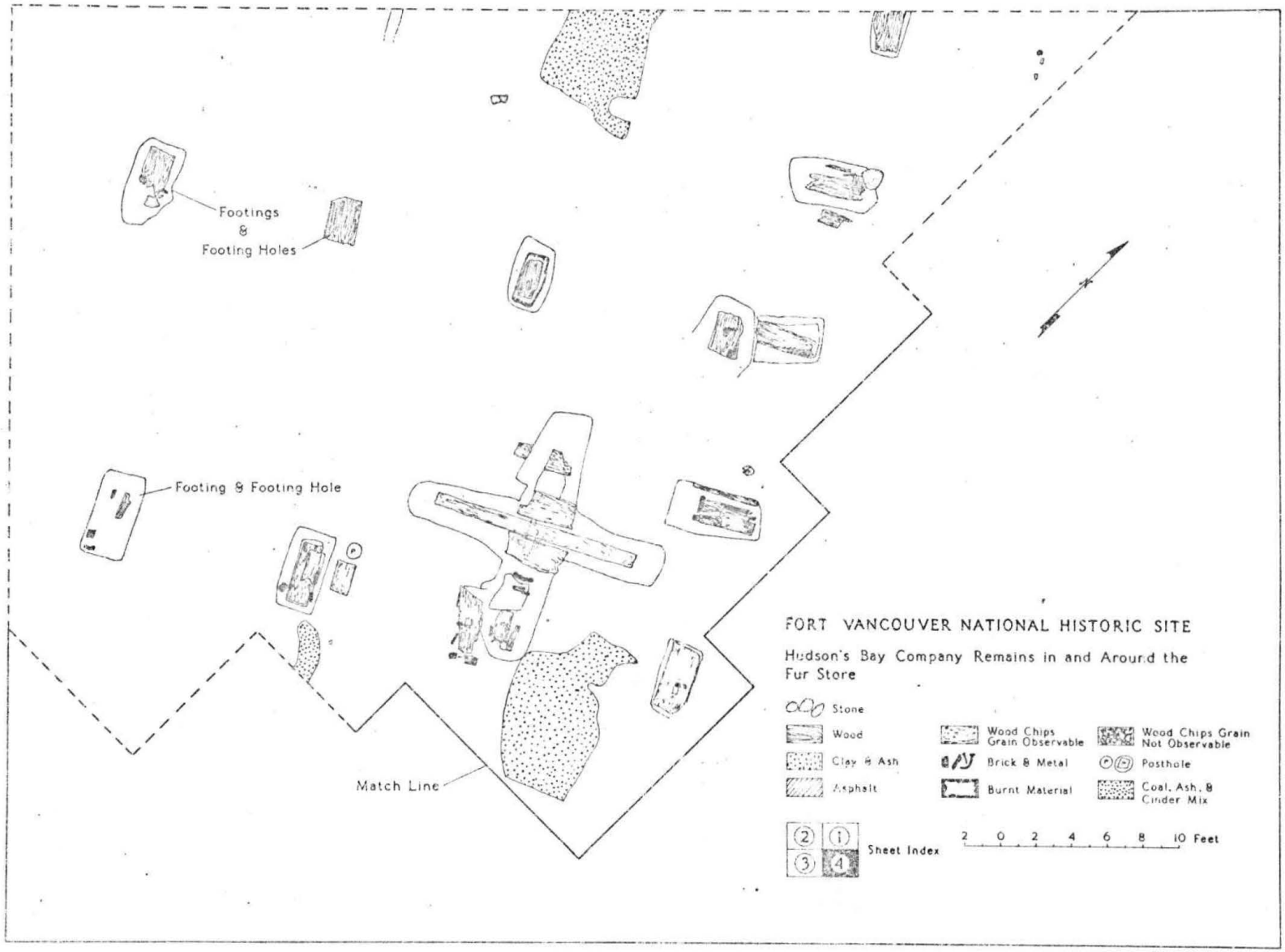

Footings
&
Footing Holes
Footing & Footing Hole
Match Line
FORT VANCOUVER NATIONAL HISTORIC SITE
Hudson's Bay Company Remains in and Around the Fur Store
Stone
Wood
Clay & Ash
Asphalt
Wood Chips Grain Observable
Brick & Metal
Burnt Material
Wood Chips Grain Not Observable
Posthole
Coal, Ash, & Cinder Mix
Sheet Index
2 0 2 4 6 8 10 Feet

Fig. 3.4

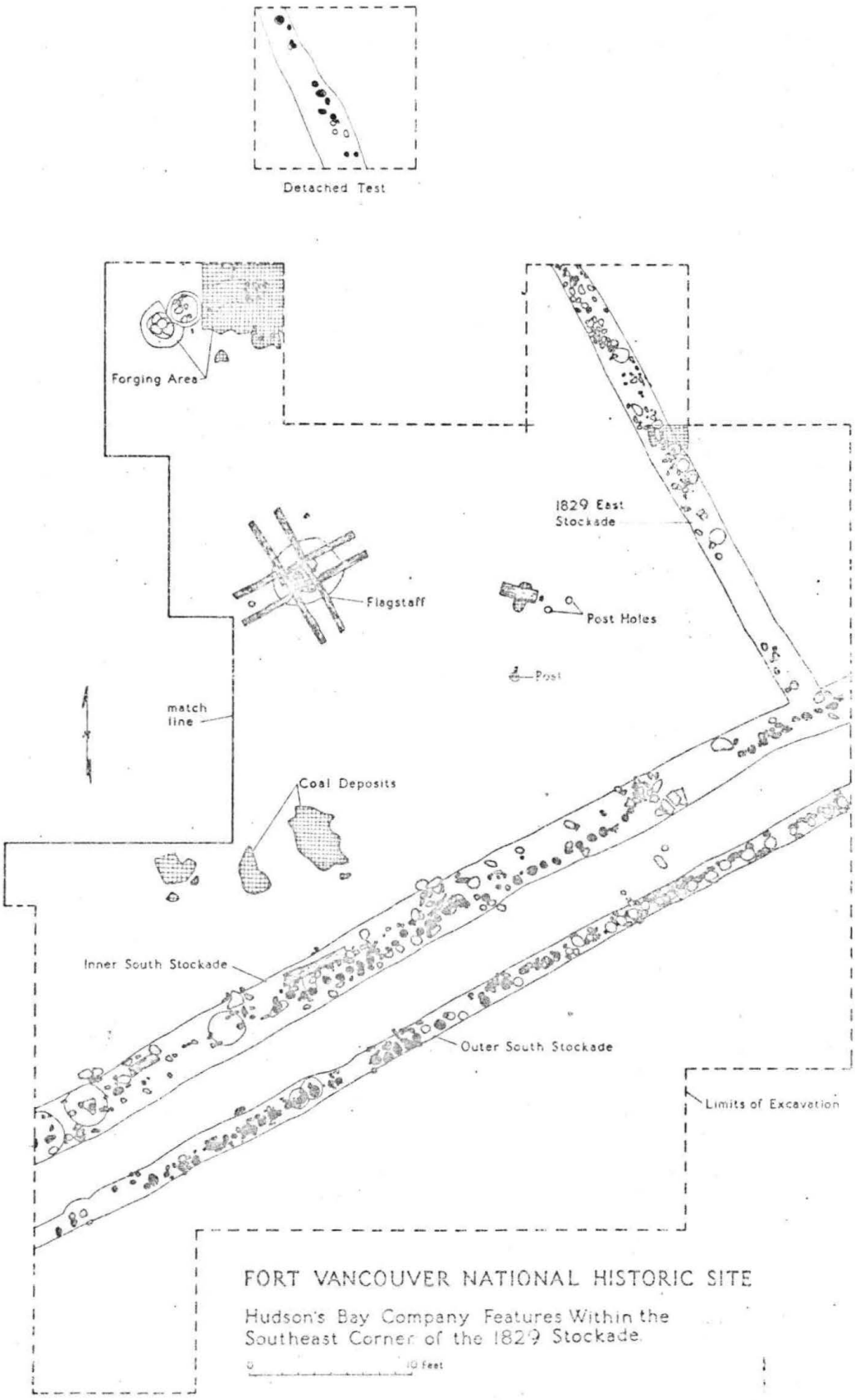

Detached Test
Forging Area
1829 East Stockade
Flagstaff
Post Holes
Post
match line
Coal Deposits
Inner South Stockade
Outer South Stockade
Limits of Excavation
FORT VANCOUVER NATIONAL HISTORIC SITE
Hudson's Bay Company Features Within the Southeast Corner of the 1829 Stockade.
0
10 Feet

Fig. 3.5

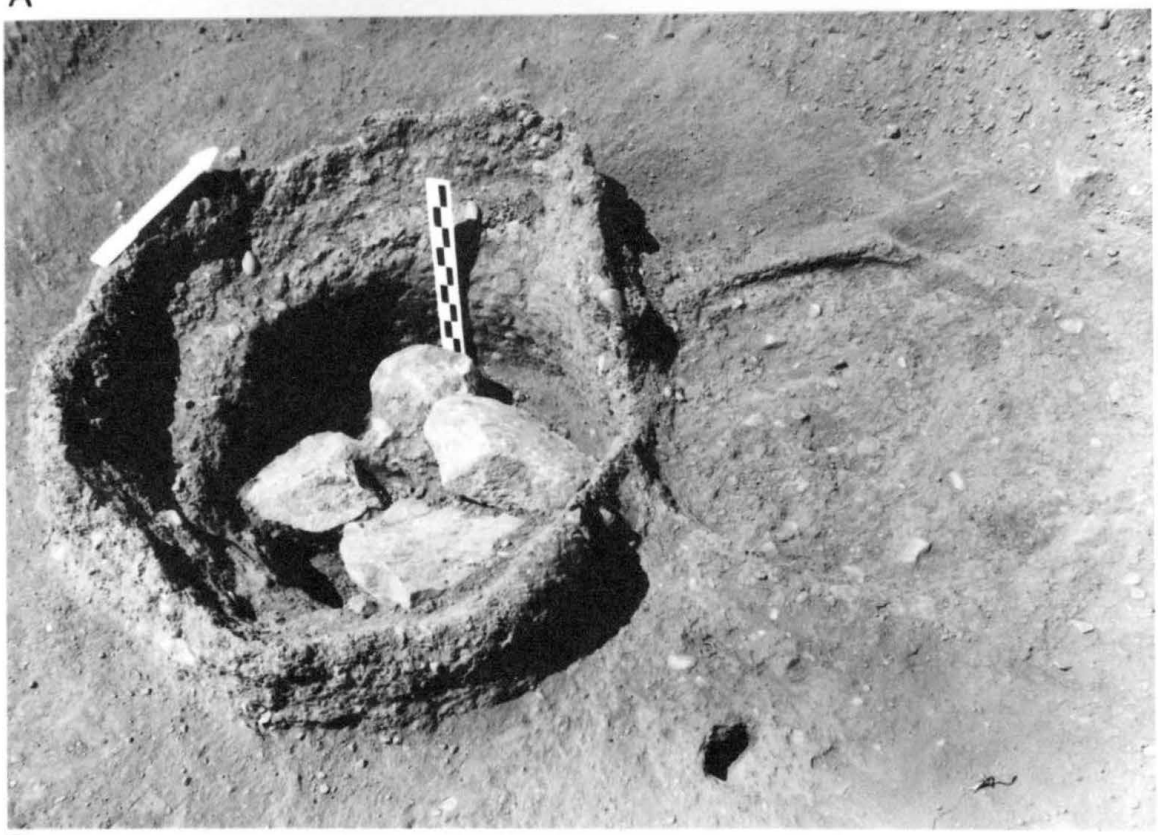
Fig. 4 - Fur Store excavations.

a - General view of the excavated area looking east (FOVA neg. 069.51-72/208).

b - Forge remains located east of the Fur Store; not completely excavated (FOVA neg. 069.51-72/190).



A



B

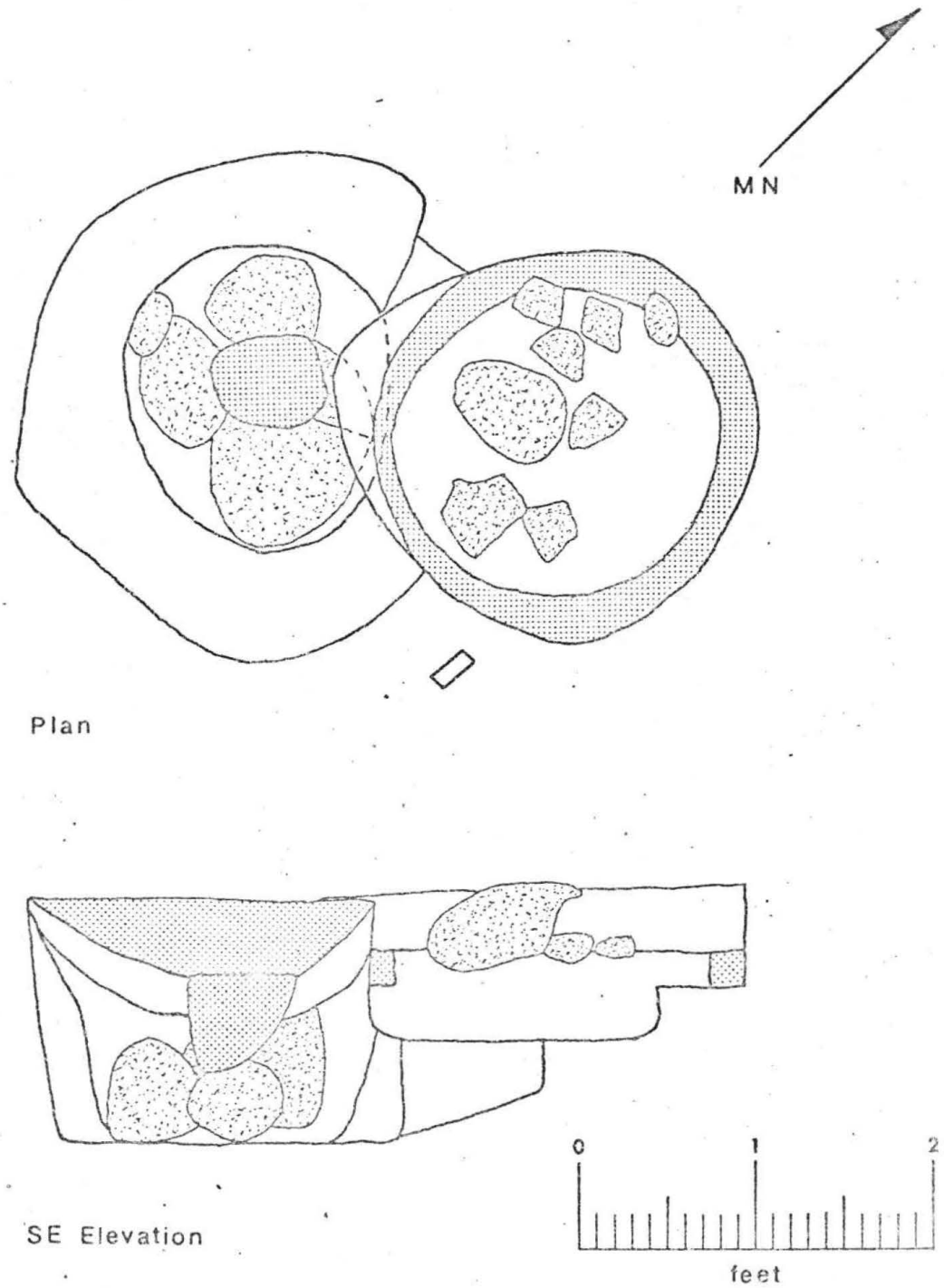


Fig. 5 - Detail of forge remains east of the Fur Store.

basin was one of the accouterments for the later forge.

Since the eastern wall of the Fur Store was built over the forging debris, there is ample reason to believe that the smithing activity preceded construction of the Store. The debris concentrations were variable in thickness, ranging from 0.1 to 0.8 ft. One was located over the trench for the east wall of the Phase I stockade, indicating that it was later in time than the stockade (Fig. 3.5).

A rectangular wooden piece similar to a footing was located over a coal concentration just east of the Flagstaff (Fig. 3.5). However, the apparent isolation of the piece made it difficult to interpret as a structural member. While not mentioned in the Flagstaff report, field records indicate that the staff and its support were set in earth containing forging debris. Evidently, this feature also post-dated the smithing activity.

Fur Store

The outstanding remains of the Store consisted of a series of wooden block footings. These outlined the perimeter of the building and also an east-west medial foundation (Figs. 2.1, 2.2). Most of the footings were set subsurface in prepared pits; undoubtedly, they were designed to support the foundation sills. Direct measurements taken between centers of corner footings and ends of medial footings showed the following lengths: north foundation = 99.75 ft.; east foundation = 39.40 ft.; west foundation = 38.40 ft.; south foundation = 98.70 ft.; and medial foundation = 92.95 ft. These figures agree favorably with the HBC inventory of 1846-47 which lists the Fur Store as being 100 by 40 ft. (Hussey 1957:184-185). If the builders of Fort Vancouver followed the ordinary HBC practice of setting outer sill and wall edges flush with outer footing edges (Hussey 1972:197, n39), the archeological dimensions of the Fur Store exceeded the inventoried dimensions.

In a few instances, remains of a wooden footing were not found. Rather, we found only the pit dug by HBC for laying the footing. In other instances, casts or earthen impressions of decayed footings were found within prepared pits (Figs. 2.1, 2.2). Casts were regarded as more credible than wooden remains for yielding original footing dimensions. Where observable, field records carefully distinguished between decayed wood, casts, prepared pits and intrusive pits of past archeological explorations.

Medial footings were generally smaller than those of the perimeter. Their mean dimensions were 1.47 ft. wide by 2.47 ft. long by 0.26 ft. thick. All were set in pits 0.45 to 0.80 ft. deep, although one pit was not defined (Table 2). Footings were set 10.25 to 13.70 ft.

apart on centers. The cumulative distance of the medial line as measured between centers of individual footings was 93.05 ft., which indicated a mean distance of 11.63 ft. between footing centers. Extending the medial line to centers of adjacent footings in the east and west walls produced a cumulative length of 99.75 ft. Using this figure, the mean distance of footings was 11.08 ft. on centers. No repair footings were present in the medial line (Table 2).

East wall footings were quite sizable. The northeast and southeast corners, for instance, were nearly 4 ft. long (Fig. 6). Other than a single repair footing, all were set in pits 0.50 to 0.95 ft. deep. Excluding the small repair footing, the east wall footings had mean dimensions of 1.47 ft wide by 3.64 ft. long by 0.45 ft. thick. Cumulative distances between individual footings set in pits was 39.55 ft., which calculated to a mean interval of 9.89 ft. on centers (Table 3).

Measurable footings of the south wall were also sizable, excepting repair footings. Where observable, footings were set in pits 0.50-1.35 ft. deep. Mean dimensions, excepting 2 repair footings, were 1.36 ft. wide by 3.49 ft. long by 0.55 ft. thick. Since several footings were cut by an intrusive trench (Figs. 2.1, 2.2), the mean length can be considered minimal. Cumulative lengths of the footings were 98.8 ft. which, excluding repairs, indicated a mean interval of 10.97 ft. on centers (Table 4).

All north wall footings were set in pits 0.3 to 1.05 ft. deep; no surface level footings were found. In 2 cases, neither wood nor casts remained for measurements. The balance had mean dimensions of 1.46 ft. wide by 3.42 ft. long by 0.39 ft. thick. The cumulative distances between individual footings was 99.9 ft. Where actual footings were missing, pit centers were used for measurement. The above total indicated a mean interval of 11.1 ft. between footing centers (Table 5).

A single surface level footing was found in the west wall line. As will be discussed, this probably represented more than a simple repair. All other western footings were set in pits 0.35 to 0.90 ft. deep. Excluding the repair footing, mean dimensions were 1.79 ft. wide by 3.77 ft. long by 0.35 ft. thick. These had a cumulative length of 38.55 ft., and a mean interval of 9.63 ft. on centers (Table 6).

Five surface level footings were present in the perimeter. Three were located in the south wall, while the east and west walls had one each (Figs. 3.2-3.4). All were noticeably smaller than subsurface footings (Tables 3, 4, 6). They appeared to have been repair footings that were slipped under sills at needed points of reinforcement. Two adjacent surface level footings were found in the south wall at an interval of 2.25 ft. (Fig. 3.4). One, F346 west, overlay a subsurface

Table 2 - Footing characteristics for medial foundation of the Fur Store.

Feature	WidthxLength xThickness	Max. Depth	Dist. from Last Footing	Remarks
374 east	1.40 x 2.20 x 0.20 ft.	1.2 ft.	0.0 ft.	West end; set in pit 0.5-1.2 ft. deep
390	1.60 x 2.75 x 0.20 ft.	1.2 ft.	13.70 ft.	Set in pit 0.4-1.2 ft. deep; casts of footings and pit preserved by asphalt; overlain by fragments of asphalted flooring
391	1.60 x 2.20 x 0.25 ft.	1.25 ft.	10.85 ft.	Set in pit 0.7-1.25 ft. deep
426	1.30 x 2.05 x 0.30 ft.	1.1 ft.	12.00 ft.	Set in pit 0.65-1.1 ft. deep
412	1.70 x 3.15 x 0.20 ft.	1.1 ft.	10.25 ft.	Set in pit 0.7-1.2 ft. deep; footing floats above pit bottom and is depressed at north end
368	1.55 x 2.75 x 0.30 ft.	1.0 ft.	12.40 ft.	Set in pit 0.4-1.1 ft. deep; metal spike enters east side of footing
355	1.80 x 2.60 x 0.30 ft.	0.9 ft.	11.05 ft.	Pit noted but not defined
333	1.10 x 2.20 x 0.20 ft.	1.2 ft.	11.25 ft.	Set in pit 0.8-1.35 ft. deep; footing has mortise 0.1x0.5 ft. through it; larger & higher pit contains the smaller and suggests that F333 may be replacement; earth over footing & small pit is scorched but footing is unburned
348	1.20 x 2.40 x 0.40 ft.	1.4 ft.	11.55 ft.	East end; set in pit 0.9-1.7 ft. deep; footing has tenon depression 0.3x0.5 ft. at upper face

Table 3 - Footing characteristics for east wall foundation of the Fur Store.

Feature	WidthxLength xThickness	Max. Depth	Dist. from Last Footing	Remarks
342	1.70 x 3.90 x 0.40 ft.	1.6 ft.	0.0 ft.	NE corner; set in pit 1.1-1.6 ft. deep; tenon depression 0.25x0.5 ft. at center of wood
347	1.10 x 3.30 x 0.40 ft.	1.9 ft.	9.80 ft.	Set in pit 1.0-1.95 ft. deep; possible shim fragments overlay footing
352	0.80 x 1.90 x 0.20 ft.	0.8 ft.	2.00 ft.	Surface level repair footing; no pit
351	1.25 x 3.50 x 0.30 ft.	1.5 ft.	7.30 ft.	Set in pit 1.0-1.8 ft. deep; larger & higher pit contains the smaller and suggests that F351 may be replacement; footing rests on forging debris
337	1.50 x 3.60 x 0.55 ft.	1.7 ft.	10.75 ft.	Set in pit 1.2-1.7 ft. deep; remains of mortise ca. 0.4x1.0 ft. in west end; tenon or shim depression 1.1x1.1 ft. located over mortise
339	1.80 x 3.90 x 0.60 ft.	1.5 ft.	9.70 ft.	SE corner; set in pit 0.9-1.6 ft. deep; mortise 0.2x0.6 ft. through the wood; NW corner of footing is burned

Table 4 - Footing characteristics for south wall foundation of the Fur Store.

Feature	WidthxLength xThickness	Max. Depth	Dist. from Last Footing	Remarks
423	1.45 x 3.35 x 0.40 ft.	1.6 ft.	0.0 ft.	SW corner; set in pit ca. 1.2-1.7 ft. deep; metal pin and fragment of sill or shim overlay footing
424	1.20 x 3.20 x 0.60 ft.	2.0 ft.	11.25 ft.	Set in pit 1.0-2.1 ft. deep; wood doesn't match cast and rests on wood dust; may be replacement
422	1.50 x 4.20 x 0.50 ft.	1.8 ft.	10.50 ft.	Set in pit 1.0-2.0 ft. deep; metal spike enters east side; measurements made on lower cast; upper cast 2.4x5.0 ft. suggests earlier footing
425	1.50 x 2.75 x 0.60 ft.	1.9 ft.	11.50 ft.	Set in pit 0.6-1.95 ft. deep; cast filled with burned debris
413	1.00 x 3.00 x 0.90 ft.	1.6 ft.	10.45 ft.	Set in pit 0.95-1.75 ft. deep; trimmed puncheon laid flat side down; discrete levels suggest puncheon is replacement
388	1.20 x 3.50 x 0.50 ft.	1.5 ft.	11.10 ft.	Set in pit 0.8-1.5 ft. deep; largely destroyed
362	?	?	10.50 ft.	Set in pit 1.0-2.0 ft. deep; neither cast nor enough wood present for measurement
346 west	1.20 x 3.75 x 0.40 ft.	1.8 ft.	11.30 ft.	Set in pit 0.9-1.95 ft. deep; overlain by repair (?) footing 1.0x1.9x0.25 ft.; metal spikes enter east side of lower and rest on face of upper footings
346 east	1.10 x 1.80 x 0.10 ft.	0.7 ft.	2.25 ft.	Surface level repair footing

Table 4 (cont'd.)

Feature	Width x Length x Thickness	Max. Depth	Dist. from Last Footing	Remarks
345	1.40 x 3.80 x 0.50 ft.	1.6 ft.	7.70 ft.	Pit remains not measurable; mortise 0.35x0.5x0.4 ft. at footing center; mortise spanned by metal spike entering from west side of footing
344	0.95 x 1.60 x 0.50 ft.	1.2 ft.	1.85 ft.	Repair footing; no pit observed; mortise 0.1x0.3x 0.2 ft. at center; vertical metal pin at east side
339	1.80 x 3.90 x 0.60 ft.	1.5 ft.	10.40 ft.	SE corner; see Table 3

Table 5 - Footing characteristics for the north wall foundation of the Fur Store.

Feature	Width x Length x Thickness	Max. Depth	Dist. from Last Footing	Remarks
365	2.50 x 4.60 x 0.50 ft.	1.6 ft.	0.0 ft.	NW corner; set in pit 1.0-1.6 ft. deep; pit & cast are same except at north edge; burned wood overlays unburned wood dust; metal spike enters west side of footing
364	1.40 x 4.00 x 0.60 ft.	1.15 ft.	11.70 ft.	Set in pit 0.6-1.4 ft. deep; metal pin at west side; footing depressed at center and partially burned
360	1.20 x 3.30 x 0.25 ft.	1.05 ft.	11.25 ft.	Set in pit 0.6-1.3 ft. deep; metal pin & forge debris under footing; mortise 0.2x0.6x0.2 near center
361	1.25 x 2.90 x 0.30 ft.	1.2 ft.	10.65 ft.	Set in pit 0.3-1.35 ft. deep; metal spike enters east side
359	?	0.8 ft.	10.95 ft.	Set in pit 0.6-1.15 ft. deep; insufficient wood for measurement
358	?	?	9.95 ft.	Set in pit 0.5-1.2 ft. deep; wood remains not measurable
357	1.20 x 4.20 x 0.30 ft.	1.3 ft.	10.95 ft.	Set in pit 1.0-1.3 ft. deep
353	1.20 x 1.80 x 0.40 ft.	1.4 ft.	10.90 ft.	Set in pit 0.9-1.4 ft. deep
349	1.30 x 2.70 x 0.40 ft.	1.5 ft.	11.70 ft.	Set in pit 0.95-1.7 ft. deep
342	1.70 x 3.90 x 0.40 ft.	1.6 ft.	11.85 ft.	NE corner; see Table 3

Table 6 - Footing characteristics for west wall foundation of the Fur Store.

Feature	Width x Length x Thickness	Max. Depth	Dist. from Last Footing	Remarks
365	2.50 x 4.60 x 0.50 ft.	1.6 ft.	0.0 ft.	NW corner; see Table 5
367	2.10 x 4.30 x 0.15 ft.	0.95 ft.	8.50 ft.	Set in pit 0.6-0.95 ft. deep; burned wood fragments in cast
376	1.20 x 2.75 x 0.10 ft.	0.50 ft.	5.90 ft.	Surface level repair footing; probably set for doorpost
374 west	1.50 x 3.40 x 0.40 ft.	1.3 ft.	5.00 ft.	Set in pit 0.5-1.4 ft. deep; southern portion of footing is burned
409	1.70 x 3.20 x 0.30 ft.	1.4 ft.	9.15 ft.	Set in pit 1.0-1.4 ft. deep; center is badly depressed; metal spike enters north side; footing edges are partially burned
423	1.45 x 3.35 x 0.40 ft.	1.6 ft.	10.00 ft.	SW corner; see Table 4

footing (Table 4). Repair footings in the south and east walls did not appear to have been set at any regular intervals in relation to subsurface footings such as was noted in the Chief Factor's House (Hoffman and Poss 1973b:30). In contrast, the surface level footing in the west wall was set exactly 5 ft. north of the subsurface central footing of the west wall (Fig. 3.2). The precise interval suggests that the surface level footing supported the sill at the position of a vertical door post. Virtually identical situations were observed in the north and west walls of the Chief Factor's House where doorways were inferred (Ibid.:27, 35). From this, we believe that the Fur Store had a narrow door set immediately north of the west wall centerline; possibly this was done sometime after the west wall was built. No surface level footings were present in the medial line (Table 2).

As noted in Tables 2-6, some unusual characteristics were noted in the Fur Store footings. These included mortise cuts in upper faces (Figs. 3.2, 3.4, 6b). Others had depressions in their upper faces suggestive of tenons and leveling shims (Tables 2, 3, 5, 6). The upper face of one medial footing was overlaid by perforated metal strips (Figs. 3.4, 7a). Ten footings had metal spikes or pins *in situ* or immediately associated (Figs. 3.2-3.4, 6a, 7b, 8a). Most unusual was a medial footing encased in asphalt (Figs. 3.2, 8b). Evidently, this footing and its pit were exposed to a flow of asphalt that originated somewhere within the Fur Store location.

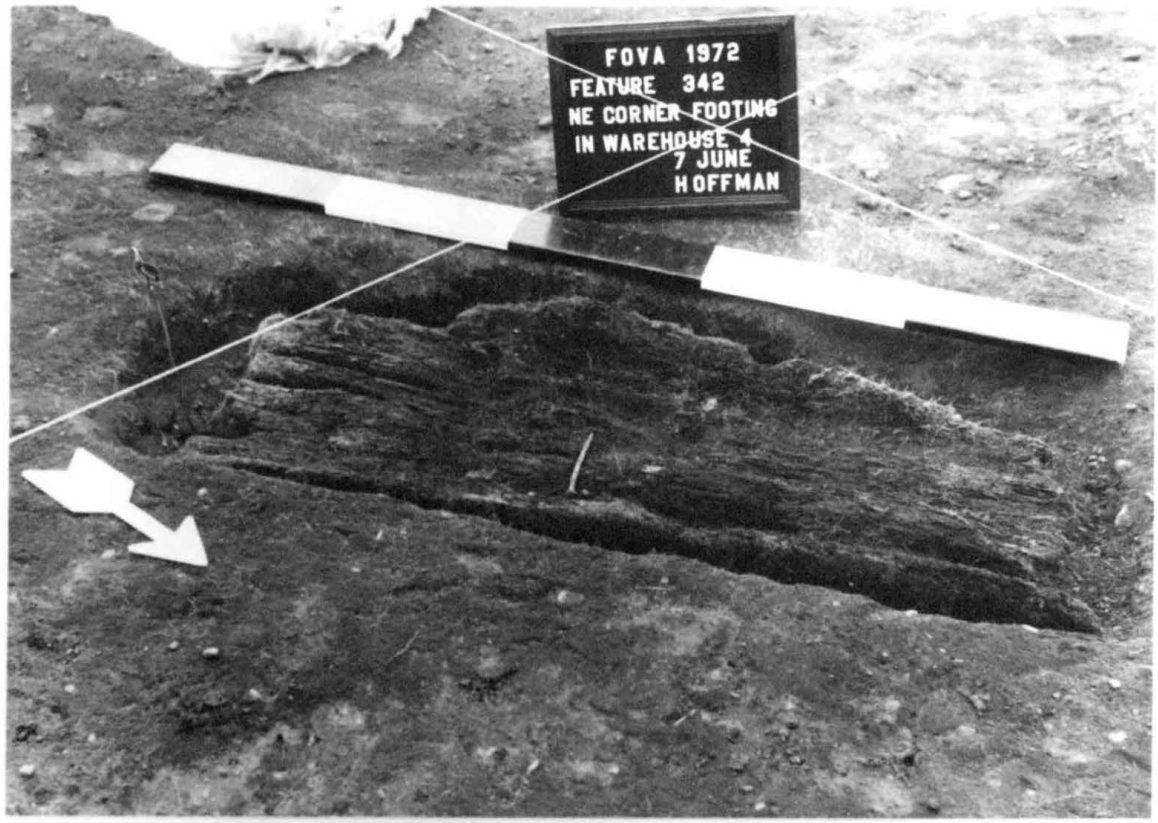
Scattered chunks of asphalt and asphalt-coated wood were also found east and southeast of the asphalted footing (Figs. 2.1, 11a). The scattering was quite limited and mixed with metal pieces and large sherds of stoneware (Fig. 11a). None of the asphalt was burned. While the chunks were mainly found at shallow elevations of 0.5 ft. or less, careful excavation showed that they were not part of the asphalt interpretive slab that once covered the Fur Store position. In fact, some of the asphalted wood was found 1.1 ft. below surface. Delineation of the nearby asphalted footing convinced us that the asphalt deposits were real Fur Store features. Presently, we believe the asphalted wood to have been remains of a portion of the Fur Store floor that was asphalted for some reason. This situation is discussed further in Chapter IV.

A rather unusual feature found in the southeast corner of the Fur Store was the base of a large baling press (Fig. 3.4). It consisted of crossed trenches 14.7 and 15.2 ft. long that were oriented to the Store foundations. The north-south trench had two flat-bottomed pits at the base of its "arms" (Fig. 10)., East-west oriented wood rested on prepared backfill within the trenches in such a way as to be higher in elevation than the surrounding surface (Fig. 9). At the center of the crossed trenches, smaller fragments of north-south oriented wood were found under the east-west wood. Centers of the

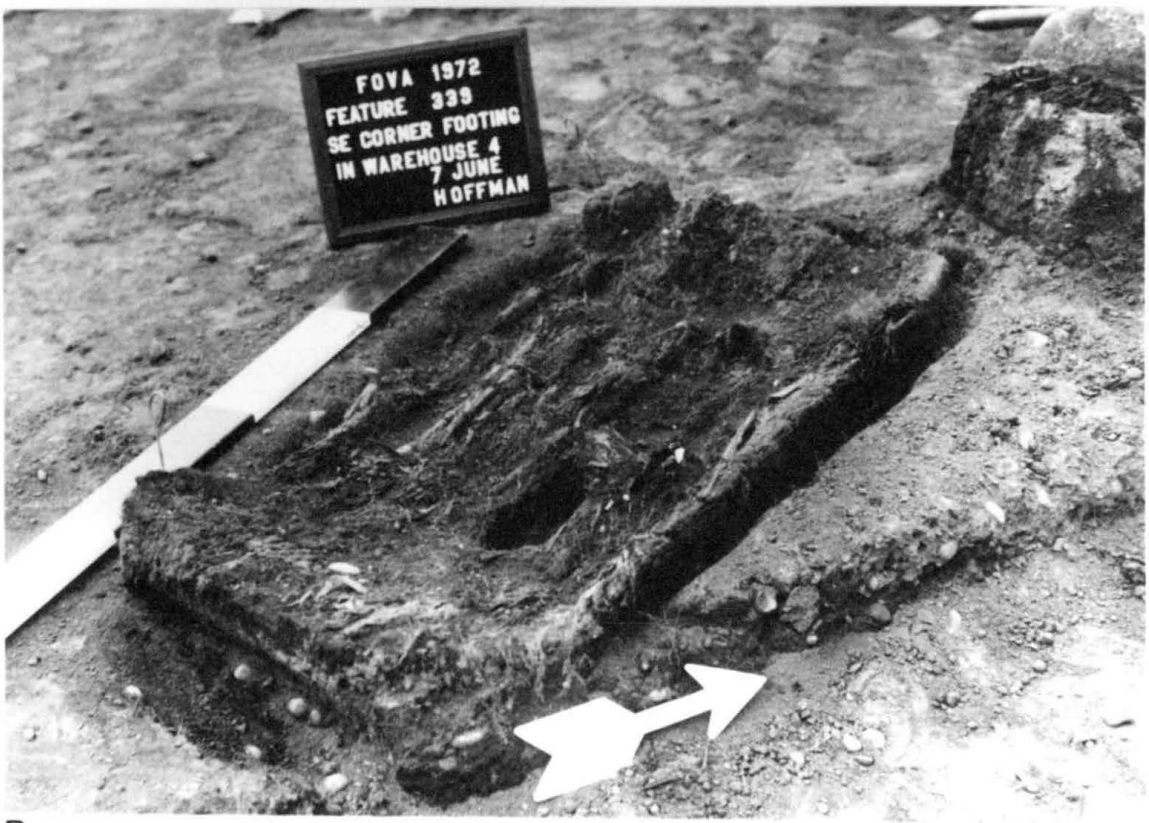
Fig. 6 - Structural remains of the Fur Store.

a - Northeast corner footing with transverse metal spike *in situ* (FOVA neg. 069.51-72/41).

b - Southeast corner footing showing mortise in upper face (FOVA neg. 069.51-72/40).


FOVA 1972
FEATURE 342
NE CORNER FOOTING
IN WAREHOUSE 4
7 JUNE
HOFFMAN

A


FOVA 1972
FEATURE 339
SE CORNER FOOTING
IN WAREHOUSE 4
7 JUNE
HOFFMAN

B

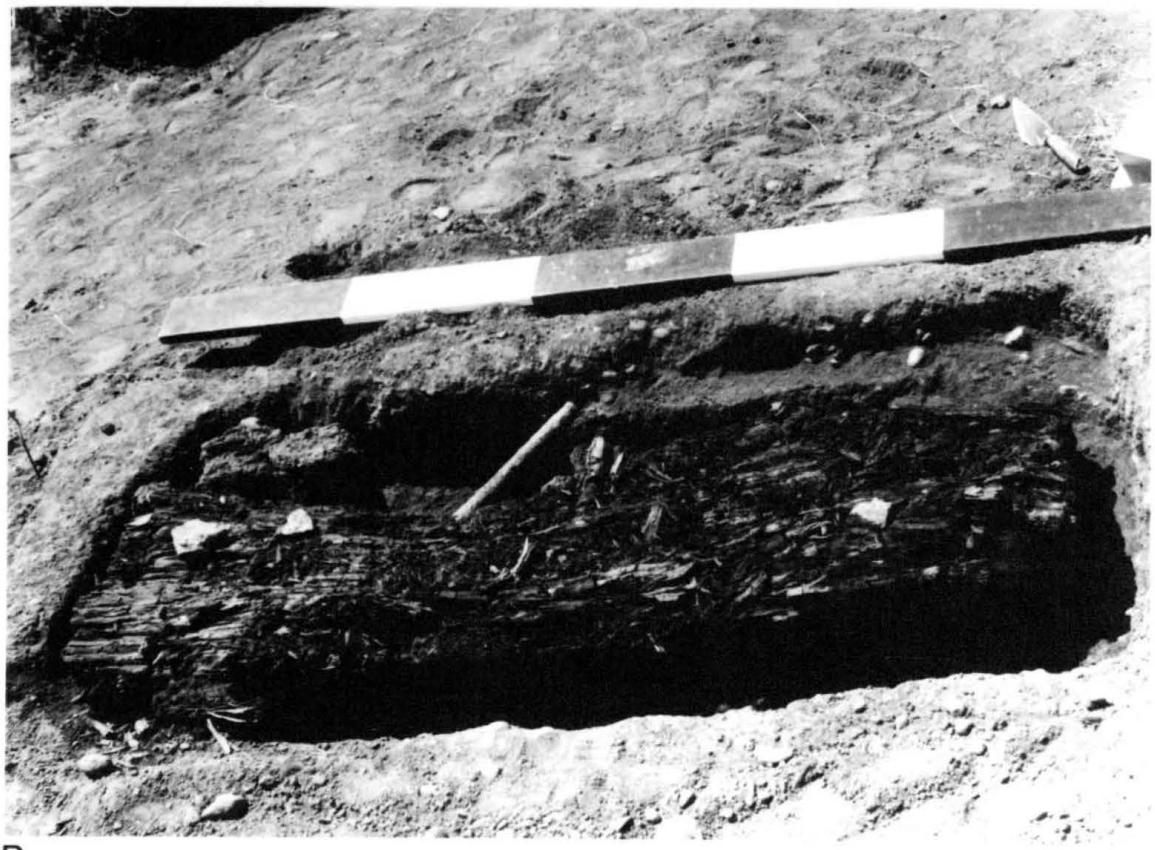
Fig. 7 - Structural remains of the Fur Store.

a - Medial footing overlaid with perforated metal straps (FOVA neg. 069.51-72/29).

b - North wall footing with transverse metal pin projecting from west side (FOVA neg. 069.51-72/57).



A

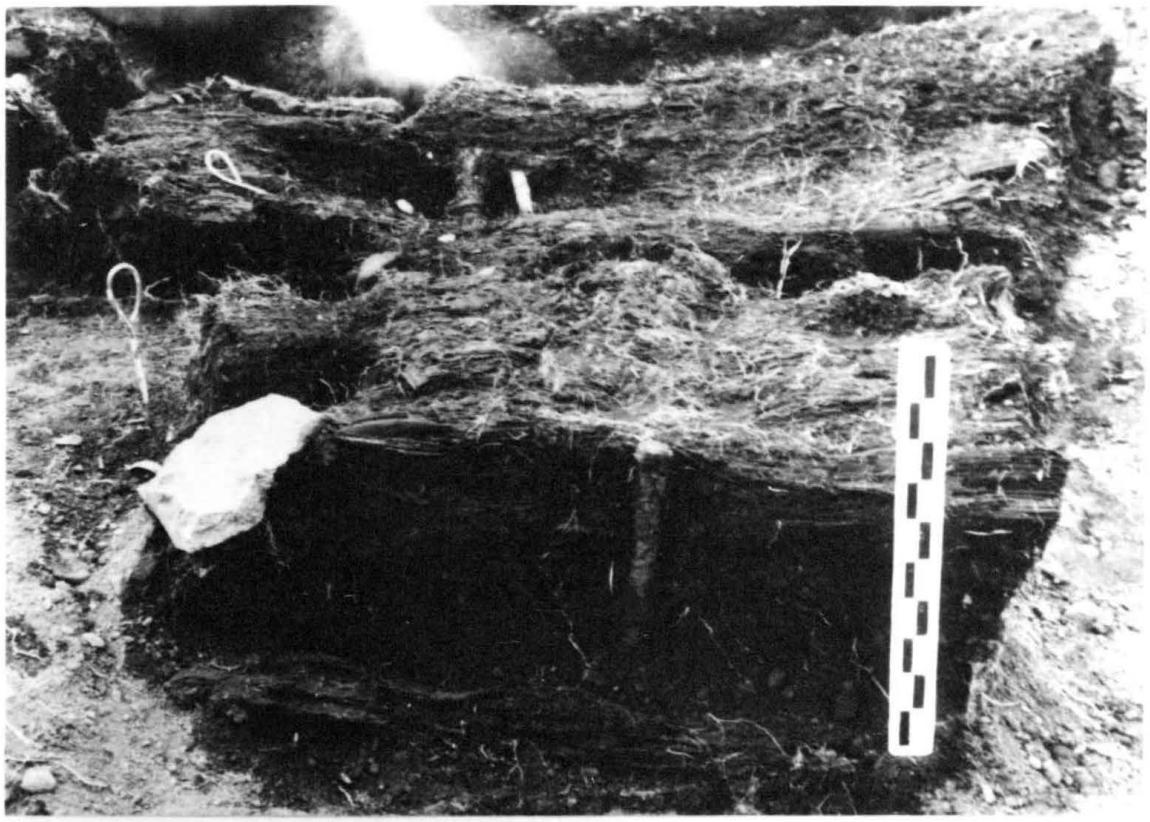


B

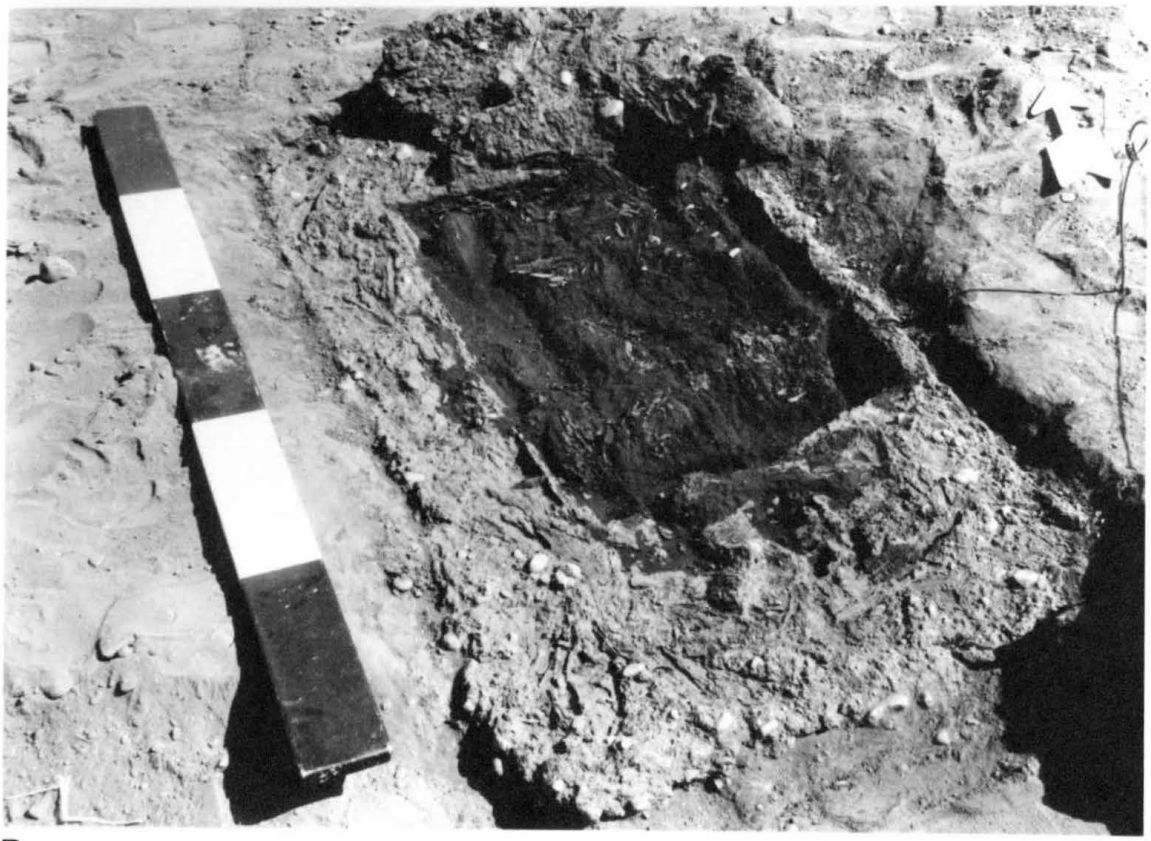
Fig. 8 - Structural remains of the Fur Store.

a - South wall footings; note transverse metal pin in west footing and vertical pin in east footing (FOVA neg. 069.51-72/36).

b - Medial footing in western sector. Dark area is dampened wood; original footing shape is preserved in asphalt matrix (FOVA neg. 069.51-72/198).



A



B

east-west wood were severely depressed along a north-south axis, as if by tremendous pressure (Fig. 9a).

Comparative information on archeological remains of 19th Century baling presses is somewhat rare, probably because these items were not always set into the ground. However, examples from the HBC depot of Rocky Mountain House (Noble 1973:99-101) and the American post of Bent's Old Fort (Moore 1973:49-50) are helpful in understanding the Fort Vancouver press. The key parts of the press remains were 2 massive posts or postholes with sizable wooden pieces between them. The posts were supportive and stabilizing units for the pressure plates that worked against the basal mounts. At Rocky Mountain House, the basal mount was found in place overlaying wooden footings between the posts (Noble 1973:Fig. 40). Two press positions were found at Bent's Old Fort. Neither retained its basal mount or footings but one had a subsurface beam connecting the two posts (Moore 1973:49). Remains of the press at Rocky Mountain House indicated a maximum bale width of 28 inches; it probably pressed bales into the standard 90 lb. pieces (Noble 1973:100-101). The larger press at Bent's Old Fort indicated a maximum bale width of 9.5 ft.; posts and the connecting beam were set in a prepared trench 0.8 ft. wide by 15 ft. long (Moore 1973:49-50).

The Fort Vancouver press remains consisted of 2 massive postholes dug below a prepared trench. North-south oriented wood at the base of the excavation probably represented a subsurface connecting beam. Above this, east-west oriented footings were set on prepared backfill; the larger footing required a cross trench 15.2 ft. long. The linear depression of the footings probably came from heavy use of the press and resultant pressure of the basal mount against the footings. Distance between postholes indicated a maximum bale width of 5 ft., although bale length could have been much larger (Fig. 10). Since repair footings of the south wall overlay part of the press base (Fig. 3.4), it is evident that the press was installed prior to later use of the building, possibly at the time it was converted to a fur store.

Construction of the baling press inside of a building, as opposed to the exterior presses at Rocky Mountain House and Bent's Old Fort, is understandable for the rainy climate of the Lower Columbia. Other than the base, no evidence was found to indicate the mechanism of the press; e.g. whether it was actuated by lever and fulcrum, rotary screw, tackle or wedges. Considering the limited amount of space in the corner of the Store, lever and fulcrum or tackle devices seem improbable, whereas the depressed footings may indicate the extreme pressure of a rotary screw. While the Fort Vancouver evidence is not as obvious as that of Rocky Mountain House, it seems most likely that the postholes and wooden remains in the crossed trenches represented

Fig. 9 - Remains of baling press base in the Fur Store.

a - Beginning exposure of the press base. East-west oriented wood is depressed along north-south axis (FOVA neg. 069.51-72/31).

b - After excavation; note hole at base of northern trench. Long east-west piece rests on fill within the cross trench (FOVA neg. 069.51-72/55).



A



B

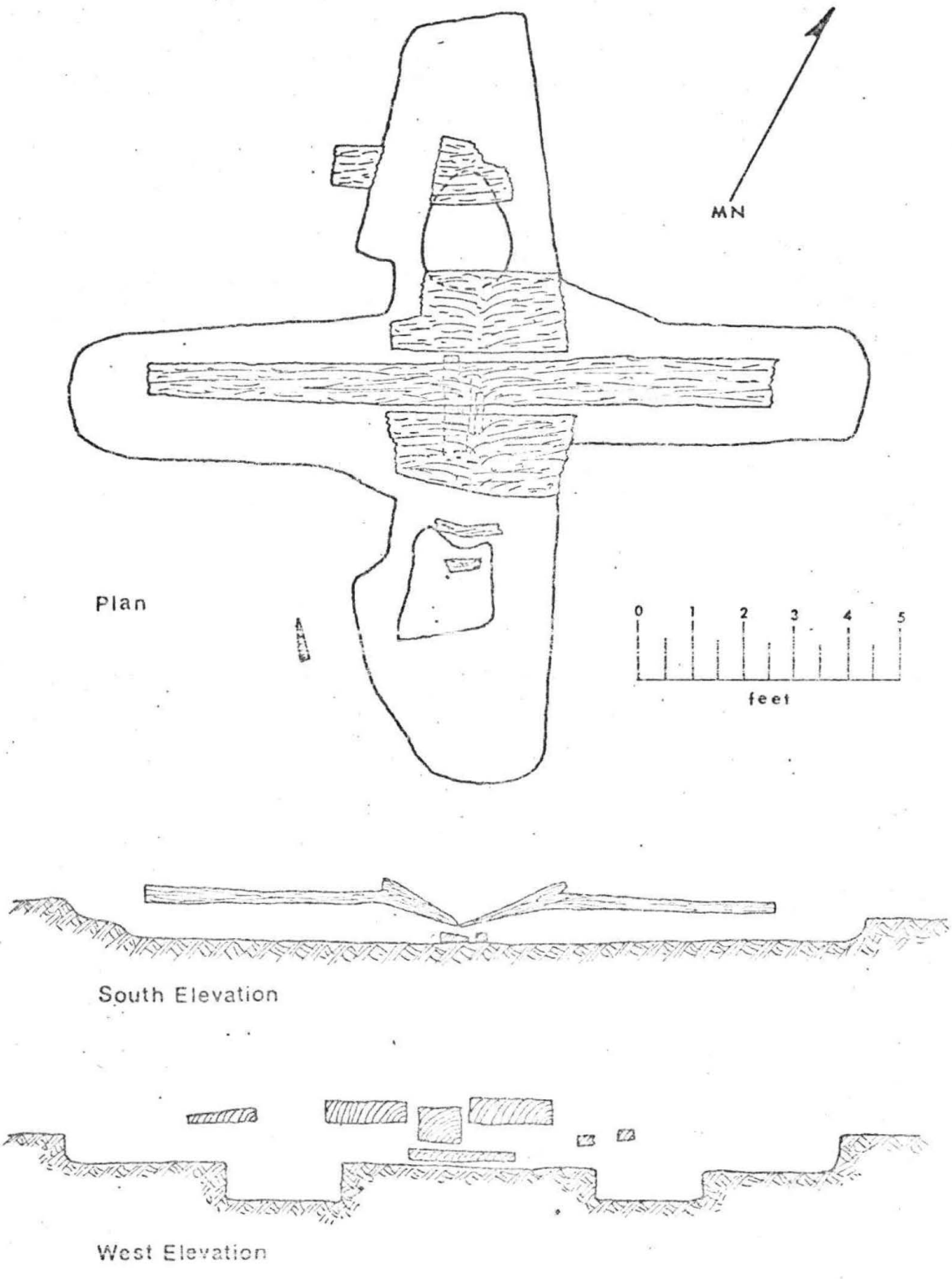


Fig. 10 - Detail of baling press base in the Fur Store.

a sizable press used for preparing large fur bales for transoceanic shipment.

Other features within the Fur Store were enigmatic. A shallow posthole was found under the north wall line adjacent to a footing and containing the metal pin similar to those found in the north wall footings (Fig. 3.2). A shallow, narrow trench of undetermined function was also noted under the north wall line (Figs. 2.2, 3.1). It was not determined whether these features were relevent to the Fur Store or the pre-store occupation. A small rock splashed with reddish paint was observed in the eastern sector between the medial and north wall lines (Fig. 3.4). It was recorded because of the known use of reddish paint on the doors and shutters of the Fur Store (Williams 1970:52). A concentration of rock, brick and fragmentary stovepipe was found inside the center of the south wall (Fig. 3.3) which may suggest the presence of a stove sometime during the building's use.

Two adjacent postholes of undetermined function lay outside of the Store in the southeast corner of the Phase I stockade (Fig. 3.5). Two small post butts braced with driven stakes were also found outside the Store. One appeared to be under the east wall of the Store and the other was in the southeast corner of the Phase I stockade. A line drawn between the posts bisects the exact center of the Flagstaff butt at an angle of 45° to the subsurface bracing of the Flagstaff. The posts were set 14 and 14.5 ft. out from the center of the Flagstaff (Figs. 3.4, 3.5). Contrary to our previous interpretations (Hoffman and Ross 1973c:19-20), we believe these post butts to have held guywires or wooden props as auxiliary support for the Flagstaff.

An unexpected but highly informative series of features was found outside the west wall of the Fur Store. These consisted of a north-south oriented trench and short angled feeder trenches in the area between the Fur Store and the adjacent Receiving Store (Figs. 3.2, 11b). The trenches were oriented to the southwest gate of the Fort (Fig. 1); mud cracks and laminated sediments in the bottoms clearly showed that the trenches contained water at some time. Vertical plank casts and wooden remains indicated that at least the sides of the trenches were lined. While quite shallow and narrow, the trenches evidently functioned as drains between the Stores. Disjointed sections of long puncheons were found depressed into the old surface on the east side of the drains. Since the area between Stores was also a roadway (Fig. 1), the puncheons were most likely the eastern rail or support for a plank road over the drains. This plank road appears to be visible on a watercolor of the Fort interior made in 1846-47 (Williams 1970:52). Certainly it is observable on a photograph of the Fort interior taken in early 1860 (Hussey 1957:Pl. XXII).

Fig. 11 - Fur Store excavations.

a - Asphalt coated wooden fragments: probable floor remnants. Note large sherds and metal *in situ* (FOVA neg. 069.51-72/194).

b - Drainage system west of the Store. Angled lateral trenches feed into central trench. Puncheon in background is eastern support for plank road over the trenches (FOVA neg. 069.51-72/199).


FOVA 1972
FEATURE 301
FLOOR REMNANTS
IN WAREHOUSE 4
19 JULY
HOFFMAN

A


FOVA 1972
DRAINAGE SYSTEM
BETEEN SOUTHERN
WAREHOUSES
10 AUGUST
HOFFMAN

B

III - DESCRIPTIONS OF MATERIAL CULTURAL REMAINS

A total of 118,586 material cultural items were recovered from the Fur Store area including 92,356 artifact and 26,230 non-artifact fragments. Quantitative distributions of these items by their descriptive categories appear as Tables 7-8.

Four historic subareas have been defined within this area -- a ca. 1829-1836 blacksmith shop, the ca. 1836-1860 "Fur Store," an undated (? - 1860) wooden roadway, and the ca. 1841-1855 Flagstaff (see Chapter IV for a more complete explanation of these subareas). No attempt has been made in this chapter to separate by structure the artifacts from this area; rather all artifacts recovered have been described as a single group. In Chapter IV discussions are directed to the distribution of material cultural remains, definition of cultural assemblages, functional interpretations regarding each assemblage, and the interpretation of each subarea.

Ceramic Household and Container Fragments

There were 2605 ceramic household and container fragments recovered, but no complete wares were reconstructed. However, 4 stoneware storage vessels were partially restored and their reconstructed shapes have been graphically reproduced (Figs. 12-13). Following our previous reports, the ceramic material has been divided into 5 major categories and further subdivided into a variety of subcategories (Table 7). A discussion of each descriptive category is presented below.

Common Pottery

Of the 3 fragments recovered, no complete or partially complete common pottery wares were reconstructed. The lustreware fragments were brown undecorated specimens.

Earthenware

Earthenware fragments, which totaled 1429, have been classified into descriptive subcategories based upon fabric color, glaze color and method of decoration (Table 7).

Clear Glazed White Body Fragments

White earthenware fragments totaled 1389 and have been classified according to function (i.e. household article vs. product containers) and method of decoration (Table 7).

Table 7 - Quantitative distribution of artifacts by descriptive category for the Fur Store area.

Descriptive Category	Sub-total 4	Sub-total 3	Sub-total 2	Sub-total 1	Total
CERAMIC HOUSEHOLD & CONTAINER FRAGMENTS					2605
Common Pottery Fragments				3	
Undecorated redware			1		
Lustreware			2		
Earthenware Fragments				1429	
White body fragments			1401		
Clear glazed		1389			
Undecorated household	1001				
Hand painted household	44				
Transfer printed household	342				
Transfer printed containers	2				
Yellow glazed		4			
Brown glazed		8			
Yellow body fragments			23		
Undecorated		15			
Banded		1			
"Mocha" decorated		7			
Yellowish buff body fragments			5		
Undecorated		4			
Hand painted		1			
Stoneware Fragments				1169	
Red body fragments			1		
Undecorated		1			
Greenish-gray body fragments (Chinese)			33		
"Canton ware"		12			
Ginger jar		20			
Hand painted polychrome		1			
Brownish-gray body fragments			1120		
"Read's Ale"		4			
Unidentified saltglazed		1116			
Gray body fragments			15		
Unidentified saltglazed		14			
Hand painted		1			
Vitreous China Fragments				2	
Decorated			2		
Porcelain Fragments				2	
Undecorated			2		

Table 7 (cont'd.)

Descriptive Category	Sub-total 3	Sub-total 2	Sub-total 1	Total
CERAMIC PERSONAL ITEMS				797
Common Pottery Items			44	
Clay pigeon fragments (USA)		44		
Earthenware Fragments			734	
Kaolin tobacco pipe fragments		729		
Kaolin pipestem beads		3		
Brown glazed tobacco pipe fragments		2		
Stoneware Items			2	
Brown glazed insulator fragments (USA)		2		
Vitreous China Items			14	
Insulator fragments		13		
Unidentified fragment		1		
Porcelain Items			3	
Buttons		3		
GLASS ITEMS				62055
Bottle, Tumbler & Stemmed Glassware Frags.			1896	
Bottle fragments		1450		
Tumbler fragments		3		
Stemmed glassware fragments		8		
Decanter fragment		1		
Unidentified glassware fragments		24		
Unidentified curved glass fragments		410		
Glass Stopper Fragments			2	
Window Glass Fragments			5780	
Mirror Glass Fragments			26	
Glass Beads			54330	
Tube beads		53741		
Wire wound beads		588		
Mandrel pressed bead		1		
Ring Settings			3	
Unidentified Jewelry Setting			1	
Glass Button			1	
Glass Insulator Fragments			9	
Melted Glass			7	
METAL ITEMS				26232
Hardware Items			12430	
Nail fragments		11126		
Wrought rod nails	2696			
Machine cut sheet nails	5292			
Machine cut wire nails	754			
Cast nails	11			
Unidentified nail fragments	2373			

Table 7 (cont'd.)

Descriptive Category	Sub-total 4	Sub-total 3	Sub-total 2	Sub-total 1	Total
Hand forged staples			7		
Screws			39		
Screw w/washer			1		
Bolts			41		
Washers			18		
Nuts			29		
Bolt and nut			1		
Wing nut w/eyelet			1		
Barrel rivets			28		
Sheet copper rivet			1		
Eye bolt w/washer and nut			1		
Roves			4		
Unidentified fasteners			44		
Hinge parts			5		
Butt hinges		3			
Mortise hinge		1			
Hinge preform		1			
Pintles			2		
Door lock part			1		
Escutcheons			4		
Key fragments			2		
Sliding door bolt			1		
Gate hook			1		
Gate hook w/staple			1		
Swivel preforms			13		
Trap parts			310		
Trap fragments		242			
Bases	9				
Pan posts	15				
Ketches	6				
Jaw posts	78				
Springs	10				
Jaws	2				
O-rings	9				
Chain lengths	2				
Chain links	111				
Trap preforms		26			
Base	1				
Pan posts	6				
Pans	5				
Jaw posts	3				
Jaws	2				
Springs	9				

Table 7 (cont'd.)

Descriptive Category	Sub-total 4	Sub-total 3	Sub-total 2	Sub-total 1	Total
Trap preform waste products		42			
Jaw cutouts	39				
Spring cutouts	3				
Axe parts			33		
Axe fragments		5			
Bodies	2				
Blades	2				
Poll	1				
Axe wedges		2			
Axe preforms		26			
Bodies	4				
Blade	1				
Polls	21				
Blacksmithing tools			34		
Tong fragments		9			
Sledgehammer heads		2			
Hardy		1			
Dies		4			
Files		18			
Flat	12				
Half round	4				
Rattail	1				
Three square	1				
Wood working tools			9		
Saw blade fragments		3			
Wedge		1			
Auger bit		1			
Drill bits		2			
Gimlet		1			
Clawhammer head		1			
Hoe blade			1		
Offset awls			2		
Handle insert tang			1		
Handles			2		
Belaying pin			1		
Valve handle			1		
Horseshoes			2		
Muleshoes			2		
Stove parts			3		
Stove pipe fragments			2		
Pipe fragment			1		
Hooks			7		
D-ring			1		
Swivel o-ring			1		

Table 7 (cont'd.)

Descriptive Category	Sub-total 3	Sub-total 2	Sub-total 1	Total
Strap ring		1		
Inner tube valve		1		
Inner tube valve cap		1		
Chain toggle		1		
Spring		1		
Metal band		1		
Sheet metal bands (USA)		23		
Painted sheet metal band (USA)		1		
Metal bundling strap		136		
Riveted strap		87		
Strap w/nails		6		
Wire bale		1		
Unidentified wire objects		4		
Drawn wire		184		
Insulated copper wire		8		
Woven wire cable (USA)		1		
Zinc sheeting		87		
Copper sheeting		91		
Copper sheeting w/tacks		1		
Riveted copper sheeting		1		
Stamped copper sheeting		1		
Laminated iron & copper sheeting		1		
Riveted sheet metal		1		
Sheet metal tube fragments		2		
Lead castings		3		
Gilt-plated fragment		1		
Household and Personal Items			207	
Buttons		17		
Button loops		3		
Fabric snaps		2		
Triangular needle		1		
Finger rings		21		
Finger rings w/glass setting		2		
Buckles		9		
Coin ornament (U.S. half-dime, 1838)		1		
Coin (U.S. nickel, 1964)		1		
Jews harp		1		
Table knives		3		
Serving spoon		1		
Pocket knife		1		
Brass cock parts		3		
Cock fragment	1			
Socket	1			
Key	1			

Table 7 (cont'd.)

Descriptive Category	Sub-total 3	Sub-total 2	Sub-total 1	Total
Iron container rim fragments		2		
Brass & lead military emblem (USA)		2		
Boot sole taps		2		
Boot heel tap		1		
Razor fragment		1		
Can opener key		1		
Foil cap		1		
Can fragments		70		
Container fragments		61		
Weaponry Items			6998	
Cartridges & bullets		97		
Lead shot, buckshot & ball		6864		
Iron grapeshot and ball		6		
Cannon primers		4		
Percussion cap		1		
Musket parts		26		
Barrel fragments	2			
Brass dragon sideplates	2			
Lockplate	1			
Flash pan	1			
Mainsprings	10			
Trigger guards	2			
Trigger plate	1			
Thimbles	2			
Frizzen	1			
Unidentified internal mechanisms	4			
Unidentified Copper Objects			30	
Unidentified Copper Fragments			12	
Unidentified Lead Objects			7	
Unidentified Lead Fragments			17	
Unidentified Cast Angle Iron Objects			15	
Unidentified Metal Objects			139	
Unidentified Metal Preforms			225	
Unidentified Metal Fragments			6152	
CONSTRUCTION MATERIAL				538
Brick Fragments			414	
Imported brick fragments		345		
Local brick fragments		37		
Unidentified brick fragments		32		
Tile Fragments			15	
Mortar			33	
Putty			12	
Tarpaper			64	

Table 7 (cont'd.)

Descriptive Category	Sub-total 1	Total
STONE ITEMS		72
Slate Pencil Fragments	16	
Slate Tablet Fragments	15	
Gunflints	6	
Graphite Crucible Fragments	22	
Abraded Stone	1	
Detritus	3	
Carved Stone	1	
Grinding Hammer Stone	1	
Flaked Stone	1	
Sawn Steatite	2	
Projectile Point Fragments	4	
LEATHER ITEMS		6
Shoe Heels	3	
Shoe Fragments	2	
Belt Fragment	1	
PLASTIC ITEMS		11
Unidentified Fragments	7	
Toothpicks	4	
RUBBER ITEMS		8
Unidentified Fragments	8	
WOODEN ITEMS		6
Wood from Flagstaff	2	
Insulator Tree (USA)	3	
Plywood Fragment	1	
MISCELLANEOUS ITEMS		26
Unidentified Fiber	2	
Paint with Wood	1	
Paint Chips	5	
Green Paint	1	
Metal Flakes (N=4 bags)		
Crayons	10	
Pencil Lead	3	
Cobble Stone	1	
Cord	1	
Unidentified Material	2	
Bead Dirt (N=369 bags)		
GRAND TOTAL		92,356

Table 8 - Quantitative distribution of non-artifacts by descriptive category for the Fur Store area.

Descriptive Category	Subtotal	Total
Bone		326
Coral		157
Slag		42
Clinkers		2697
Wood Fragments		91
Charred Wood or Charcoal		145
Soil Samples from Forge Area (N=17 bags)		
Unidentified Material		15
Walnut Shell		1
Fossilized Shell		4
Tar and Wood Fragments		794
Minerals		21958
Coal	21844	
Asphaltum	102	
Iron Crystals	7	
Rock with Red Paint	2	
Mica	5	
GRAND TOTAL		26,230

Undecorated Household Article Fragments. No complete or partially complete wares were found among the 1001 fragments recovered, and no new manufacturing marks were observed.

Hand Painted Household Article Fragments. No complete or partially complete wares were found among the 44 fragments recovered, and no manufacturing marks were observed. None of the decorations were identified as to specific pattern, but there were 4 general styles -- floral, banded, gold edging and "mocha." One fragment with a black fern-like frond on a brown slip was observed and was classified as a "mocha" decoration. The interior of this ware definitely had a clear glazed white body.

Transfer Printed Household Article Fragments. No complete or partially complete wares were found among the 342 fragments recovered. Fragments of 3 new patterns were observed and have been classified as Varieties #7108, #7116 and #7117 within the FOVA Ceramic Catalog.

No new manufacturing marks were observed but a "Copeland & Garrett" brown garter mark (coded CG-TP-1) was found with what is believed to be Variety #7037. An identical mark occurring with the same pattern was found in the Harness Shop area (FOVA 4493) but at that time this pattern was classified as "Rose" (Hoffman and Ross 1973:26). This pattern is not "Rose" but as yet its pattern name has not been identified. At Fort Vancouver, "Rose" had not been found with a "Copeland & Garrett" garter mark.

Transfer Printed Product Container Fragments. Two fragments of an "Ambrosial Shaving Cream" jar were recovered.

Yellow Glazed White Body Fragments

Four fragments of an undecorated yellow glazed white body ware were recovered, but the original shape could not be reconstructed.

Brown Glazed White Body Fragments

Of the 8 fragments of brown glazed white body wares recovered, 6 were partially reconstructed into a small bowl or jug lid (shape too incomplete for significant graphic reconstruction). One fragment (with more of a buff body) may have come from a one-piece spitoon, and the last fragment has an incised "Rockingham." This would indicate the Rockingham Works in Swinton, Yorkshire, which operated ca. 1745-1842 (Godden 1964:545).

Clear Glazed Yellow Body Fragments

All 23 fragments of yellow body earthenware recovered are probably from a "mocha" decorated ware. The banded fragment has a blue slip on molded bands while the "mocha" decorated fragments have a green fern-like motif on a white glaze.

Clear Glazed Yellowish Buff Body Fragments

No complete or partially complete ware was reconstructed from the 5 fragments recovered. Decoration on one fragment consisted of a red hand painted sinuous line.

Stoneware

Red Body Fragment

A single relatively thin fragment of an unidentified red body ware was recovered.

Greenish-Gray Body Fragments

The 33 fragments of greenish-gray stoneware are all from "Chinese Porcelain" household articles or product containers.

"Canton Ware" Fragments. Twelve fragments of "Canton Ware" plates were recovered, but no complete or partially complete plates were reconstructed.

Chinese Ginger Jar Fragments. Twenty fragments of Chinese ginger jars were recovered, but no complete or partially complete jars were reconstructed.

Hand Painted Polychrome Fragment. One fragment of a hand painted polychrome ware was recovered. This pattern is painted in red, green and yellow and appears to be geometric.

Brownish-Gray Body Fragments

"Read's India Pale Ale" Bottle Fragments. Of the four fragments recovered, no complete or partially complete bottles were reconstructed.

Lynne Sussman (Ceramic Cataloguer, National Historic Sites Service, Ottawa) has informed us that these bottles were possibly manufactured for a brewery in Troy, New York:

> Read, Armstrong & Co., in 1837, changed its name to Read & Son; to M. P. Read & Bros. in 1841; Read & Bros. in 1847; Arba Read in 1856; Read Bros. in

1857 and finally to Dunn & Kennedy and Kennedy & Murphy in 1867. This information came from One Hundred Years of Brewing, a reprint of a 1903 publication by H.S. Rich Co. Chicago (Sussman 1974).

Unidentified Saltglazed Product Container Fragments. Of the 1116 fragments recovered, 4 partially complete containers have been graphically reconstructed (Figs. 12-13). None of these containers could be identified as to manufacturer or as to the products originally held.

SC 1 -- A large, round crock (Fig. 12) with a light-dark brown (10 YR 7/4 - 7.5 YR 3/4) saltglazed exterior, a dark reddish brown (5 YR 3/4) interior rim, and an unglazed light brown (10 YR 3/2) interior body. Fabric color is a light brownish gray (10 YR 3/2).

SC 2 -- A medium, round crock (Fig. 13a) with a medium-dark reddish brown (7.5 YR 4/6 - 5 Y 2/1) saltglazed exterior, a dark reddish brown (5 YR 2/4) interior rim, and a brownish red (2.5 YR 5/6) interior. Fabric color is a light brownish gray (10 YR 8/1).

SC 3 -- A medium, round crock (Fig. 13b) with a light reddish brown (5 YR 5/6) saltglazed exterior and a light green (2.5 Y 7/2) glazed interior. The interior glaze has vitrified and has formed a smooth glass-like surface. Fabric color is a light brownish gray (10 YR 8/2).

SC 4 -- A small, square jar (Fig. 13c) with a brown (10 YR 6/4) saltglazed exterior and a light reddish brown (7.5 YR 6/6) interior. Fabric color is a light brownish gray (10 YR 8/2). This jar may be a snuff bottle.

The 3 round crocks appear to be stylistically similar and vary only in size and internal glazing. Since none of the containers could be completely reconstructed, it was not possible to compute liquid capacities.

Gray Body Fragments

Fourteen of the 15 gray body fragments recovered were from a saltglazed ink or blacking bottle, but the complete bottle could not be reconstructed.

One fragment of a blue hand painted saltglazed container was recovered, but the fragment was too small for meaningful identification.

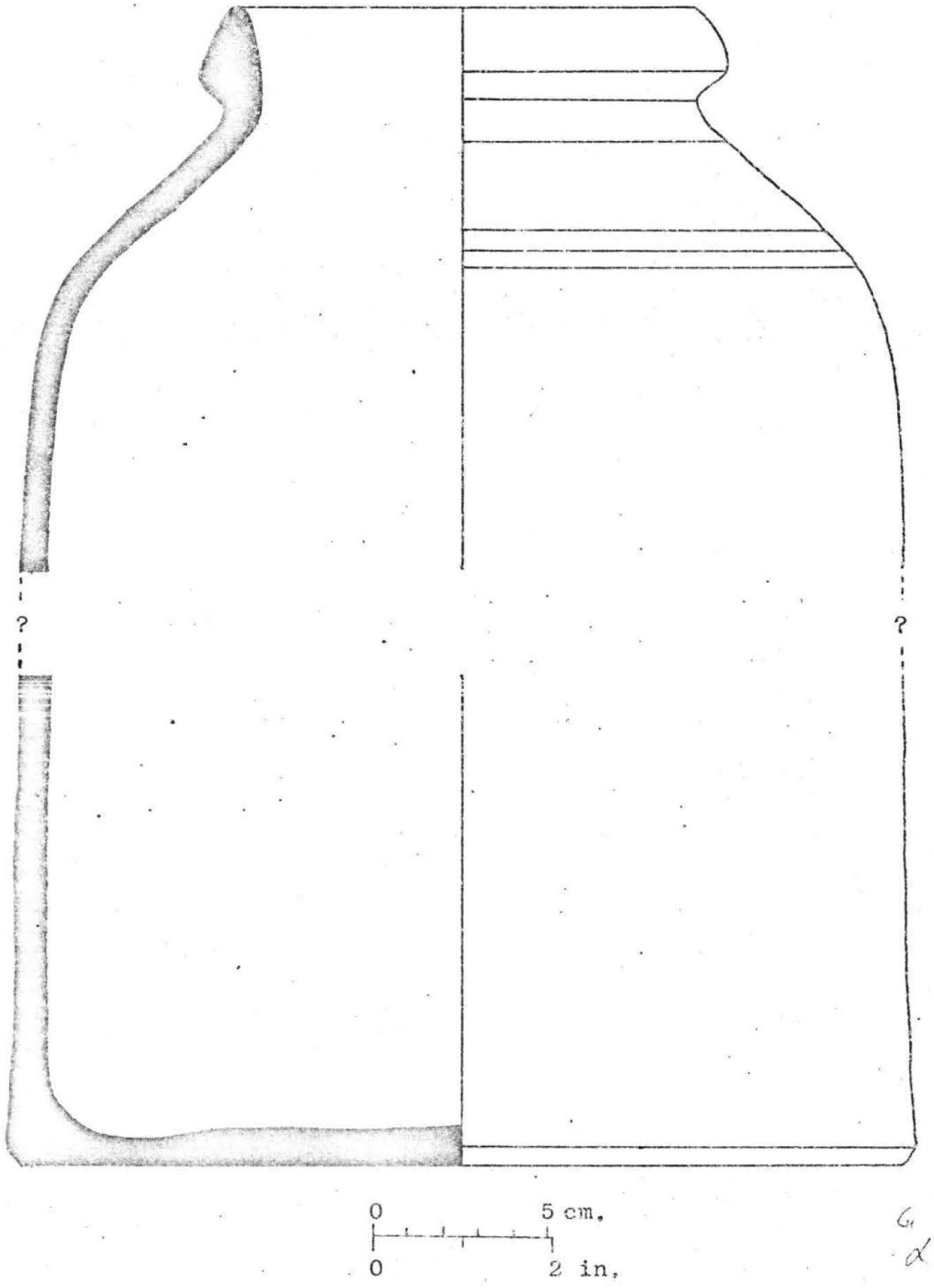


Fig. 12. Reconstructed stoneware container SC1 from the Fur Store area.

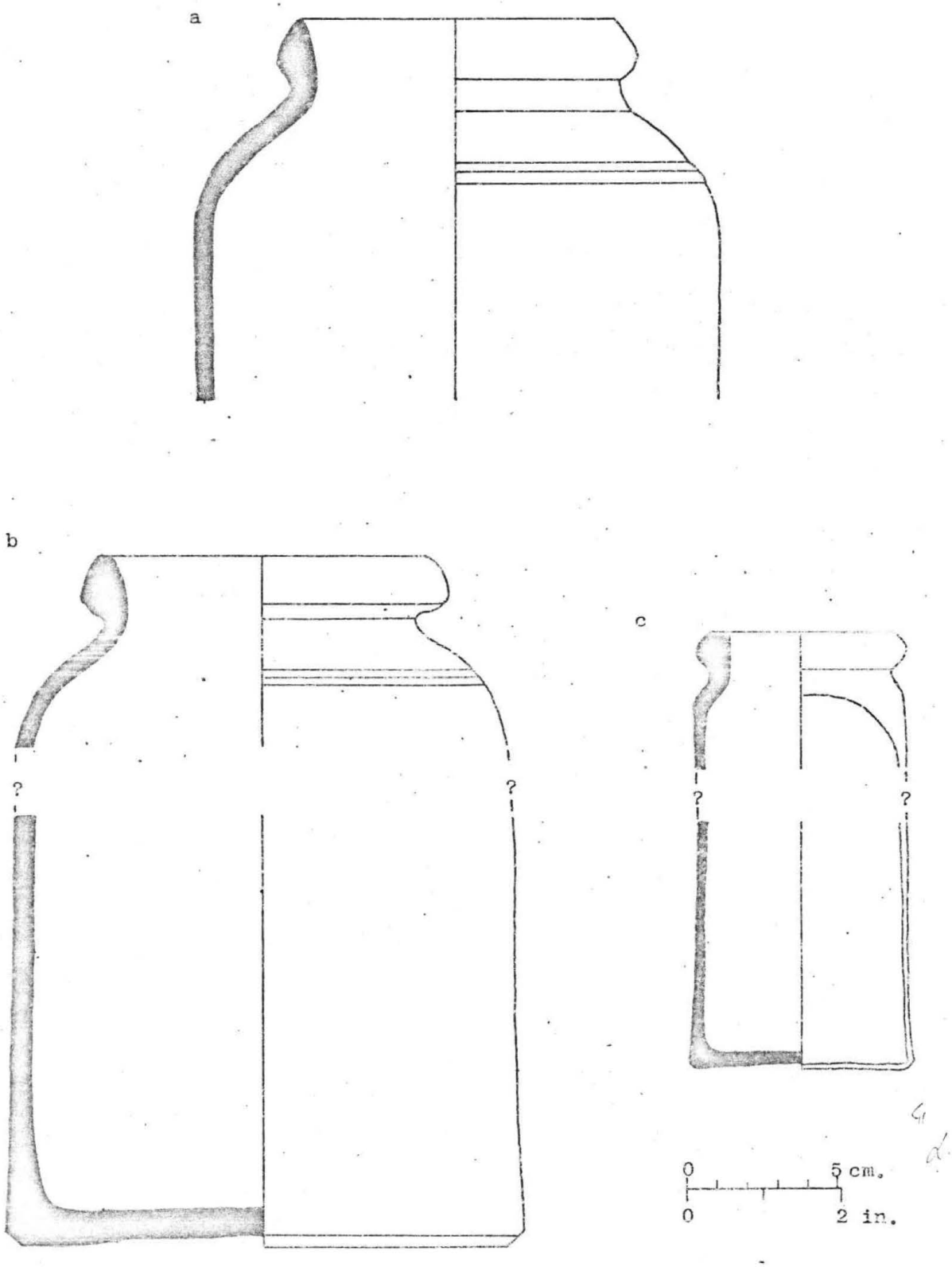


Fig. 13. Reconstructed stoneware containers SC1, SC2 and SC3 from the Fur Store area.

Vitreous China

Decorated Household Ware Fragments

Two fragments of a vitreous china plate were recovered which had both molded and hand painted decorations. Molded decoration appeared along the rim of the plate with a hand painted floral chain just below the molding running into the well. No manufacturing marks were observed.

Porcelain

The 2 undecorated porcelain fragments were too small to provide any meaningful descriptive information.

Ceramic Personal Items

Earthenware

Kaolin Tobacco Pipe Fragments

Kaolin pipe fragments totaled 729 specimens but no complete or partially complete pipes could be reconstructed.

Bowls. Only one type of marked bowl was recognized -- "Ford, Stepney" (see illustration in Hoffman and Ross 1973b:Fig. 13b).

Stems. Two types of manufacturing marks were observed on pipestem fragments:

1. "McDOUGALL, GLASGOW"
2. "Gambier
   à Paris
   nt * H
   Depose"

Based upon the decoration running down the stem, the Gambier pipe appears to have a floral decorated bowl, but no bowl fragments were found. Also, this pipe apparently did not have a spur.

One floral decorated stem was recovered, but it has yet to be identified.

Spurs. Four spurs were found with the raised letters "F/I", one with "P/J" and one with "J/J". The F/I marks belong to Ford pipes.

Kaolin Pipestem Beads

Three pipestems were found which had both broken ends ground. These were probably used as beads.

Brown Glazed Pipe Fragments

Two brown glazed pipe fragments were recovered. One fragment is from a "Knobby" bowl, while the second is a spur. No identification has been made.

Porcelain

Buttons

One 2-hole and two 4-hole "Prosser" buttons were recovered.

Glass Items

Bottle, Tumbler & Stemmed Glassware

Bottle Fragments

Of the 1450 bottle fragments recovered, no complete or partially complete bottles could be reconstructed. Eight fragments have been identified as part of a "J. T. Daly, Clubhouse" medicinal cordial gin bottle (Rim Type 14 and Base Type 14). John T. and William H. Daly were New York wholesale liquor dealers who bottled alcoholic beverages from ca. 1850-1870, and their San Francisco agent was William Newhall (Wilson and Wilson 1968:59). This bottle could have been shipped directly from New York aboard the Robert Burton with other supplies ordered by Peter Skene Ogden in 1852; or it may have been procurred in San Francisco during one of the HBC purchasing trips in the mid-1850's.

Numerous fragments of pharmaceutical bottles were recovered (Rim Type 3 and Base Type 4), but none could be reconstructed.

Bottle Rims. Fifteen bottle rim types were reconstructed and have been classified according to their manufacturing attributes and form (Table 9). New or previously unillustrated types are graphically presented in Figs. 14-15.

Bottle Rim Type #29 (Fig. 15) came from a very large wine bottle and may represent what the French called an "imperiale" holding the equivalent of 8-9 bottles of claret and equaling ca. 1 1/2 US gallons (Simon 1967:123).

Bottle Bases. Four bottle base types were recovered and have been classified according to their manufacturing attributes, form and color (Table 10).

Table 9 - Bottle rim types from the Fur Store area as defined by manufacturing attributes and form.

Attributes	Rim Type 2	3	6	9	11	12	14	15	23	24	25	26	27	28	29
Rim Manufacture															
Rim Shaped from Neck Glass															
Nonoverlapping	X	X	X										X		X
Overlapping Outside				X										X	
Overlapping Inside												X			
Rim Shaped from Additional Glass															
Outside Application					X	X	X	X			X				
Wrapped			X					X							X
Rim Molded									X	X					
Spout Formed at Mouth											X				
Mouth Ground															X
Neck Ring Present									X						
Rim Form															
Single Lipped															
Straight from Mouth					X										
Flared from Mouth						X							X		
Convex from Mouth	X			X								X			
Extended from Neck		X												X	
Straight Below Mouth			X							X					X
Double Lipped															
Flared							L	B	U		B				
Convex							U		L						

U = upper lip
L = lower lip
B = both lips

Fig. 14 - Glass bottle rims and glass button from the Fur Store area.

a-h - Bottle rims

a - Rim Type #9 (FOVA 16635)

b - Rim Type #11 (FOVA 16012)

c - Rim Type #23 (FOVA 17877)

d - Rim Type #24 (FOVA 16236)

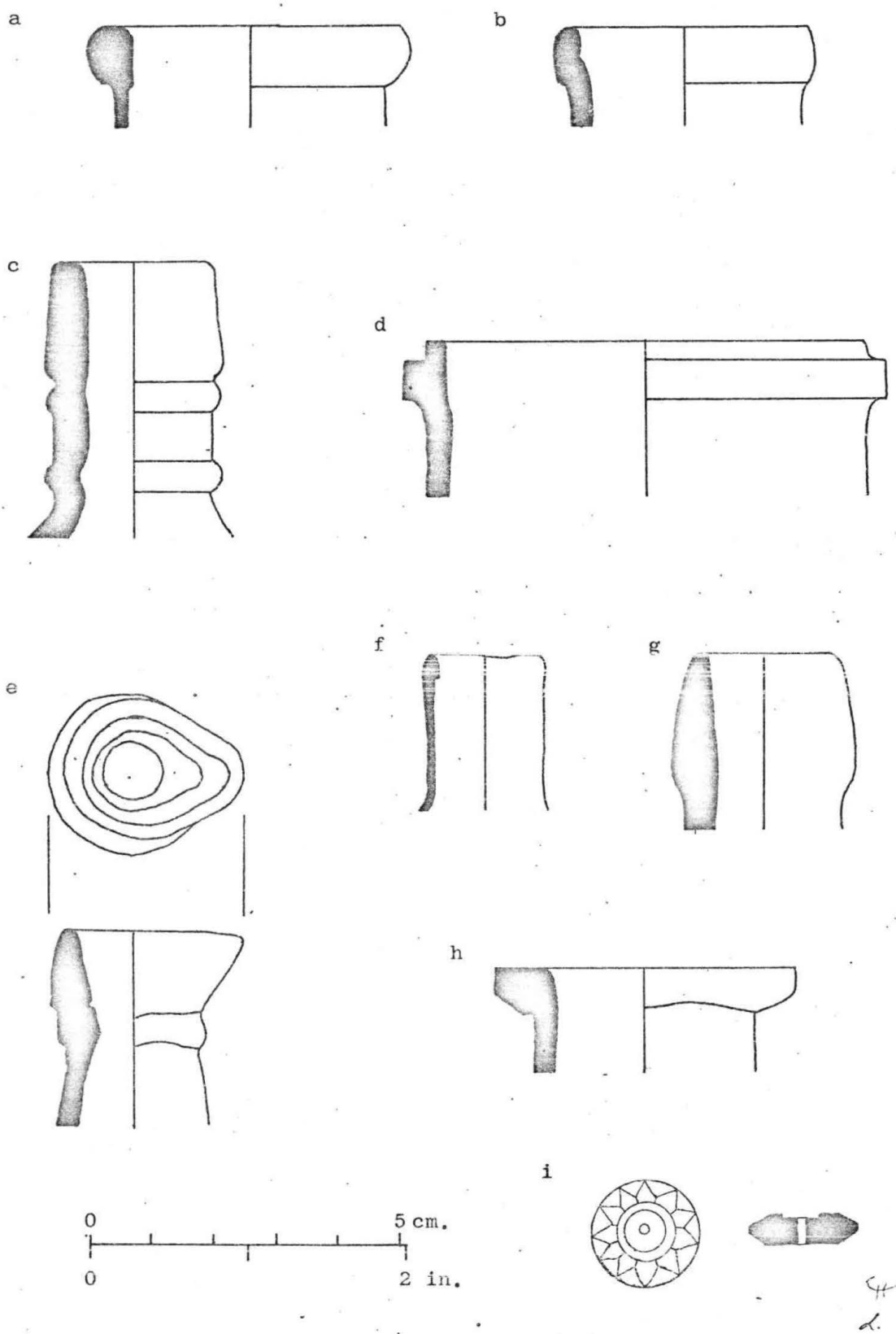
e - Rim Type #25 (FOVA 15312)

f - Rim Type #26 (FOVA 17861)

g - Rim Type #27 (FOVA 16236)

h - Rim Type #28 (FOVA 17195)

i - Glass button (FOVA 15867)


a
b
c
d
e
f
g
h
i
0
5 cm.
0
2 in.

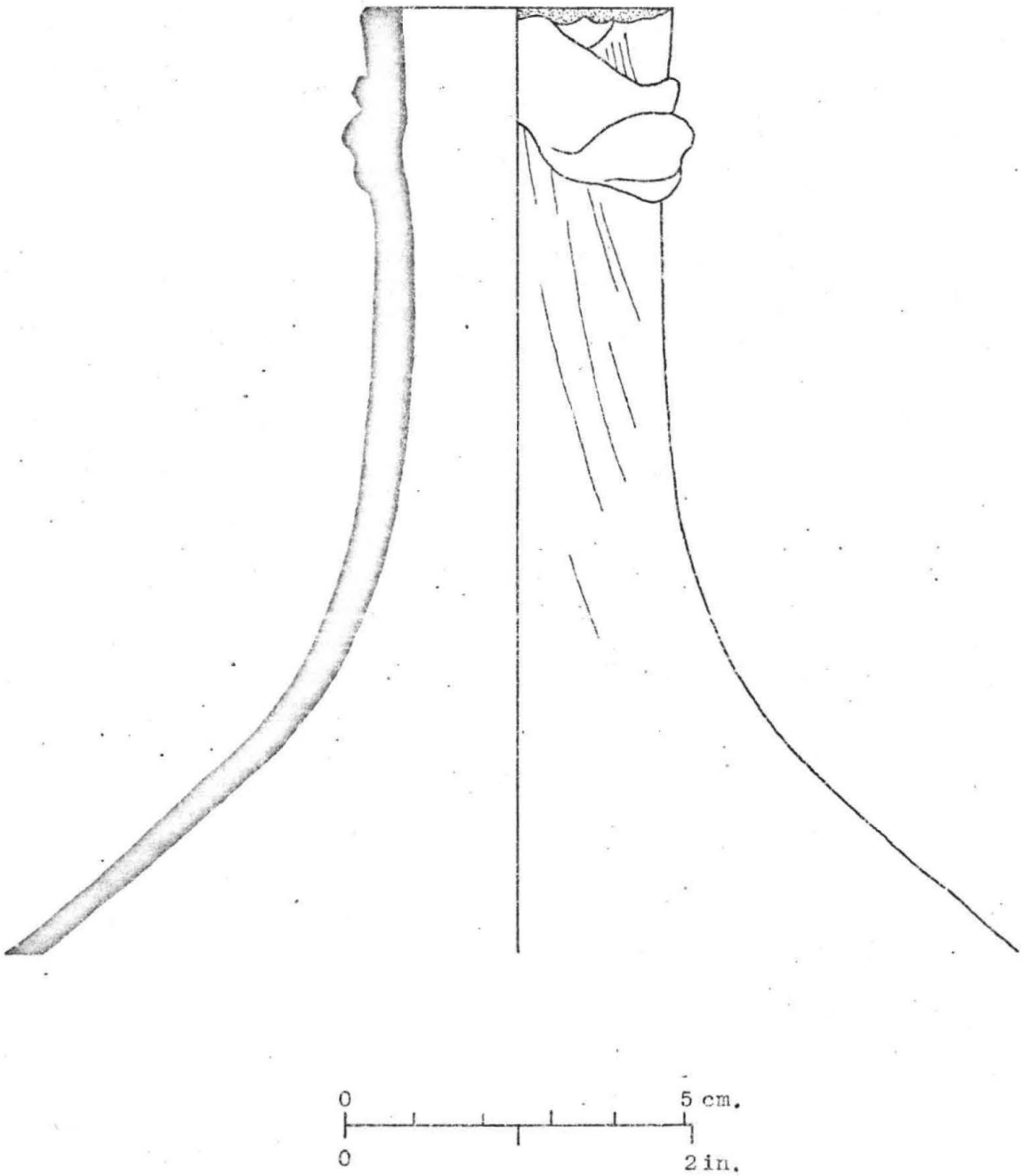


Fig. 15. Glass bottle rim type #29 from the Fur Store area.

Table 10 - Bottle base types from the Fur Store area as defined by manufacturing attributes, form and color.

Attributes	Base Type 1	4	14	30
Manufacturing Type				
Freeform	X	X		
1-piece Mold			X	X
Pontil Type				
Bare Iron	X			
Blowpipe		X		
Absent			X	X
Bottle Shape				
Round	X	X		X
Square			X	
Basal Crossection				
Conical ("Push up")	X			
Concave		X	X	X
Circular Indent			X	X
Central Nipple			X	X
Color				
Dark Olive	X			X
Olive Green		X	X	
Aqua		X		
Colorless		X		

Tumbler Fragments

Of the 3 tumbler fragments recovered, no complete or partially complete tumblers could be reconstructed and no manufacturing types could be identified.

Stemmed Glassware Fragments

Of the 8 stemmed glassware fragments recovered, no complete or partially complete glasses could be reconstructed and no manufacturing type could be identified.

Window Glass

There were 5780 fragments of window glass recovered. Glass thickness varied from 0.4-5.0 mm. with a mean of 1.56 mm. and a standard deviation of .30 mm. (Fig. 16).

Mirror Glass

Twenty-six fragments of mirror glass were recovered and they varied in thickness from 0.9-2.3 mm. (Fig. 17).

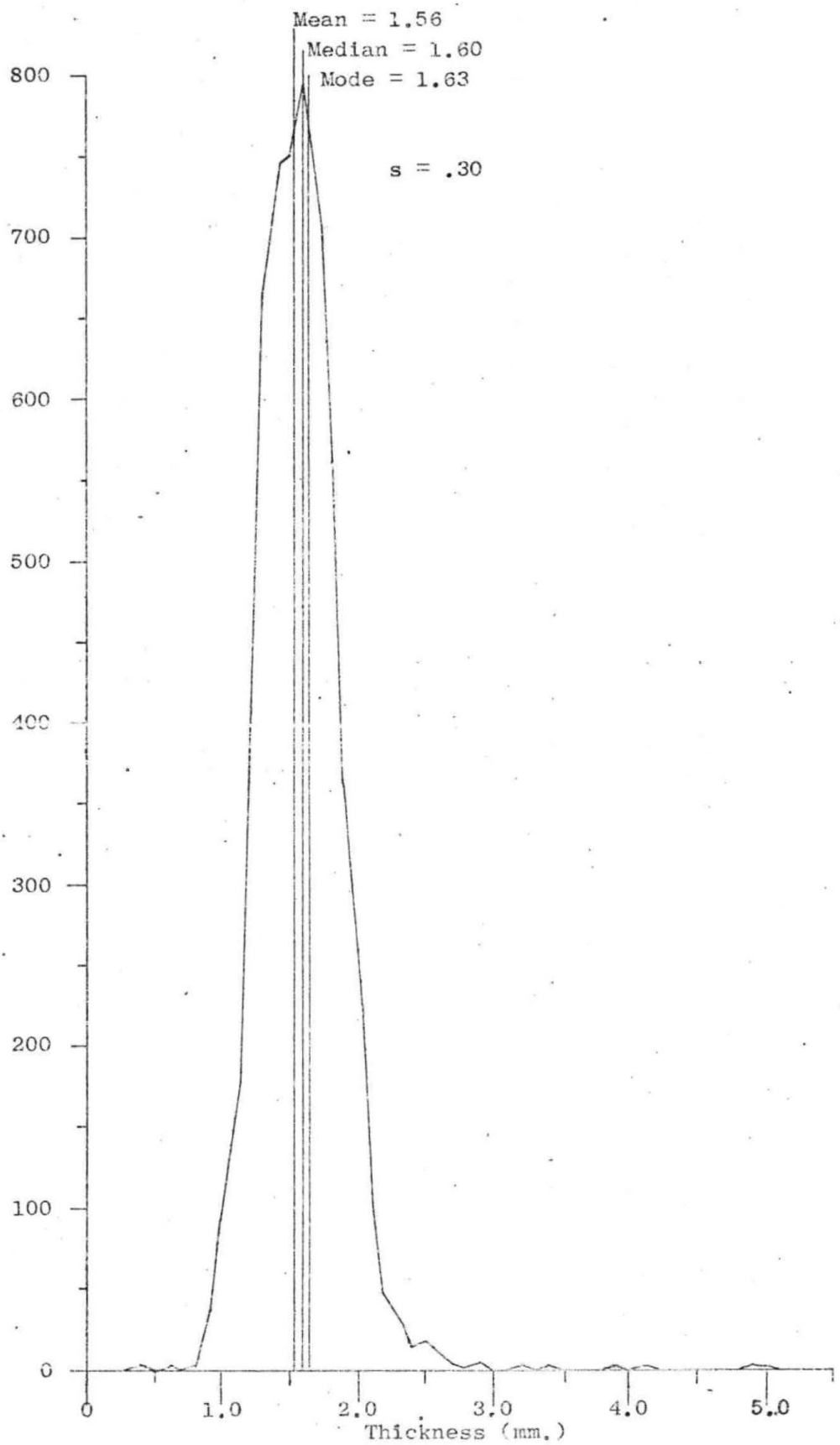


Fig.16 . Frequency of window glass thickness for the Fur Store area (N = 5780).

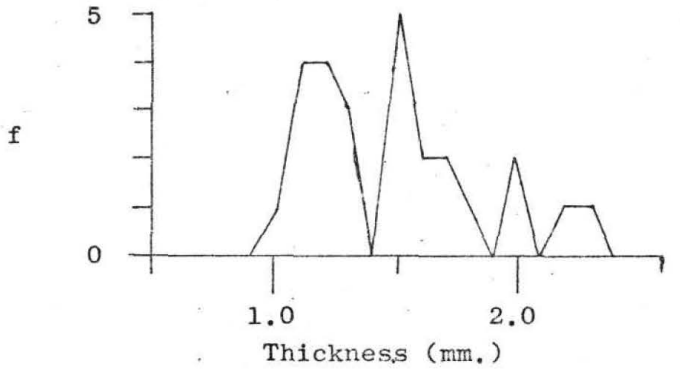


Fig.17 . Frequency of mirror glass ("Looking Glass") thickness for the Fur Store area (N = 26).

Glass Beads

The most common artifacts recovered at the Fur Store were glass beads -- a total of 54,330. This represents the total number of beads recovered and analyzed, but does not represent all beads collected from the Fur Store during excavation.

Due to the gravelly texture of the soil (see discussion of Lauren gravelly loam, McGee 1972:22-24), recovery of beads proved to be a time-consuming task. The most efficient technique employed was to water-screen the soil through 1/2 inch, 1/4 inch and 1/16 inch mesh screens. The large gravels were removed by the 1/2 and 1/4 inch screens, the silt washed through the 1/16 inch screen and the residue was then handsorted for beads. Actual mesh size of the 1/16 inch screen varied from 0.8-1.3 mm., and the smallest beads recovered (0.7 mm.) could not effectively pass through a wet screen due to increased surface tension. Water-screening represented only one of the 3 techniques utilized for recovering beads with the other 2 consisting of troweling and shoveling.

Whenever concentrations of beads were recognized in the Fur Store while troweling or shoveling, the crew would water-screen the soil either to recover "all" beads or to recover the "bead dirt" from the 1/16 inch screen. This bead dirt was not handsorted for beads, but rather was bagged according to provenience unit and retained for future sorting and analysis. Presently, 364 bags (approximately 1/6 bbl. in size) of bead dirt remain at FOVA. Five bags were sent to Dr. Roderick Sprague (University of Idaho) for his research into bead recovery technique.

During the excavation, sampling tests were performed on our artifact recovery techniques; and for beads, the following recovery percentages were obtained:

1. Water-screening -- 90-100% recovery
2. Troweling -- 30-40% recovery
3. Shoveling -- less than 10% recovery

No record was kept of the cubic footage of soil processed by each of the above techniques within the Fur Store.

In our previous reports we have classified glass beads on the basis of manufacturing type, color and reflection; and have compared our bead groupings with the Kidds' (1970) master bead identification charts. This approach proved useful when dealing with relatively few beads but as our total sample increased, we had to develop a more efficient procedure for classifying and identifying bead groups. This procedure, its description, its comparison with the Kidds' system and its applicability to the beads from the Fur Store are presented below.

FOVA Bead Classification System

A simplified hierarchical classification system for glass beads has been created to serve the descriptive and research needs of the present historical archeological project at Fort Vancouver (Fig. 18). The first determination made on glass beads was to identify the generalized method used to manufacture each bead. Five methods thus far have been defined for the beads from Fort Vancouver -- tube, wire wound, mandrel pressed, blown and "Prosser" molded -- and these are designated as manufacturing types.

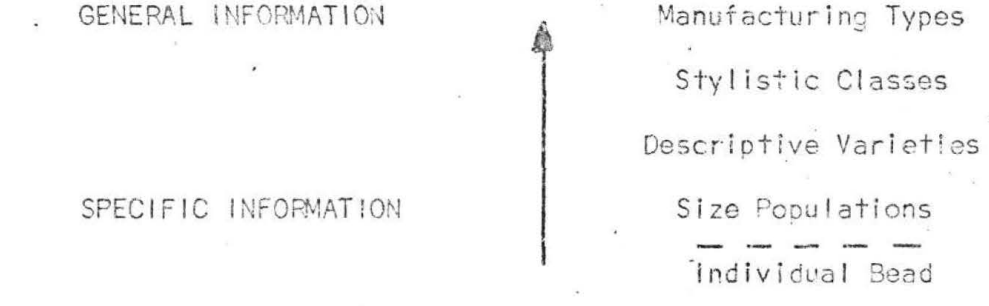


Fig. 18 - Classificatory system for glass beads from Fort Vancouver.

After determining the manufacturing type, beads were sorted into descriptive varieties representing polythetic sets (Sokal and Sneath 1963:13-15) of observed attributes such as number of distinguishable glass layers; shape of bead; color and reflection of each layer; presence or absence of rounded ends; frequency, color , reflection

and location of stripes; frequency, type and location of facets; color, reflection, configuration and location of spiral decorations; etc.

For each variety, size populations were hypothesized, defined and identified by the correlation of bead least diameter with length. Twenty-three size populations belonging to 6 varieties have been statistically identified on the basis of bead least diameter. The percentage of beads within 1, 2 and 3 standard deviations of each population mean has been computed (Table 11), and the average percentage for these populations is presented in Table 12. On the basis of these observations, glass bead sizes at Fort Vancouver can be regarded as relatively "normal" with a tendency toward peakedness -- a condition called leptokurtic. In other words, beads within a single population tend to cluster tightly about a centroid measurement.

Whereas our descriptive varieties were created to represent the polythetic sets of observable attributes, stylistic classes were created to emphasize monothetic sets of varietal attributes. Stylistic classes developed for this report place stress upon the attributes of number of layers, presence or absence of rounded ends (produced through hot tumbling), shape and decoration. Each class was either created to serve the purpose of comparing beads from Fort Vancouver with the bead classes defined by the Kidds or to demonstrate the presence of a new class which was not defined by the Kidds.

All available historical archeological comparative information for glass beads has been recorded for each variety and includes the location of relevant published descriptions and illustrations, applicable HBC historical referents, and known temporal and geographic distributions. This bead information has been recorded on individual variety sheets (Fig. 19) and placed in the "FOVA Comparative Bead Collection Catalog." Specimens from each bead variety have been stored in the "FOVA Comparative Bead Collection" and are available for future research at the site.

FOVA Bead Manufacturing Types

The five manufacturing types present at Fort Vancouver include: tube, wire wound, mandrel pressed, blown and "Prosser" molded. Within the FOVA Bead Classification System, each manufacturing type is designated by a type number -- 1000=tube, 2000=wire wound, 3000=mandrel pressed, 4000=blown and 5000="Prosser" molded; and within each type, individual varieties are designated by variety numbers (e.g. 1001, 1002, etc.).

Tube Beads. Traditionally, tube beads were manufactured in mass quantities by drawing glass bubbles into tubes then cutting these tubes into bead length sections (Kidd and Kidd 1970:48-49) (Fig. 20).

Table 11 - Percentage of beads measured which fall within 1, 2 and 3 standard deviations of each population mean.

FOVA Variety # (Population #)	Standard Deviation 1s	2s	3s	Population Frequency	Variety Frequency
1003					1780
(1)	88.4%	99.3%	99.8%	406	
(2)	83.4%	98.0%	100.0%	814	
(3)	70.6%	99.2%	100.0%	497	
(4)	90.5%	96.8%	100.0%	63	
1016	73.2%	97.2%	100.0%	2499	2499
1027	88.3%	97.7%	99.4%	342	342
1028	77.3%	95.5%	100.0%	66	55
1038	81.2%	95.9%	100.0%	510	510
1040					5887
(1)	67.5%	98.2%	99.2%	880	
(2)	76.9%	95.4%	99.3%	5007	
1051					370
(1)	92.1%	99.6%	100.0%	280	
(2)	85.6%	96.7%	100.0%	90	
1055	92.9%	99.4%	100.0%	155	155
1057	73.7%	98.0%	98.7%	148	148
1058	76.4%	99.1%	100.0%	106	106
1059	71.4%	97.4%	99.6%	234	234
1060	73.6%	97.2%	100.0%	72	72
1061	80.2%	97.0%	99.8%	1022	1022
1063					4748
(1)	73.7%	98.1%	99.9%	2135	
(2)	82.0%	97.0%	99.9%	2231	
(3)	79.6%	95.8%	99.5%	382	
2005	76.4%	96.6%	99.2%	471	471
2018	79.8%	96.2%	97.5%	79	79
TOTAL SAMPLE FREQUENCY					18489

Table 12 - Average percentage of glass beads from Fort Vancouver within 1, 2 and 3 standard deviations of each population mean as compared to the average percentages expected for a normal population (following Spiegel 1961:71-72).

Standard Deviation	Percentage Range for FOVA Glass Beads	Average Percentage ±s for FOVA Glass Beads	Percentage for Normal Distribution
1s	67.5-92.9%	79.3±7.0%	68.3%
2s	95.4-99.6%	97.4±1.3%	95.5%
3s	97.5-100.0%	99.6±0.6%	99.7%

Artifact Category: Beads

Manufactured Type:_____ FOVA Variety:_____

Description:

Composition:_____ Quantity:_____

Method of Manufacturing:_____

_____

_____

_____

Layering:_____ Shape:_____

Coloring (Reflection):

1._____

2._____

3._____

4._____

5._____

Treatment of Ends:_____

Stripes (Number, Color, & Description):_____

_____

_____

Facets (Number, Type, & Location):_____

_____

_____

Size Range (n=):

Diameter (D):_____

Length (L):_____

Hole Diameter (HD):_____

Hypothetical Populations:

A._____

B._____

C._____

D._____

E._____

F._____

G._____

H._____

I._____

J._____

Comparative Descriptions:_____

_____

_____

Comparative Illustrations:_____

_____

Hypothetical HBC Terminology:_____

_____

HBC Regional Distribution:_____

_____

_____

Known Temporal Distribution:_____

_____

Fig, 19 - Sample bead variety form used at FOVA.

Decoration of tube beads was either accomplished while the glass was molten (e.g. multiple layering), plastic (e.g. marvering) or solidified (e.g. ground faceting). The decorative attributes observed for tube beads from Fort Vancouver consisted of the following:

1. Number, color and reflection of bead layers
2. Shape of finished bead
3. Type of surface decoration
   a. Striping
   b. Faceting
      1) Ground
      2) "Formed"
4. Presence or absence of rounded ends produced by hot tumbling

Examples of the stylistic classes of tube beads at Fort Vancouver are shown in Fig. 21. Rather than attempting to key stylistic classes by number and letter (e.g. IIc1a), all references to a given stylistic class have been by descriptive terms (e.g. double layered, hot tumbled, six-striped tube bead). This may be cumbersome for the reader, but it should avoid any confusion with the Kidds' bead notation system.

At the glass factory, when a number of tube beads of the same variety were completed, they were passed through a set of sieves in order to separate out populations of beads sharing a common dimension (Kidd and Kidd 1970:49). At Fort Vancouver, a few of these sieve sizes have been hypothesized and their respective bead populations defined and identified (Figs. 27-57). Hopefully, through HBC archival research it will become possible to correlate these archeological populations with HBC historic referents and subsequently with country of manufacture.

Wire Wound Beads. Wire wound beads were manufactured individually by wrapping molten glass around a rotating wire (Kidd and Kidd 1970:49) (Fig. 22). By this process, the beadmaker determined the size and shape of each bead with variability due to human skill rather than physical limitations as with tube bead shaping. At Fort Vancouver, wire wound beads of the same variety exhibit wide ranges of variability in shape and size when compared with tube beads (except for those wire wound varieties subsequently shaped in a mold). While variability in shape was expected, variability in size should have been comparable to tube bead size variability if all beads were sieved as assumed. This apparently was not the case, as all wire wound beads within a single variety occurred only in a single size (e.g. Figs. 58-61). From this observation, it is hypothesized that wire wound beads were not sieved; but rather, the beadmaker had a mental template of the size and shape for each bead variety being produced, and the resultant population was considered to be pre-sorted. This hypothesis could be negated (or at least temporarily restricted) if sieve-sized populations occur elsewhere.

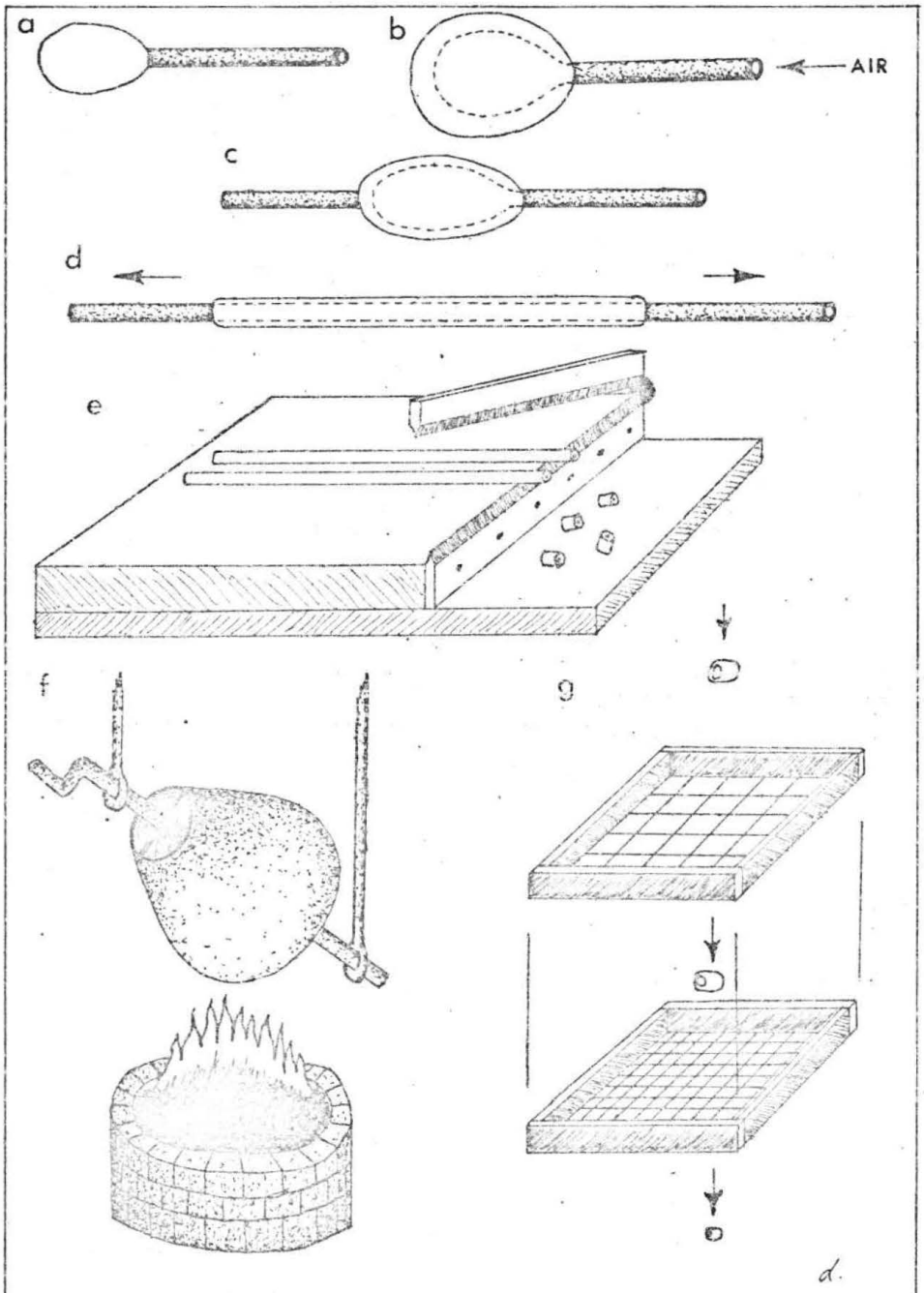
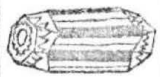


Fig. 20 - Manufacturing sequence for tube beads: a. Glass on blowpipe, b. Bubble formation, c. Attachment of rod, d. Tube formation, e. Cutting, f. Hot tumbling, g. Sieving.

Fig. 21 -Stylistic classes of glass tube beads from Fort Vancouver.

Surface Decoration		Single Layered		Double Layered		Multiple Layered	
		Hot Tumbling		Hot Tumbling		Hot Tumbling	
		Absent	Present	Absent	Present	Absent	Present
Undecorated	Short Tubular						
	Long Tubular						
Striped Short Tubular							
Faceted Short Tubular	Ground						
	"Formed" and Ground						
Striped with Ground Faceting Long Tubular							

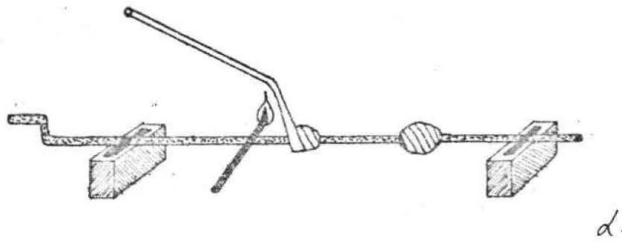


Fig.22- Wire wound bead manufacture.

Decoration of wire wound beads found at Fort Vancouver was generally accomplished while the beads were on the rotating wire, but some decoration did occur after solidification (e.g. faceting). The decorative attributes observed for wire wound beads from Fort Vancouver consisted of the following:

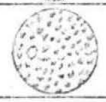
1. Number, color and reflection of bead layers
2. Shape of finished bead
3. Type of surface decoration
   a. Combed, banded loups
   b. Spirals
      1) Twisted cording
      2) Polychrome canes and combed loups
   c. Faceting
   d. Polychrome fritting
   e. Molded banding

Examples of the stylistic classes of wire wound beads at Fort Vancouver are shown in Fig. 23.

Mandrel Pressed Beads. As far as can be determined from available archeological manuscripts, mandrel pressed beads have never been described. A survey of the major published references on beads (Beck 1973; Kidd and Kidd 1970; van der Sleen 1973) also turned up no information regarding this bead type. From the 84 specimens presently at Fort Vancouver, a complete manufacturing sequence for mandrel pressed beads has been hypothesized (Fig. 24). This hypothetical sequence purports to accurately portray each step within the manufacturing process but not the exact procedure nor the exact equipment utilized.

Mandrel pressed beads at Fort Vancouver were made by pressing 2 pieces of molten (or plastic) glass in a mold (Fig. 24a). The resultant bead blank had a conical hole which did not pass through the entire bead. This bead blank was placed upon a mandrel and random facets were ground over the entire surface (Fig. 24b). After faceting, the remaining portion of the hole was punched through the bead (Fig. 24c).

Fig.23.- Stylistic classes of glass wire wound beads from Fort Vancouver.

Surface Decoration		Single Layered								Double Layered
		Oblate	Spherical	Bi-spherical	Barrel	Ellipsoidal	Cylindrical	Conical	Asymmetrical Truncated Bi-conical	Barrel
Undecorated										
Combed, Banded Loups										
Spiral	Twisted Cording									
	Polychrome Cane & Combed Loups									
Faceting										
Polychrome Fritting										
Molded Banding										

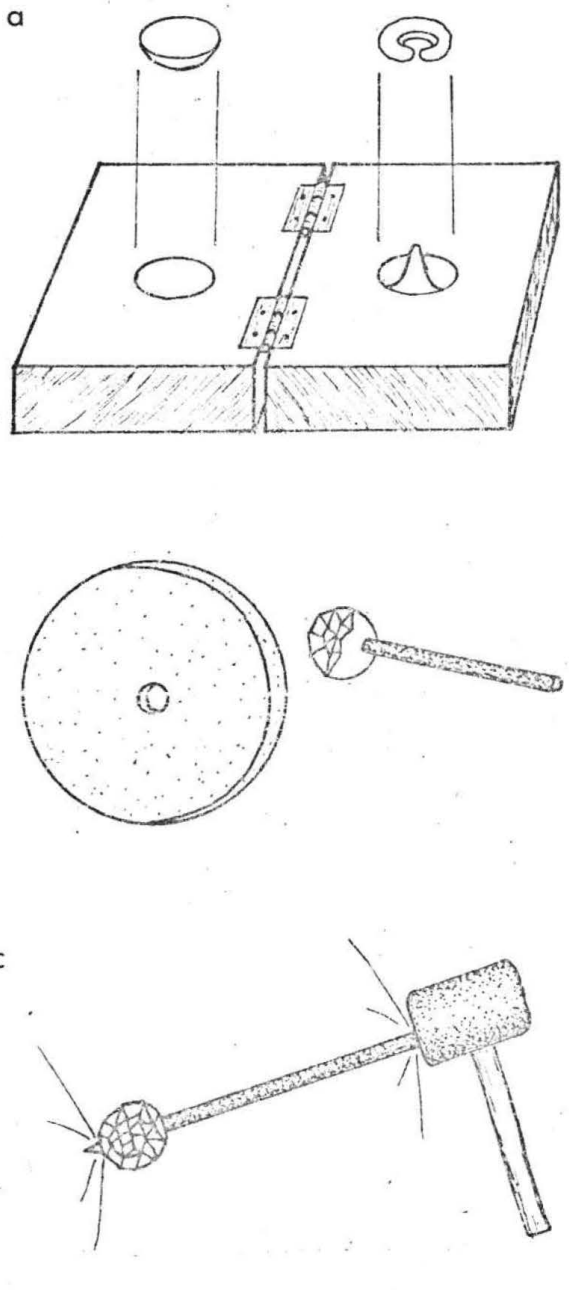


Fig.24 - Manufacturing sequence for mandrel pressed beads: a. Formation of bead "blank", b. Grinding of facets, c. Final hole punching.

For each step of the process, one or more beads at Fort Vancouver can be found which definitely documents the activities depicted. Some beads have an unfused seam in the lower hemisphere -- demonstrating the beginning and end of the glass wrapped around the mandrel -- while the upper hemisphere shows no seam. All beads have a midline seam which marks the fused upper and lower hemispheres. This midline circumscribes each bead, and on opaque colored beads it appears as a dark line. A few beads retained remnants of their original molded surface (i.e. the surface which was removed during faceting). All beads have ground facets (24-53) arranged randomly over the surface of the bead except for the top and bottom. Most beads did not have facets at the margins of the wide portion of the conical hole (i.e. bottom), thus suggesting that the beads were held in a similar fashion while the facets were being ground. All beads had a facet ground on the top of the bead at a right angle to the length. This top facet was ground before the final hole was produced and it may have facilitated the hole punching process. Production of the top hole by percussion could have shattered the top of the bead, but with a single facet on the top, radiating lines of percussion force would terminate at the facet edges, thus producing a uniform conical hole..

The decorative attributes of this bead type at Fort Vancouver consisted of:

1. Color and reflection of bead
2. Shape of bead (spheroidal only)
3. Surface decoration (ground faceting only)

Blown Beads. As with wire wound beads, blown beads were individually produced; but unlike wire wound beads, they had to be blown either freeform or in a mold (Fig. 25). Depending upon the method utilized, blown beads of a single variety may or may not show wide ranges of variability in shape and size. Decorative attributes observed at Fort Vancouver consisted of:

1. Color and reflection of bead
2. Shape of bead
3. Surface decoration (ridging only)

"Prosser" Molded Beads. In 1973, Dr. Roderick Sprague described the Prosser process for dry molding ceramic buttons and hypothesized that a similar (if not identical) process was used to produce a variety of ceramic beads found at the Palouse Burial Site in southeastern Washington (Sprague 1973). Subsequently, through discussions between Dr. Sprague and the junior author of this report, it became apparent a manufacturing technique similar to Richard Prosser's 1841 dry molding technique had been applied to the manufacture of glass beads. Beads produced by this technique are herein classified as "Prosser" Molded Beads, and the manufacturing sequence has been hypothesized in Fig. 26.

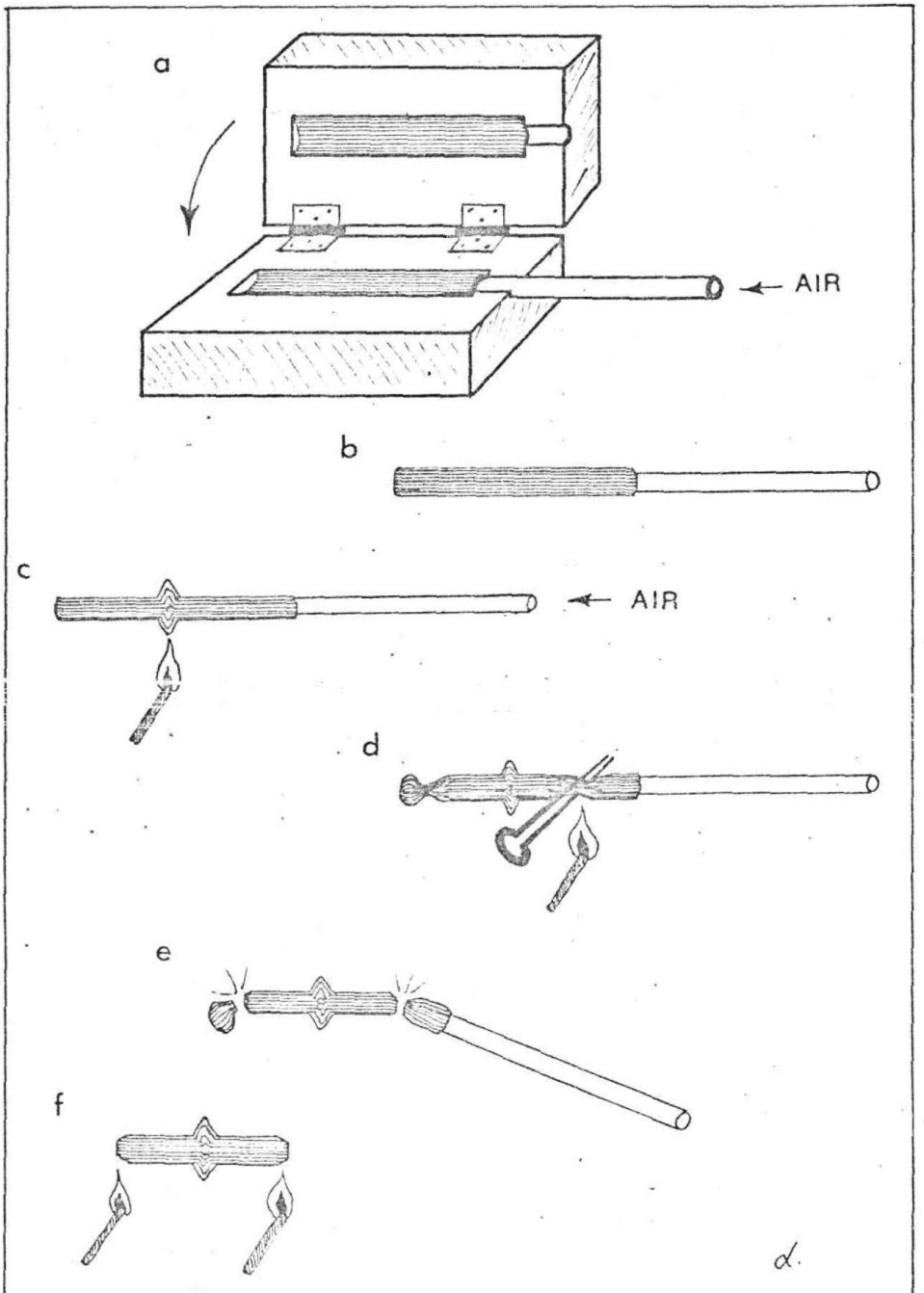
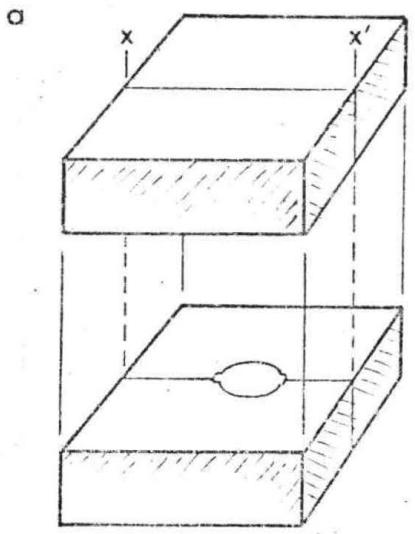
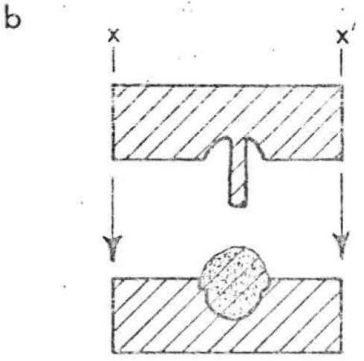


Fig. 25 - Manufacturing sequence for blown beads: a. Glass tube blown in mold, b. Grooved tube removed and cooled, c. Upset decoration formed, d. Tube crimped, e. Ends snapped, f. Ends fire polished.





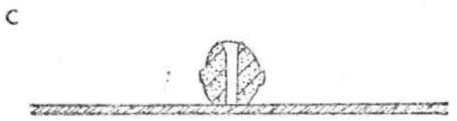




Fig. 26 - Manufacturing sequence for "Prosser" molded beads: a. Two-piece mold, b. Cross-sectional view of molding process, c. Molded bead removed from mold and placed on flat surface, d. Finished bead.

At Fort Vancouver, only one "Prosser" molded bead has presently been recovered, and its shape is depicted in Fig. 26d. This bead has been identified as glass on the basis of numerous small air bubbles within the bead. It was molded from one piece of glass within a two-piece mold (Fig. 26a-b), and does not appear to have a surface glaze. After removal from the mold, the bead while still plastic was placed on a flat surface (Fig. 26c), thus flattening one end as well as creating small pits on the flattened surface (an "orange peel" surface identical to that produced on Prosser dry molded ceramic buttons). The decorative attributes observed for the bead from Fort Vancouver consisted of:

1. Color and reflection of bead
2. Shape of bead
3. Surface decoration (banding only).

Comparison of the FOVA Bead Variety and the Kidds' (1970) Bead Identification Systems

To quote Dr. Roderick Sprague's observation of the Kidds' bead identification system: "...I fear that acceptance will be less than enthusiastic" (1971:129). As a practical manual for field archeologists, the Kidds' system was found to have more disadvantages than advantages for research at Fort Vancouver. Because of its current popularity, wide scope of investigation, and since many researchers will utilize the Kidds' system, it is only proper that attention be given to the specific difficulties encountered with its applicability to Fort Vancouver.

Of the 150 bead varieties presently defined at Fort Vancouver, over 80% (representing 55% of all beads presently recovered) could not be found within the Kidds' system. As the Kidds stated in their opening remarks, their research was confined to beads from northeastern North America and their specific knowledge of beads from other areas was limited (1970:47). At Fort Vancouver, of the 65,000 beads presently analyzed, 35,000 were not identifiable within the Kidds' system, but the problems of identification were not confined strictly to those attributable to a lack of knowledge of non-northeastern beads. One of the biggest problems was color identification and comparability.

The Kidds utilized the Descriptive Color Name Dictionary (Taylor, Knoche and Granville n.d.) -- also referred to as the Color Harmony Manual (Karklins 1971:7) -- whereas at FOVA the Munsell Book of Color (Munsell Color Company, Inc. 1966) was utilized. Karlis Karklins has prepared a table of relevant equivalent notations (Karklins 1971:7) but even with this list, comparisons were difficult. Two reasons for the difficulty included:

1. How was the color "read"?
2. What was the range of color variation for the entire bead variety?

At FOVA, a standard procedure for describing color has been employed since the beginning of the project, but not all problems associated with color descriptions could be eliminated:

> All color descriptions from this lab using the Munsell Color System are determined while viewing objects and color standards under a 120 volt, 60 watt incandescent light source located approximately one foot from the object. All other light sources (i.e. sunlight, overhead lights, etc.) are either blocked out or turned off. With the color notation system and light sources kept constant, our only variables for color descriptions are variations of individual color vision and variations of material reflection.
>
> Variations in the individual color vision of our staff are unavoidable, but the effects of such variation within the lab are kept to a minimum by crosschecking descriptions. However, crosschecking is useful only on opaque colors since translucent objects transmit light waves, and descriptions of their "true" colors are impossible with the Munsell system. Variables such as thickness, color density, background color, quantity of ambient light, etc., affect the color of translucent objects; any attempt to describe color is only an approximation based upon the researcher's judgment relative to any of the above variables. Therefore, translucent color descriptions must be viewed as relatively more subjective than opaque color descriptions (Hoffman and Ross 1972: 93-94).

Range of color variability is an important varietal determinant and in many cases one bead variety will include beads of more than one color. The Kidds discussed some of the reasons for color variation (1970:50), but their system neglected to identify this color variation. Creation of "arbitrary" color populations on the basis of a single color chip from a color manual distorts the "natural" grouping present within archeological sites. At Fort Vancouver, there is an archeological bead variety (FOVA Variety #1063) with an extremely wide color range (blue -- 7.5-10 BG to 2.5-10 B 3-6/2-10). Originally there may have been as many as a dozen distinct translucent blue tube bead varieties imported to the Fort, but once mixed within the site they could not be resorted into their original groupings. The problem presented is -- How shall the beads be further sorted and classified? Following the Kidds' system, beads from this variety could be placed into any one of 5 existing types (IIa31, IIa43, IIa44, IIa50 or IIa51) or into an undetermined number of nonexisting, presently unrecognized types. Rather than subdividing the variety into "arbitrary" types, it might be better to tabulate the frequency of beads for each color chip

included within the varietal color range. Thus, like determining size population, it would be possible to determine color populations. Unfortunately, with translucent beads this separation is extremely difficult to accomplish, and we have had no significant success in repeated attempts to sort our varieties in this manner.

Second to the color problem was the problem of determining shape. Using the nomenclature within the Kidds' system, it was very difficult to determine what is "round", "circular", "oval" or "tube". A spherical bead when drawn two-dimensionally is round, but "round" in the Kidds' system appears to range from cylindrical to barrel-shaped to spherical to oblate (following terminology from Beck 1973). "Circular" is apparently oblate, "oval" is ellipsoidal and "tube" is cylindrical. At FOVA, no claim for determining absolute shape is made, but an attempt has been made to define the methods utilized for determining shape (Tables 13-14). Also, for each bead variety, shape is regarded as a discrete attribute with an explicit range of variability.

A third difficulty with the Kidds' system was with its approach to bead sizing. The size categories "Very Small" (less than 2mm.), "Small" (2-4 mm.), "Medium" (4-6 mm.), "Large" (6-10 mm.) and "Very Large" (greater than 10 mm.) are much too arbitrary to be of significant practical use. At Fort Vancouver, it can be demonstrated that beads occur in "natural" size populations (as defined by correlating bead length with bead least diameter); and further, that for some varieties, regular metric intervals can be distinguished between multiple size populations (e.g. Figs. 27-29). The Kidds acknowledged that beads were originally sieved and sorted into distinct sizes by the manufacturer (1970:49), but their recommended method for reporting bead sizes obscurred the determination of these original sizes. At Fort Vancouver, "natural" size populations are considered to be culturally significant, and their comparisons with populations from other sites may provide knowledge of past bead measuring systems and how such systems were used by other cultures.

A fourth difficulty which warrants statement is that "tube" and "wire wound" beads represent only two of the many manufacturing methods utilized for making glass beads. Other methods would include such processes mentioned earlier -- "mandrel pressed," "blown" and "Prosser molded." Also, variations of tube and wire wound methods exist, but have yet to be adequately described. For example, a Portland, Oregon bead dealer (Ken Dithman) recently visited Murano, Italy, and described to us the present-day method for manufacturing tube beads. Tube beads are produced by winding a stream of molten glass onto a turning, sloping, conical mandrel. As the molten glass slid down and wrapped itself around the mandrel, it formed a sleeve of glass which gradually became smaller in diameter until it slipped off the mandrel onto a conveyer belt. Thus, a continuous tube was formed,

Table 13 - Wire wound and mandrel pressed bead shapes.

Term	Illustration	Definition
Oblate		Diameter always greater than length.
Spherical		Diameter equal to length with radii tending to be equal in all dimensions.
Bi-spherical		Central diameter less than two greatest diameters with length greater than any diameter.
Barrel		Central diameter generally equal to length with both ends smaller in diameter than the central diameter.
Ellipsoidal		Central diameter always less than length . with both ends smaller in diameter than the central diameter.
Cylindrical		Diameter always less than length with end diameters generally equal to central diameter.
Conical		Diameter at one end smaller than diameter at opposite end with a continuous straight side inbetween.
Asymmetrical Truncated Bi-conical		Central diameter less than length and greater than diameter of ends with one end larger in diameter than opposite end.

Table 14 - Tube bead shapes.

Term	Illustration	Definition
Short Tubular		Diameter generally greater than length.
Long Tubular		Diameter generally less than length.

not by stretching a bubble but by winding a stream. From an archeological site in The Dalles, Oregon (ca. 1888-1921), a sample of "seed" beads with square and hexagonal holes were collected by members of the Oregon Archaeological Society. These beads (at least the square-holed variety) are still being made today and are available from the Hiroshima Co. of Japan. How these beads were manufactured remains to be investigated, but they surely cannot be classified as tube or wire wound beads. The use of the terms "tube" and "wire wound" as literally defined by the Kidds may have a restricted temporal dimension. However, if the terms are used as indicators of a generalized phenomena, then their use may have less restrictive temporal boundaries.

A fifth difficulty was that if archeologists are to utilize a single "Classification System for Glass Beads" then such a system must be an "open ended" system designed to be expanded by those using the system. Bead type designations such as those proposed by the Kidds "close" the system and make it exceedingly difficult to add new types. For example, bead Types IIa1, IIa2 and IIa3 represent round, circular and oval opaque redwood bead types. Type IIa4 is a round, clear redwood bead and logically one may expect Type IIa5 to be a circular, clear redwood bead. However, Type IIa5 is a round, clear ruby bead. If a circular, clear redwood bead was discovered, it could not be added into the system; but rather, it must be assigned a new arbitrary number. This in itself is not a major problem if everyone using this system was appraised of the new type and its number. The present system will not serve the stated purpose of being used by "field archeologists" if over half the beads found cannot be classified.

The bead variety system used at FOVA is not intended to serve as a universal classificatory scheme for glass beads. Rather, it is a procedure "thrown' together to handle the needs of the current research project. The difficulties noted the Kidds' system were derived from the problems faced in classifying the beads from Fort Vancouver and are only relevant to the Kidds' system as compared to the FOVA Variety System. One to one correlations between the FOVA and Kidds' bead groupings could rarely be obtained with any high degree of significance and any final correlations must await future comparisons. The work undertaken by the Kidds is encouraged, and our data will be sent to them with the hope that a "better" system can be developed. It would have been much to our advantage to have had access to a universal bead classification system, but as we now know, the Kidds' system fell somewhat short of that goal.

Beads from the Fur Store

Of the 54,330 beads recovered and analyzed from the Fur Store, there were 3 manufacturing types -- tube, wire wound and mandrel pressed (Table 7).

Tube Beads. The 53,741 tube beads recovered represented 98.916% of the total number of beads recovered from the Fur Store. Nine stylistic classes were identified representing 40 descriptive varieties and 51 size populations (Tables 15-16).



Undecorated, Single Layered, Short Tubular Beads -- This stylistic class was not represented in the Kidds' system.

Opaque Yellow Bead (FOVA Variety #1085) -- This bead was in a very deteriorated condition when found and had extremely thin walls (ca. 0.3 mm.). This descriptive variety undoubtedly does not accurately reflect the appearance of the original bead.



Undecorated, Single Layered, Long Tubular Beads -- This stylistic class is equivalent to the Kidds' Class Ia but no equivalent type could be found.

Translucent Green Bead (FOVA Variety #1066) -- This bead probably represents an untumbled specimen of FOVA Variety #1016.



Undecorated, Single Layered, Hot Tumbled, Short Tubular Beads -- This stylistic class is equivalent to the Kidds' Class IIa, and of the 22 varieties defined (Tables 15-16), only 6 equivalent types could be found in the Kidds' system (IIa2, IIa7, IIa12, IIa14, IIa27 and IIa47). Of all the tube beads recovered from the Fur Store, 57% belong to this class with the most common colors being blue, green and white. Shape is almost always short tubular, but long tubular specimens do occur.

Opaque White Beads (FOVA Variety #1003) -- Equivalent to the Kidds' Type IIa14, this bead variety was one of the most popular within the Fur Store and comprised 6.6% of all tube beads recovered. Four size populations were defined from the measurements obtained upon a 50% sample (Figs. 27-29), and 4 sieve sizes were hypothesized -- 1.4 mm., 1.9 mm., 2.4 mm., and 2.9 mm. The original color range of this variety appears to have been white (9.5/) to off-white (N 8/), but due to soil staining many specimens have become a light yellowish brown (2.5 Y 8-9/2-4). Some specimens appear to have 2 colors suggesting either double layering or differential deterioration of the glass. In the manufacturing process, as the glass tubes cooled, differential concentrations of ingredients may have occurred and subsequent environmental actiona may have altered the appearance of the bead.

Opaque Brownish Red Beads (FOVA Variety #1051) -- Equivalent to the Kidds' Type IIa2, this bead variety is identical in outer appearance to the opaque brownish red on transparent light green beads (FOVA Variety #1038; Kidds' Type IVa6). From measurements obtained upon

Table 15 - Stylistic classes and descriptive varieties of tube beads from the Fur Store.

Stylistic Class and Variety Description	FOVA Variety	Variety Frequency	Class Frequency	Class %
UNDECORATED SINGLE LAYERED, SHORT TUBULAR BEADS			1	.002
Opaque				
Yellow (2.5 Y 8/12)	1085	1		
UNDECORATED SINGLE LAYERED, LONG TUBULAR BEADS			1	.002
Translucent				
Green (5 G 4/8)	1066	1		
UNDECORATED SINGLE LAYERED, HOT TUMBLED, SHORT TUBULAR BEADS			30816	57.341
Opaque				
White (N 8-9.5/)	1003	3557		
Brownish Red (7.5 R 3/6	1051	373		
Orange (5 YR 6/10)	1052	5		
Lt. Brownish Yellow (10 YR 6/10)	1084	1		
Yellow (7.5 Y 8.5/10)	1004	5		
Green (2.5 G 3-4/6-8)	1053	47		
Lt. Purplish Blue (2.5 PB 7/2)	1054	24		
Purplish Blue (2.5 PB 4/4)	1081	1		
Lt. Bluish Purple (5 PB 8/4)	1068	1		
Bluish Purple (5 PB 5/8)	1055	155		
Dk. Bluish Purple (5 PB 3/6)	1012	18		
Purple (7.5 PB 4/10)	1056	5		
Dk. Purple (7.5 PB 2/6)	1083	4		
Lt. Pink (7.5 RP 5-6/8-10)	1015	2		
Opaque to Translucent				
Black (N 0.5/) to Dk. Reddish Purple (10 RP 2/1)	1050	229		
Translucent				
White (N8.5/)	1009	2		
Yellowish Green (2.5 G 3-4/6-8)	1061	3659		
Green (5-10 G 3-4/6-8)	1016	6742		
Grayish Blue (7.5-10 BG to 2.5-10 B 3-6/2-10)	1063	15210		
Transparent				
Colorless	1060	72		
Red (7.5 R 3/12)	1027	701		
Dr. Bluish Purple (5 PB 2/6)	1047	3		

Table 15 (cont'd.)

Stylistic Class and Variety Description	FOVA Variety	Variety Frequency	Class Frequency	Class %
UNDECORATED DOUBLE LAYERED, HOT TUMBLED, SHORT TUBULAR BEADS			22219	41.344
Opaque on Opaque				
Cream (10 Y 9/1) on Cream (10 Y 8.5/1)	1040	21698		
Cream (10 Y 8.5/1) on Gray (N 5.5/)	1089	1		
Opaque on Translucent				
Lt. Blue (7.5 B 7/4) on Blue (7.5 B 5/6)	1082	2		
Opaque on Transparent				
Brownish Red (7.5 R 3/6) on Lt. Green (10 GY 6/6)	1038	518		
STRIPED SINGLE LAYERED, HOT TUMBLED, SHORT TUBULAR BEADS			66	0.123
Opaque				
White (N 8-9/) with 4 Gray (N 3/) to Dk. Purple (7.5 PB 4/6) Stripes	1028	66		
STRIPED DOUBLE LAYERED, HOT TUMBLED, SHORT TUBULAR BEADS			3	0.006
Opaque on Opaque				
White (N 9/) on Purplish Blue (5 PB 6/6) with 4 Dk. Purple (5 PB 2/8) Stripes	1070	1		
Lt. Purplish White (5 PB 8/1) on Purplish Gray (5 PB 7/2) with 4 Purple (5 PB 3/4) Stripes	1087	1		
Lt. Purplish White (5 PB 8/1) on Purplish Gray (5 PB 7/2) with 6 Purple (5 PB 4/4) Stripes	1086	1		
FACETED SINGLE LAYERED, SHORT TUBULAR BEADS			173	0.322
Opaque to Translucent				
Black (N 0.5/) to Dk. Reddish Purple (10 RP 2/1)	1057	150		
Transparent				
Colorless	1067	2		
Amber (10 YR 5/10)	1043	1		
Purple (7.5 PB 2/10-Max)	1002	20		

Table 15 (cont'd.)

Stylistic Class and Variety Description	FOVA Variety	Variety Frequency	Class Frequency	Class %
FACETED SINGLE LAYERED, HOT TUMBLED, SHORT TUBULAR BEADS			459	.854
Transparent				
Red (7.5 R 3/12)	1058	106		
Dk. Reddish Purple (7.5 RP 2/8)	1059	353		
FACETED DOUBLE LAYERED, SHORT-LONG TUBULAR BEADS			3	.006
Opaque on Opaque				
Purple (5 PB 4/8) on Lt. Purple (5 PB 6/8)	1032	2		
Transparent on Translucent				
Purple (7.5 PB 3/8) on Lt. Purple (7.5 PB 7/6)	1077	1		
TOTAL FREQUENCY			53741	100.000

Table 16 - Hypothetical tube bead size populations from the Fur Store.

FOVA Variety # (Population #)	Hypothetical Size Population		Variety Frequency	Variety %
	Least Diameter (mm.)	Length (mm.)		
1002 (1)	4.8-6.6	3.5-6.2	20	0.037
(2)	8.5-9.2	6.4-7.8		
1003 (1)	1.1-1.8	0.7-1.4	3557	6.619
(2)	1.5-2.4	1.0-2.0		
(3)	1.9-3.0	1.4-2.6		
(4)	2.6-3.3	1.7-2.6		
1004	2.6-3.5	2.3-2.7	5	0.009
1009	1.5-1.6	1.1-1.2	2	0.004
1012	2.0-4.5	1.7-3.2	18	0.033
1015	1.2-1.3	0.9-1.0	2	0.004
1016	2.0-4.3	1.0-3.9	6742	12.545
1027	1.5-2.6	0.9-1.9	701	1.304
1028	2.4-3.0	1.7-2.6	66	0.123
1032	-	-	2	0.004
1038 (1)	1.9-2.8	1.1-2.2	518	0.964
(2)	2.6-3.7	2.2-2.9		
1040 (1)	1.2-2.2	0.7-2.1	21698	40.375
(2)	1.6-5.5	1.3-5.0		
1043	8.3	8.8	1	0.002
1047	1.9-2.5	1.3-1.8	3	0.006
1050	1.8-5.3	1.0-4.1	229	0.426
1051 (1)	1.5-2.0	1.1-1.7	373	0.694
(2)	1.9-2.8	1.3-2.2		
1052	2.6-3.2	1.7-2.1	5	0.009
1053 (1)	2.7-3.4	2.2-2.4	47	0.087
(2)	4.1-5.4	2.8-4.7		
1054	2.1-2.7	1.4-2.1	24	0.045
1055	1.5-2.0	0.8-1.3	155	0.288
1056	1.4-1.6	1.0-1.3	5	0.009
1057	4.6-6.5	3.6-6.3	150	0.279
1058	1.9-2.9	1.3-2.1	106	0.197
1059	2.2-4.2	1.6-3.7	353	0.657
1060	2.0-4.3	2.0-4.5	72	0.134
1061	2.1-3.9	1.1-2.8	3659	6.809
1063 (1)	1.2-3.0	1.2-2.5	15210	28.302
(2)	2.4-4.1	1.7-3.7		
(3)	3.2-5.3	2.5-5.9		
1066	1.7	2.0	1	0.002
1067	4.9-5.2	4.3-5.2	2	0.004
1068	1.7	1.1	1	0.002
1070	2.9	2.5	1	0.002
1077	5.5	6.0	1	0.002

Table 16 (cont'd.)

FOVA Variety # (Population #)	Hypothetical Size Population		Variety Frequency	Variety %
	Least Diameter (mm.)	Length (mm.)		
1081	3.3	2.2	1	0.002
1082	1.9-2.1	1.0-1.8	2	0.004
1083	2.5-2.8	1.9-2.5	4	0.007
1084	2.2	1.3	1	0.002
1085	2.6	1.8	1	0.002
1086	4.6	3.6	1	0.002
1087	2.9	1.7	1	0.002
1089	2.6	1.6	1	0.002
TOTAL FREQUENCY			53741	100.000

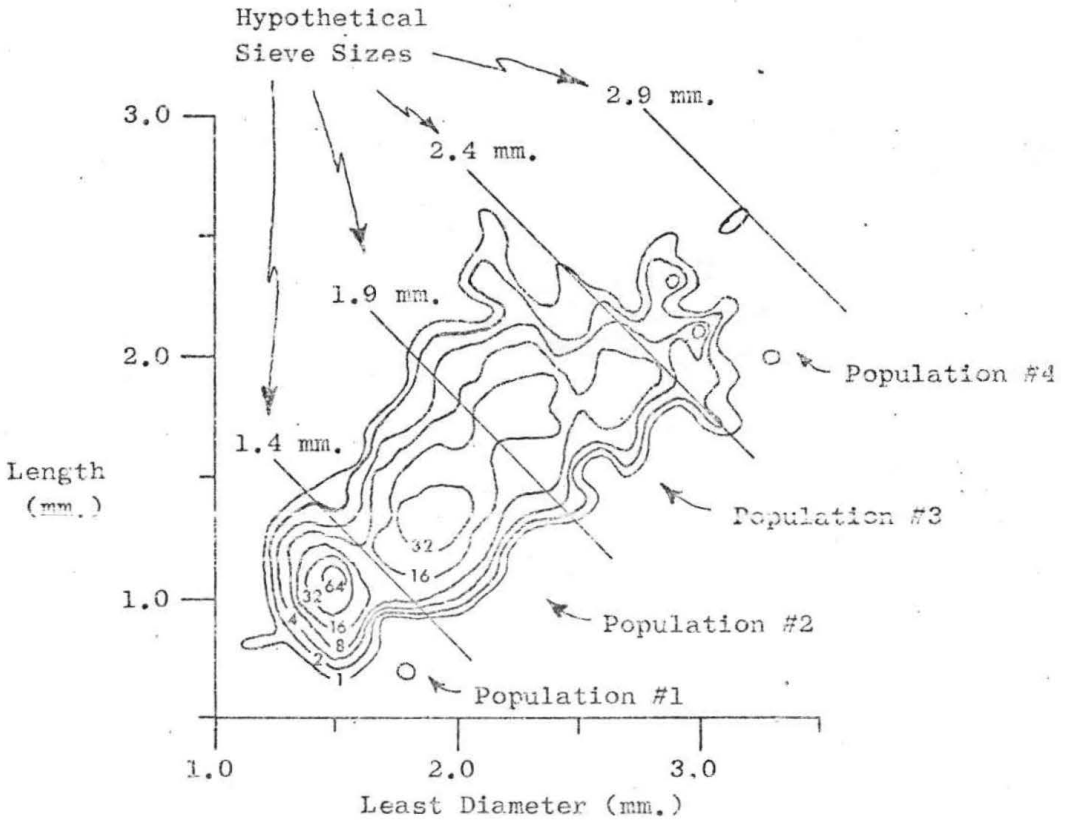


Fig. 27 - Isarithmic map of opaque white tube bead (FOVA Variety #1003) populations as defined by the correlation of bead length with bead least diameter (N=1780 -- Contour intervals based upon the geometric sequence 1, 2, 4, 8, 16, 32, 64, 128).

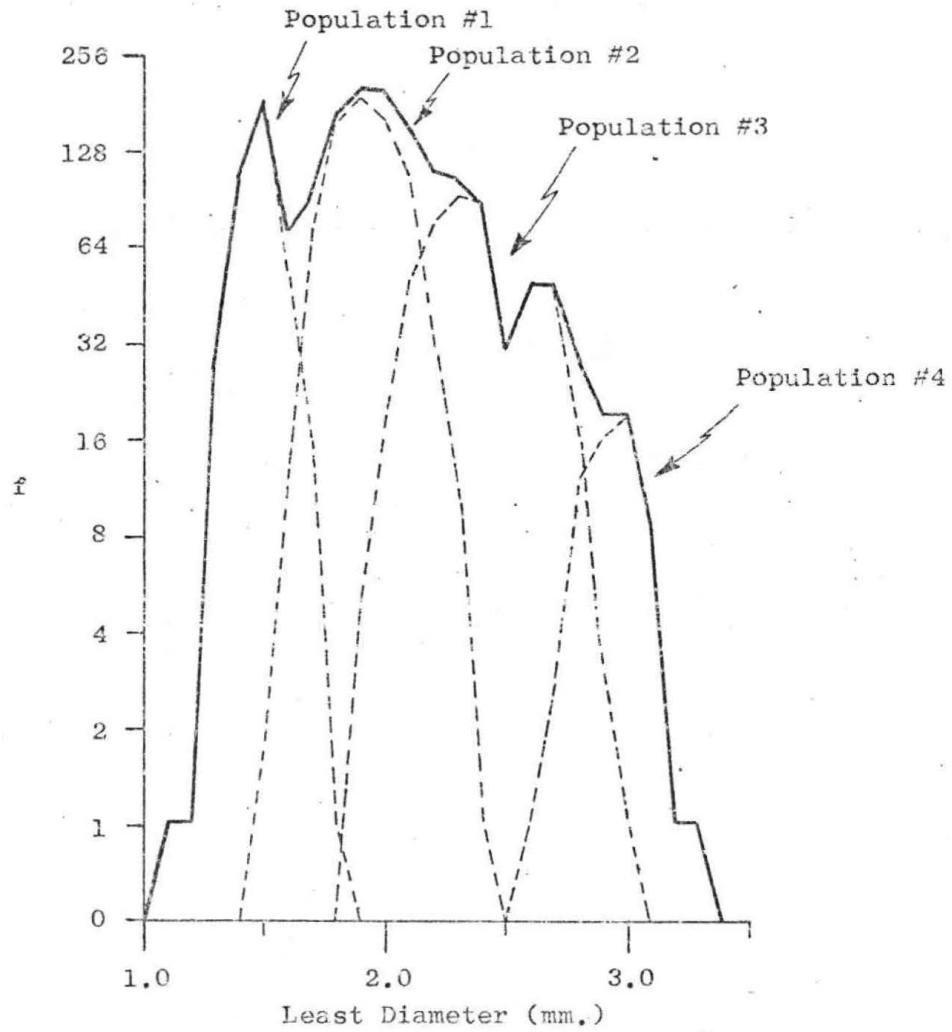


Fig. 28 - Opaque white tube bead (FOVA Variety #1003) populations as identified by least diameters (N=1780).

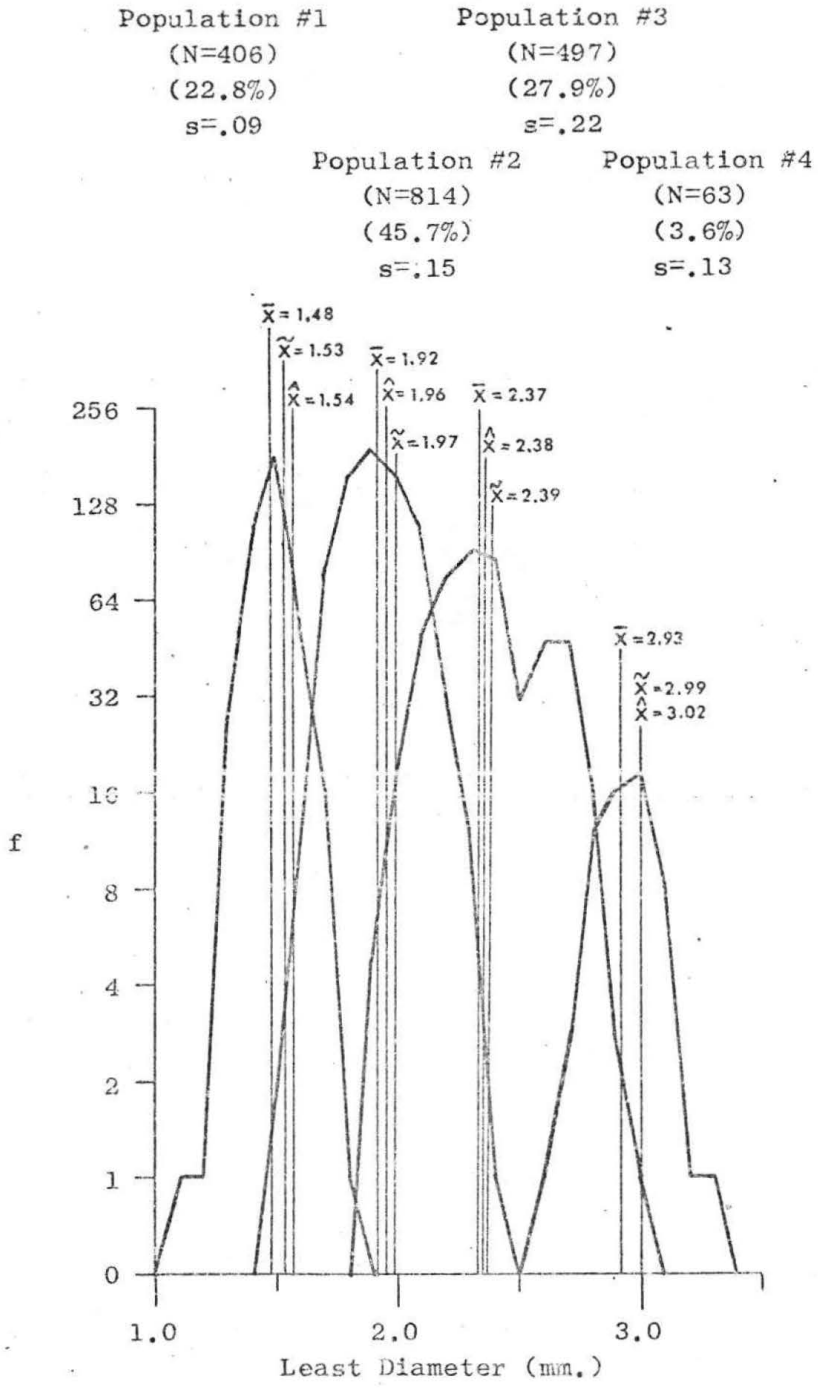


Fig. 29 - Opaque white tube bead (FOVA Variety #1003) populations as identified by least diameters (N=1780).

a 99% sample (Figs. 30-31), 2 size populations were defined and 2 sieve sizes hypothesized -- 1.75 mm. and 2.4 mm. Population #2 is identical to Population #1 of FOVA Variety #1038, and based upon this relationship between color and size, it is hypothesized that both varieties were manufactured at the same factory.

Opaque Orange Beads (FOVA Variety #1052) -- Only 5 specimens were recovered so the size population (Table 16) was not defined statistically. No equivalent type was found in the Kidds' system.

Opaque Light Brownish Yellow Bead (FOVA Variety #1084) -- One specimen was recovered and its size is noted in Table 16. No equivalent type was found in the Kidds' system.

Opaque Yellow Beads (FOVA Variety #1004) -- Only 5 specimens were recovered so the size population (Table 16) was not defined statistically. No equivalent type was found in the Kidds' system.

Opaque Green Beads (FOVA Variety #1053) -- This variety appears to contain 2 size populations (Table 16), but due to low frequency of specimens and a relatively scattered distribution, the populations could not be significantly defined statistically. Many times, specimens of this variety (notably the larger size) had white speckles on the outer surface. This coloration appears to have been created during the manufacturing process, but may be due to subsequent deterioration. No equivalent type was found in the Kidds' system.

Opaque Light Purplish Blue Beads (FOVA Variety #1054) -- Due to the relatively low frequency of this variety the size population (Table 16) was not defined statistically. No equivalent type was found in the Kidds' system.

Opaque Purplish Blue Beads (FOVA Variety #1081) -- Only one specimen was recovered and its size is recorded in Table 16. Within the Kidds' system, Type IIa47 appears to correspond more with this variety than with the other purplish varieties.

Opaque Light Bluish Purple Beads (FOVA Variety #1068) -- Only one specimen was recovered and its size is recorded in Table 16. No equivalent type was found in the Kidds' system.

Opaque Bluish Purple Beads (FOVA Variety #1055) -- One size population was defined for this variety (Figs. 32-33), and a sieve size of 1.6 mm. has been hypothesized. No equivalent type was found in the Kidds' system.

Opaque Dark Bluish Purple Beads (FOVA Variety #1012) -- Only 18 specimens representing one size population (Table 16) were recovered; and due to its relatively low frequency, this population was not defined statistically. No equivalent type was found in the Kidds' system.

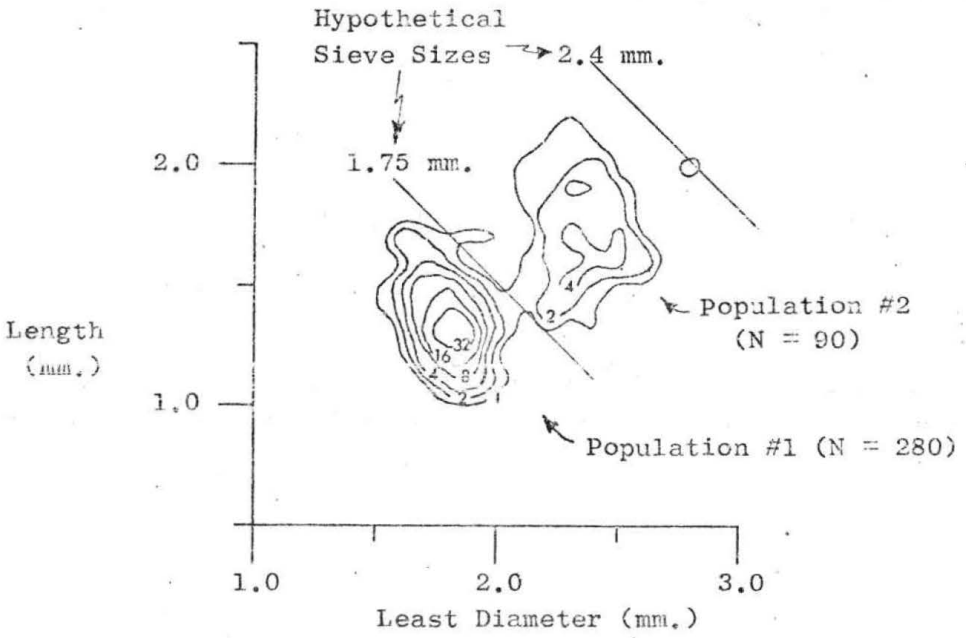


Fig. 30 - Isarithmic map of opaque brownish red tube bead (FOVA Variety #1051) populations as defined by the correlation of bead length with bead least diameter (N = 370 -- Contour intervals based upon the geometric sequence 1, 2, 4, 8, 16, 32, 64).

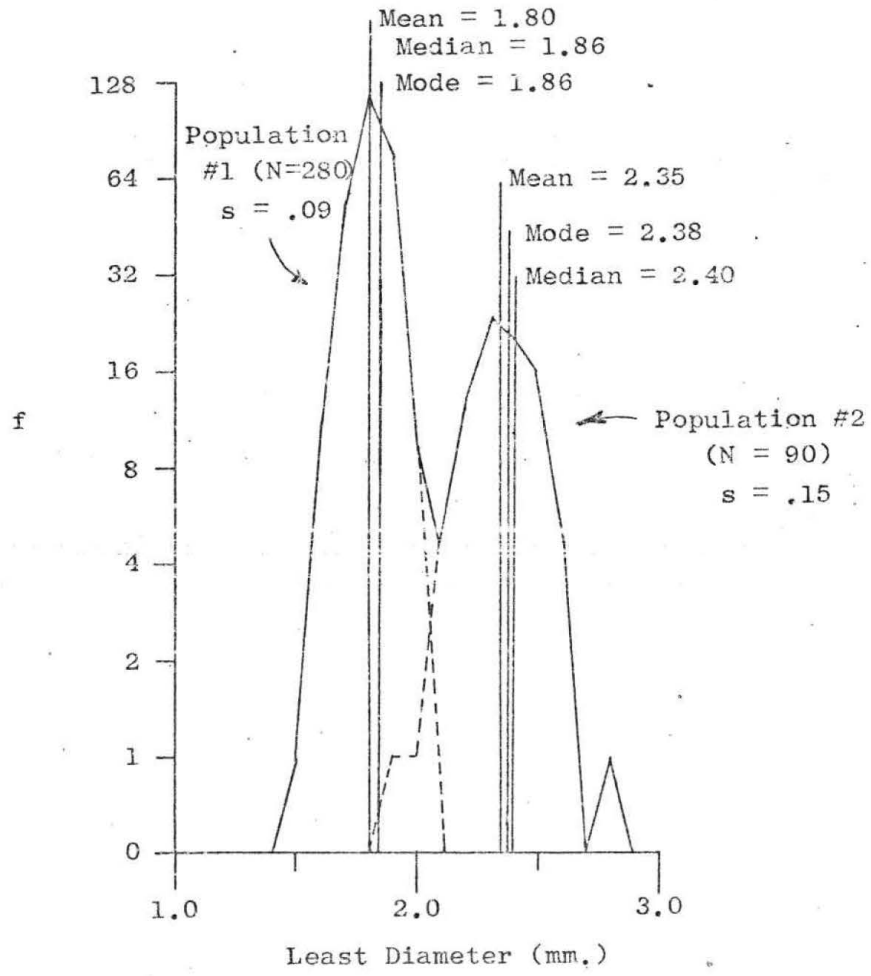


Fig. 31 - Opaque brownish red tube bead (FOVA Variety #1051) populations as identified by least diameters (N = 370).

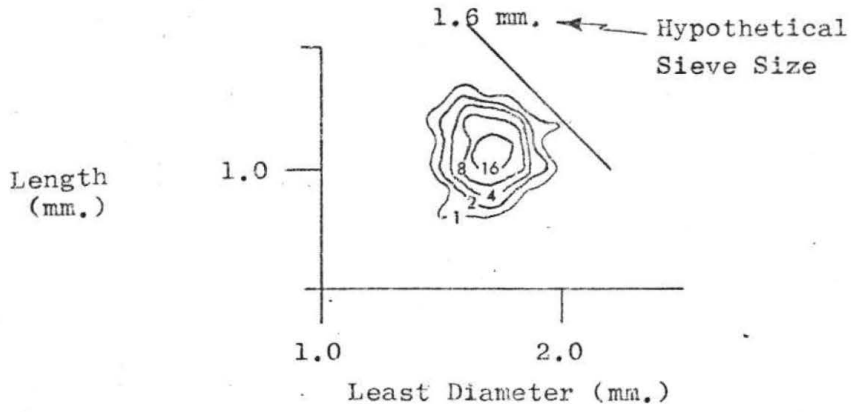


Fig. 32 - Isarithmic map of opaque bluish purple tube bead (FOVA Variety #1055) population as defined by the correlation of bead length with bead least diameter (N = 155 -- Contour intervals based upon the geometric sequence 1, 2, 4, 8, 16, 32).

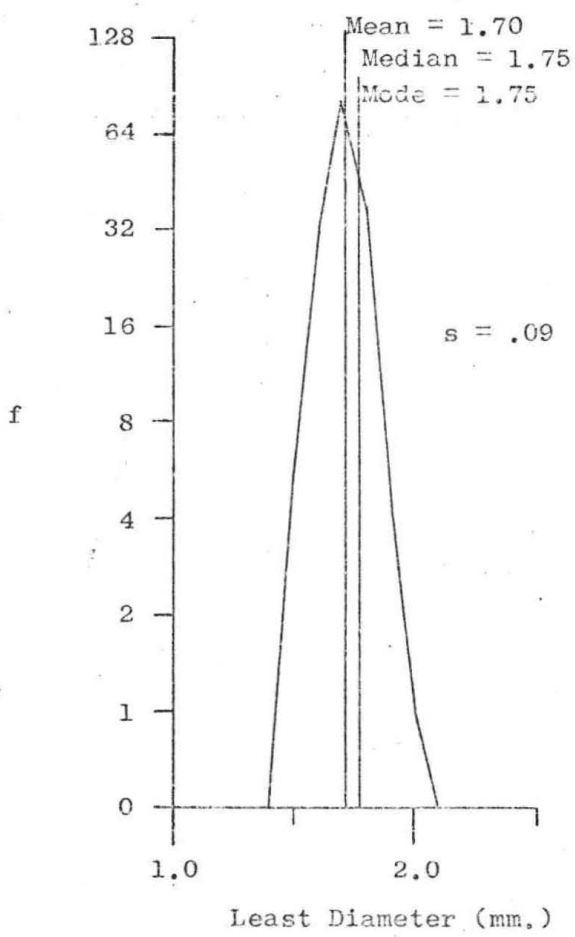


Fig. 33 - Opaque bluish purple tube bead (FOVA Variety #1055) population as identified by least diameter (N = 155).

Opaque Purple Beads (FOVA Variety #1056) -- Only 5 specimens were recovered so the size population (Table 16) was not defined statistically. No equivalent type was found in the Kidds' system.

Opaque Dark Purple Beads (FOVA Variety #1083) -- Only 4 specimens were recovered so the size population (Table 16) was not defined statistically. No equivalent type was found in the Kidds' system.

Opaque Light Pink Beads (FOVA Variety #1015) -- Only 2 specimens were recovered so the size population (Table 16) was not defined statistically. No equivalent type was found in the Kidds' system.

Opaque Black to Translucent Dark Reddish Purple Beads (FOVA Variety #1050) -- To the normal eye these beads appear black, but upon examination against a strong light they are definitely a translucent dark reddish purple. This variety is assumed to be equivalent to the Kidds' type IIa7. On the basis of measurements taken for this variety, 2 or more size populations may be present (Figs. 34-35), but due to the relatively low frequency of each possible population, no statistical definitions were made. Rather, one general population was hypothesized (Table 16), and a statistical definition left to await inclusion of future specimens. Examples of this variety have recently been found elsewhere within Fort Vancouver with random facets ground into the surface, and these specimens have been classified as FOVA Variety #1005.

Translucent White Beads (FOVA Variety #1009) -- Only 2 specimens were recovered so the size population (Table 16) was not defined statistically. This variety is equivalent to the Kidds' Type IIa12.

Translucent Yellowish Green Beads (FOVA Variety #1061) -- One of the more popular varieties of tube beads (6.8% of all tube beads found in the Fur Store), this variety is similar in color to Variety #1016. However, enough of a color difference exists so that consistent sorting was possible. Also, when size populations of each variety (Figs. 36-39) are compared, it can be demonstrated that 2 distinct (but overlapping) populations exist. The size population from this variety was determined from a 27.9% sample of the beads from this variety found within the Fur Store. From experience in handling this variety, it becomes apparent that some beads reflect light differently than others, and there is a tendency to separate such beads into different groups. This separation cannot be made consistently and mixing frequently occurs. It is suggested that this variety does not represent a single discrete manufacturing variety, but rather is composed of many original varieties which subsequently became mixed together in the site. No equivalent type was found in the Kidds' system.

Translucent Green Beads (FOVA Variety #1016) -- This variety was the third most popular variety (12.5% of all tube beads within the Fur Store). As mentioned above, this variety is similar in color to

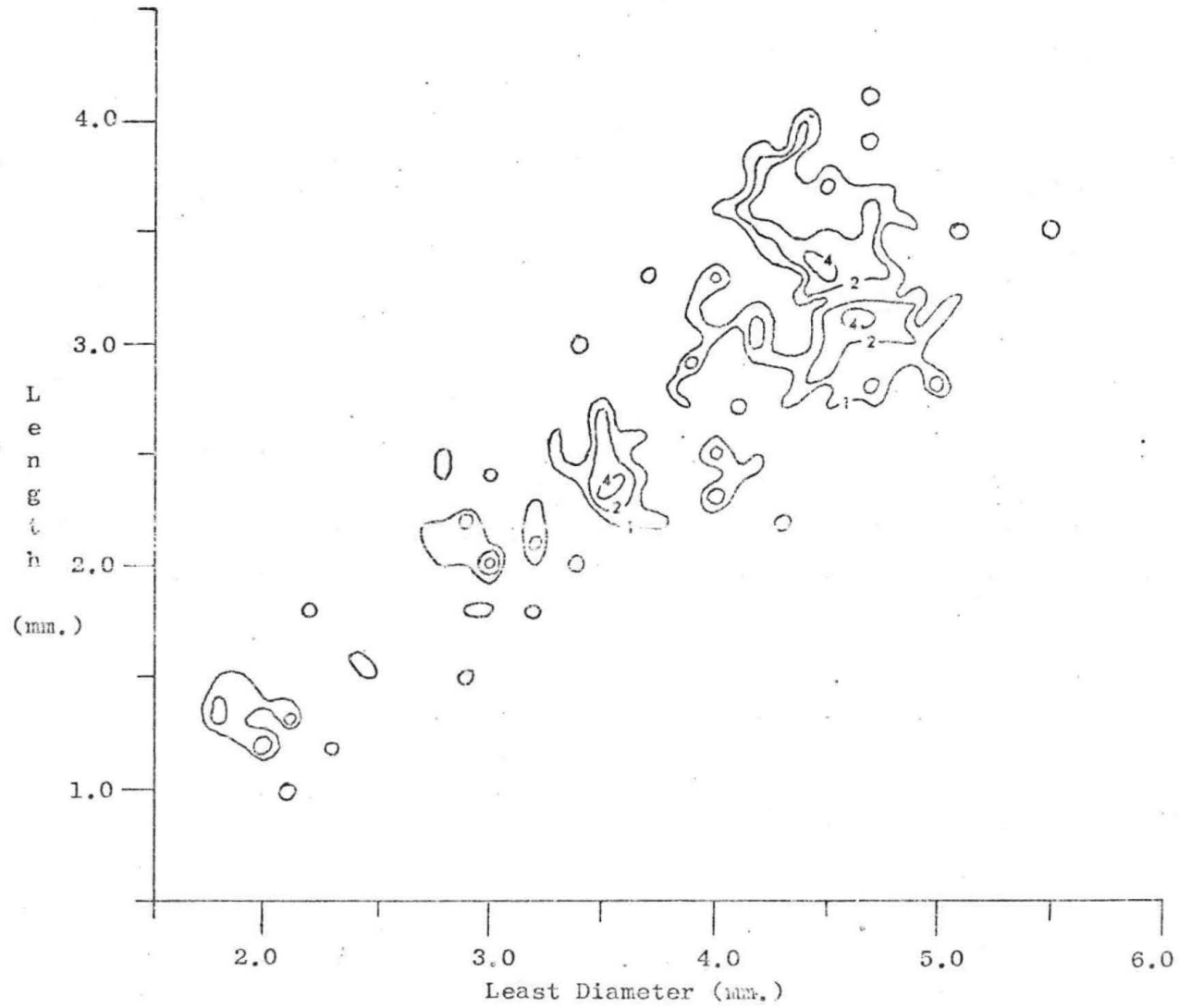


Fig. 34 - Isarithmic map of opaque black tube bead (FOVA Variety #1050) population as defined by the correlation of bead length with bead least diameter (N = 229 -- Contour interval based upon the geometric sequence 1, 2, 4, 8).

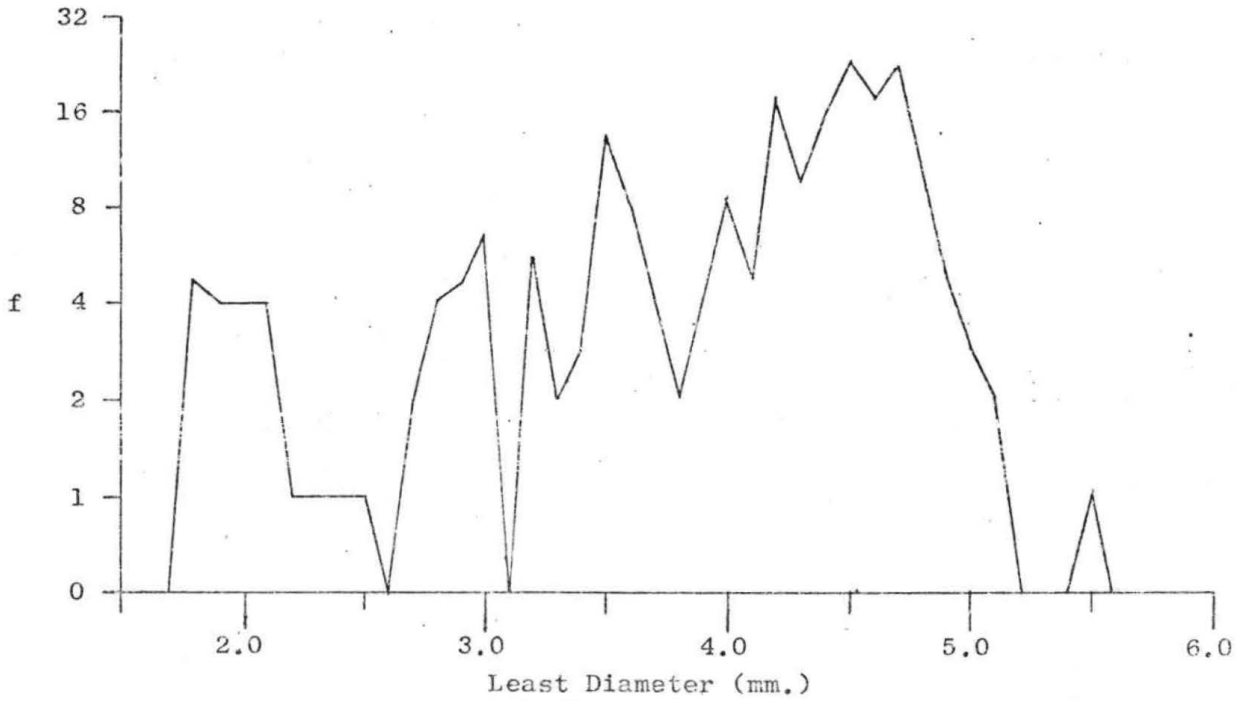


Fig. 35 - Opaque black tube baed (FOVA Variety #1050) population as identified by least diameters (N = 229).

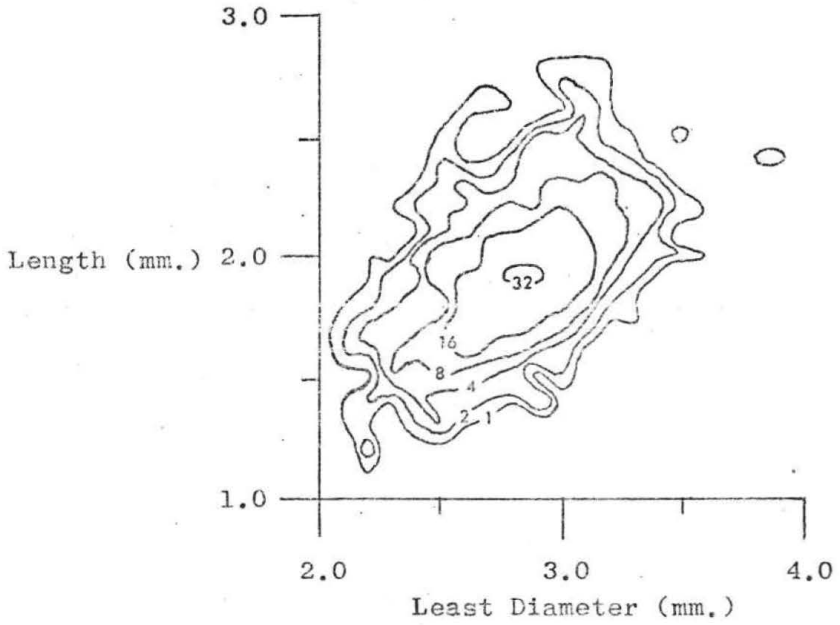


Fig. 36 - Isarithmic map of translucent yellowish green tube bead (FOVA Variety #1061) population as defined by the correlation of bead length with bead least diameter (N = 1022 -- Contour intervals based upon the geometric sequence 1, 2, 4, 8, 16, 32, 64).

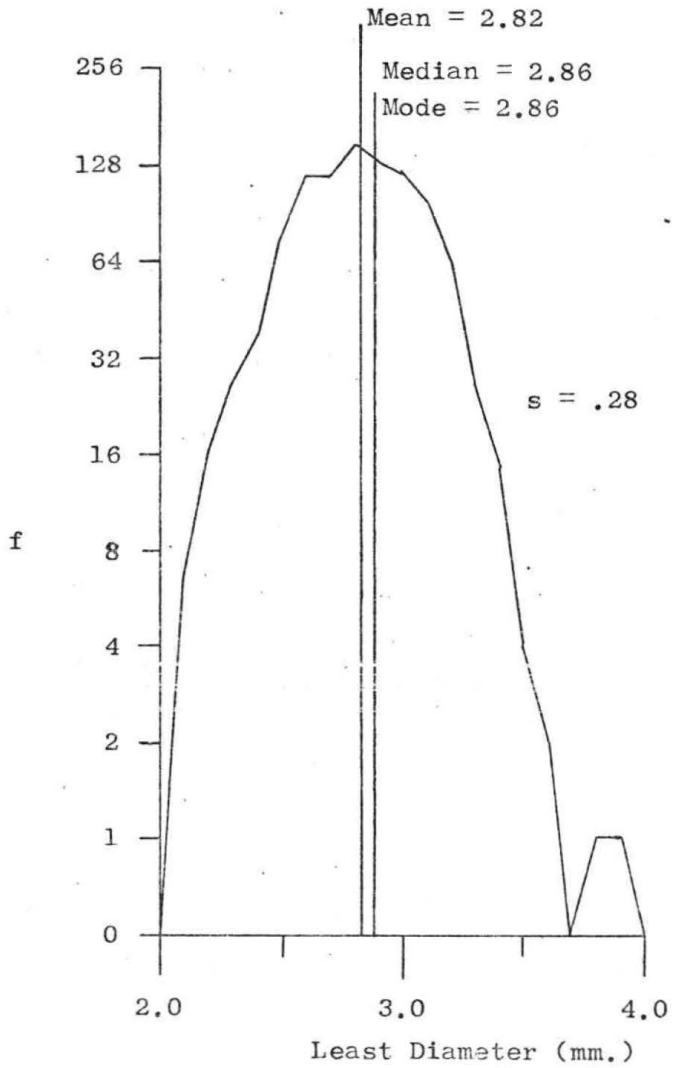


Fig. 37 - Translucent yellowish green tube bead (FOVA Variety #1061) population as identified by least diameters (N = 1022).

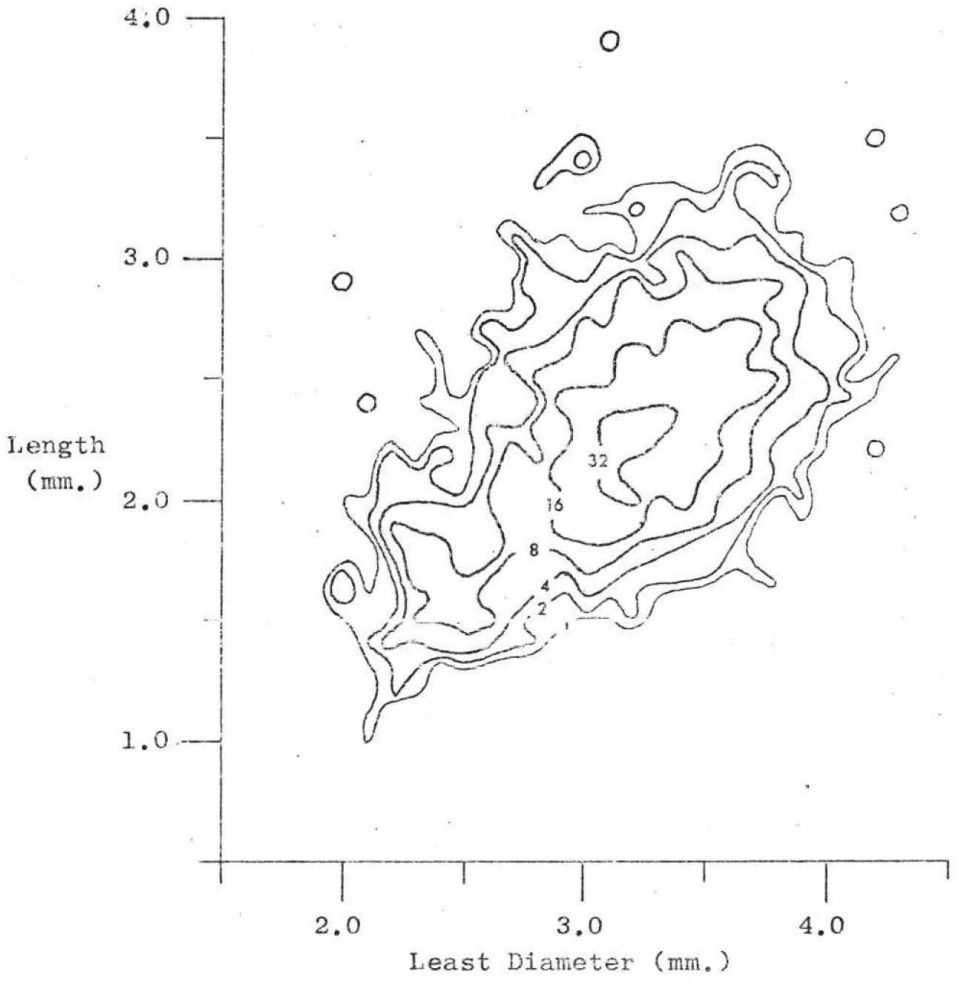


Fig. 38 - Isarithmic map of translucent green tube bead (FOVA Variety #1016) population as defined by the correlation of bead length with bead least diameter (N = 2499 -- Contour intervals based upon the geometric sequence 1, 2, 4, 8, 16, 32, 64).

FOVA Variety #1061), and is probably composed of many original varieties. On the basis of measurements of a 37.1% sample of beads from this variety, one size population was defined (Figs. 38-39), but there is an indication that this variety actually consists of 2 size populations. However, the 2 sizes cannot be accurately defined on the basis of the sample measured. Within the Kidds' system this variety is equivalent to Type IIa27.

Translucent Grayish Blue Beads (FOVA Variety #1063) -- This is the second most popular variety comprising 28.3% of all tube beads recovered from the Fur Store. As discussed previously in the section on color as a variable in defining bead types, it was stated that this variety probably contains many original varieties which have become mixed within the site and cannot be resorted into their original varieties. Presently, this variety cannot be subdivided into finer groupings with any significant degree of accuracy. On the basis of measurements obtained from a 31.2% sample of beads from this variety, 3 size populations have been defined (Figs. 40-41) and 2 sieve sizes have been hypothesized -- 2.45 mm. and 3.35 mm. Attempting to compare this variety to the Kidds' system resulted in the observation that at least 5 types could be considered to be equivalent -- IIa31, IIa43, IIa44, IIa50 and IIa51.

Transparent Colorless Beads (FOVA Variety #1060) -- This bead variety has a tendency to be slightly longer than other varieties within this class, but most of the beads are short tubular rather than long tubular. Only one size population was present (Figs. 42-43). No equivalent type was found in the Kidds' system, but Type IIa9 ("round") may represent this variety. As discussed earlier, the use of the term "round" by the Kidds appears to be variable.

Transparent Red Beads (FOVA Variety #1027) -- This variety occurs in one size (Figs. 44-45) with a hypothetical sieve size of 2.05 mm. Like the opaque black variety (FOVA Variety #1050) and its counterpart with facets (FOVA Variety #1005), this bead variety also is found with facets ground randomly over the outer surface (see discussion of FOVA Variety #1058). However, these 2 varieties also occur in 2 separate sizes which partially overlap. No equivalent type was found in the Kidds' system.

Transparent Dark Bluish Purple Beads (FOVA Variety #1047) -- Only 3 specimens were recovered so the size population was not defined statistically. No equivalent type was found within the Kidds' system.

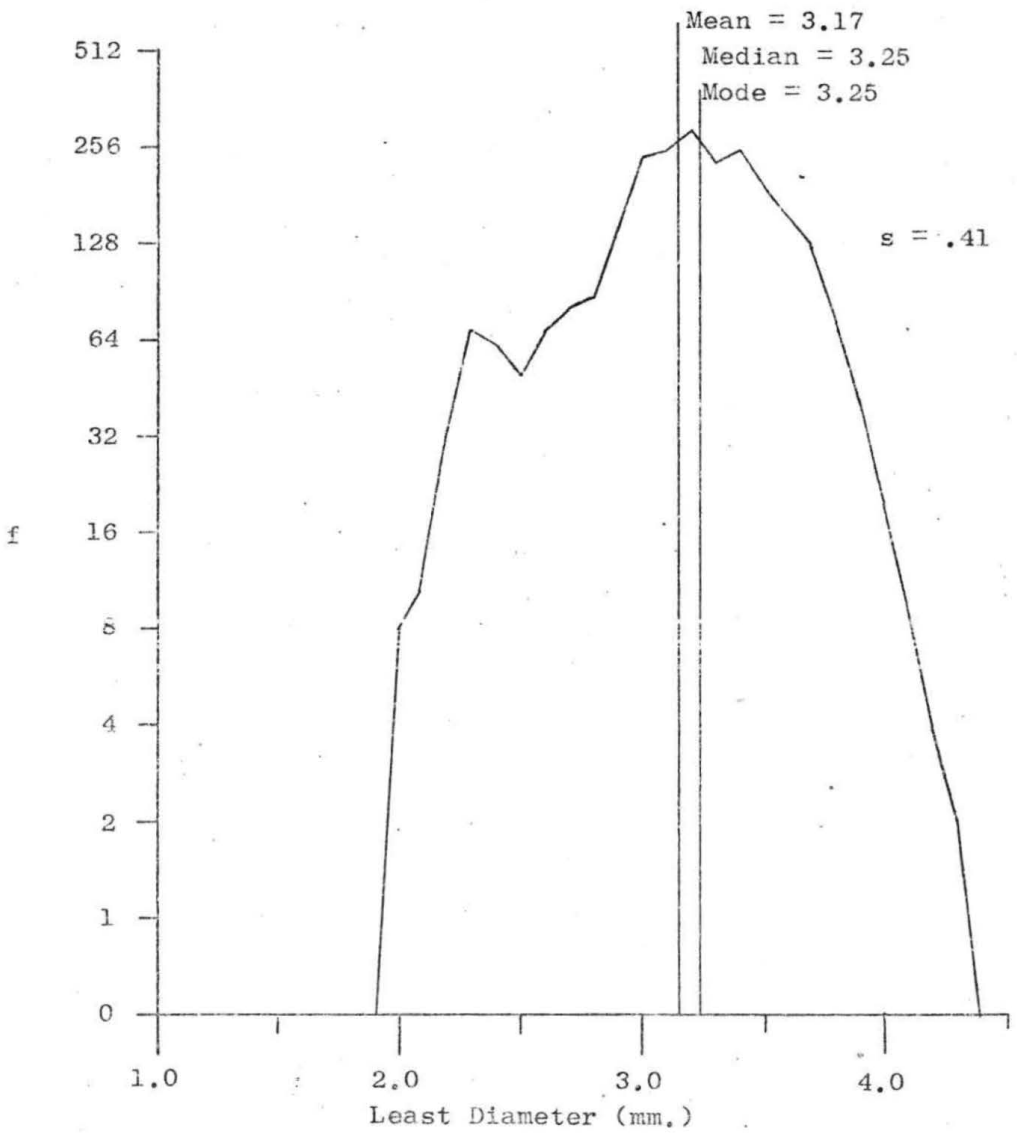


Fig. 39 - Translucent green tube bead (FOVA Variety #1016) population as identified by least diameters (N = 2499).

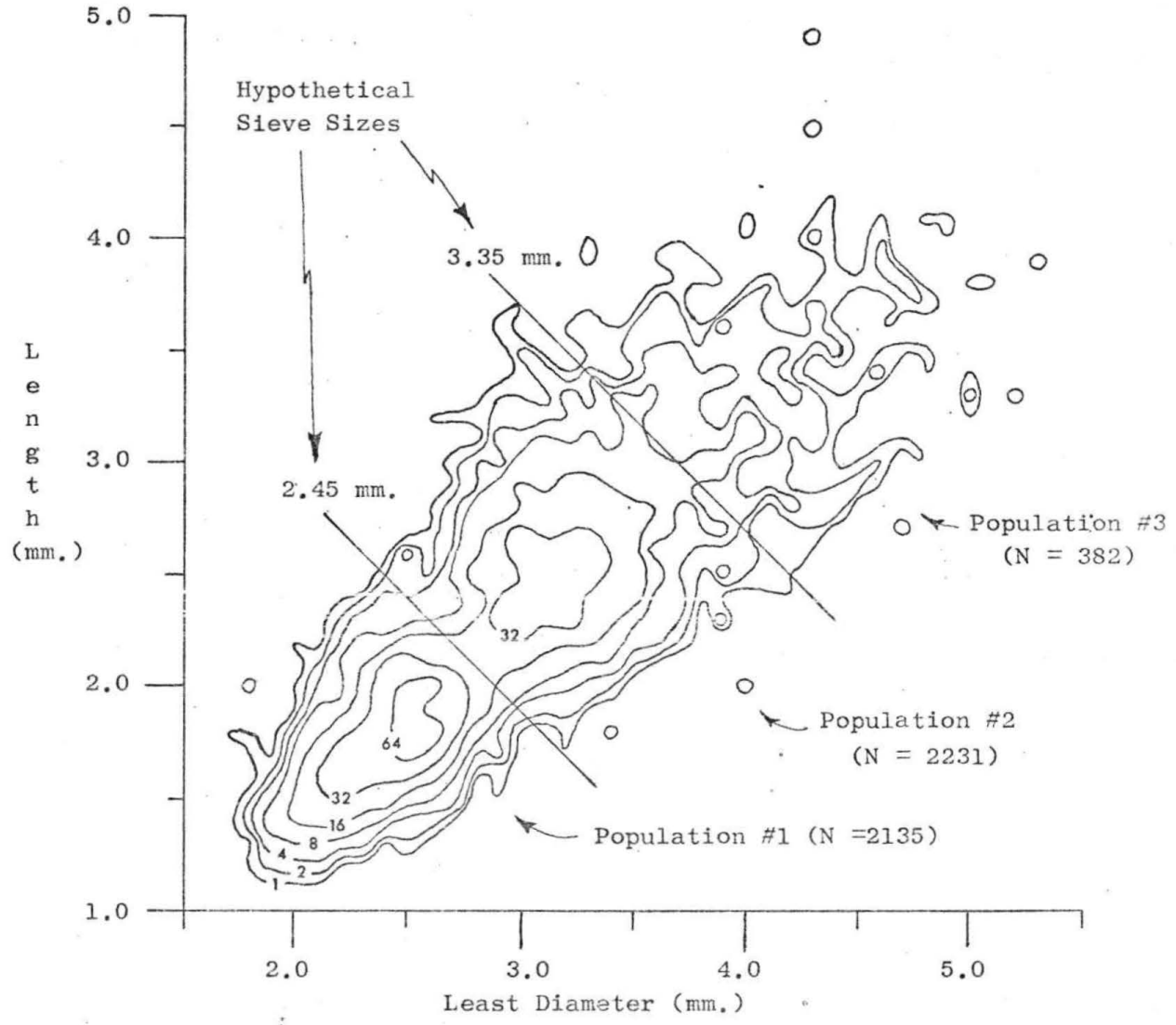


Fig. 40 - Isarithmic map of translucent grayish blue tube bead (FOVA Variety #1063) populations as defined by the correlation of bead length with bead least diameter (N = 4748 -- Countour intervals based upon the geometric sequence 1, 2, 4, 8, 16, 32, 64, 128).

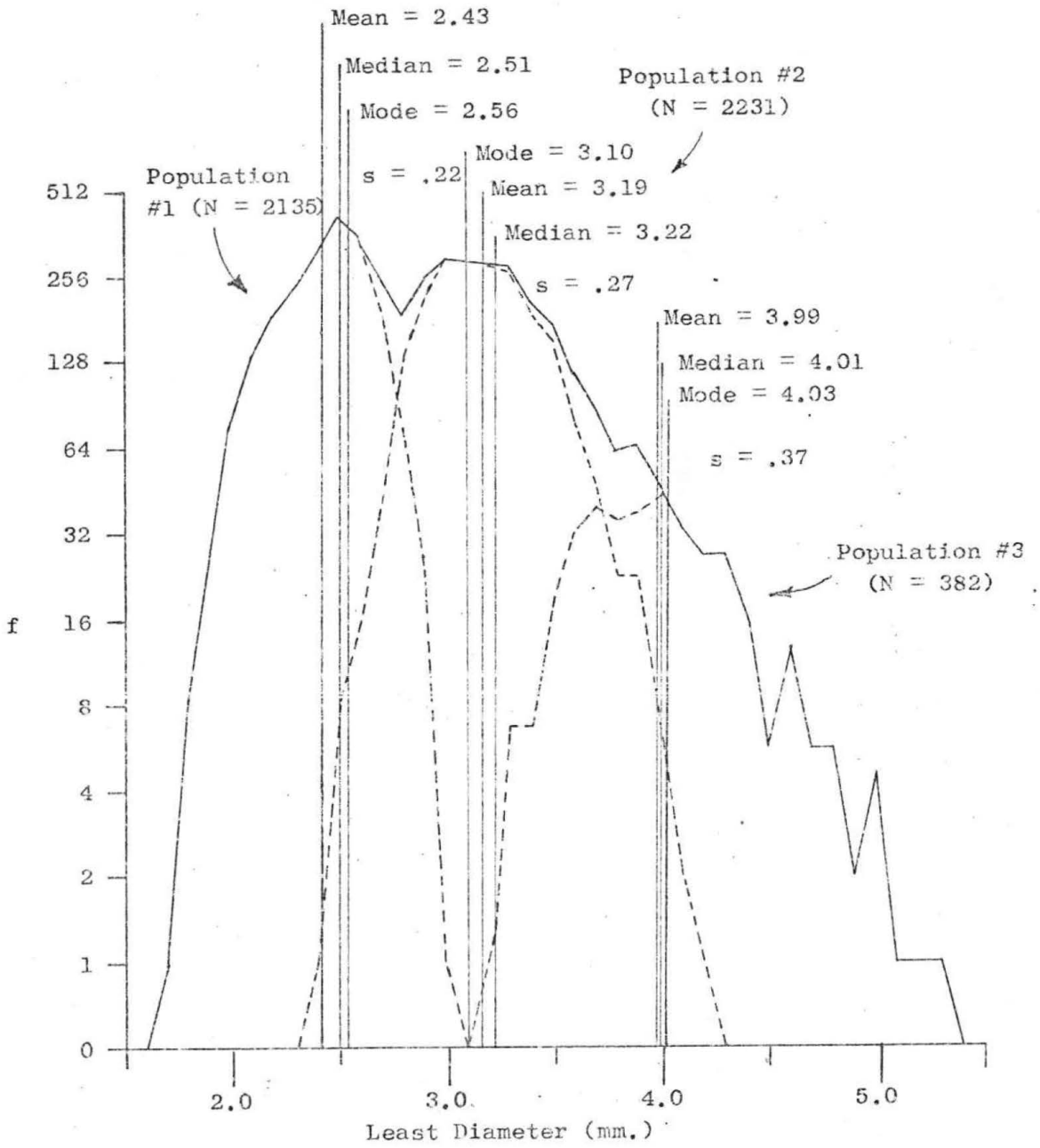


Fig. 41 - Translucent grayish blue tube bead (FOVA Variety #1063) populations as identified by least diameters (N = 4748).

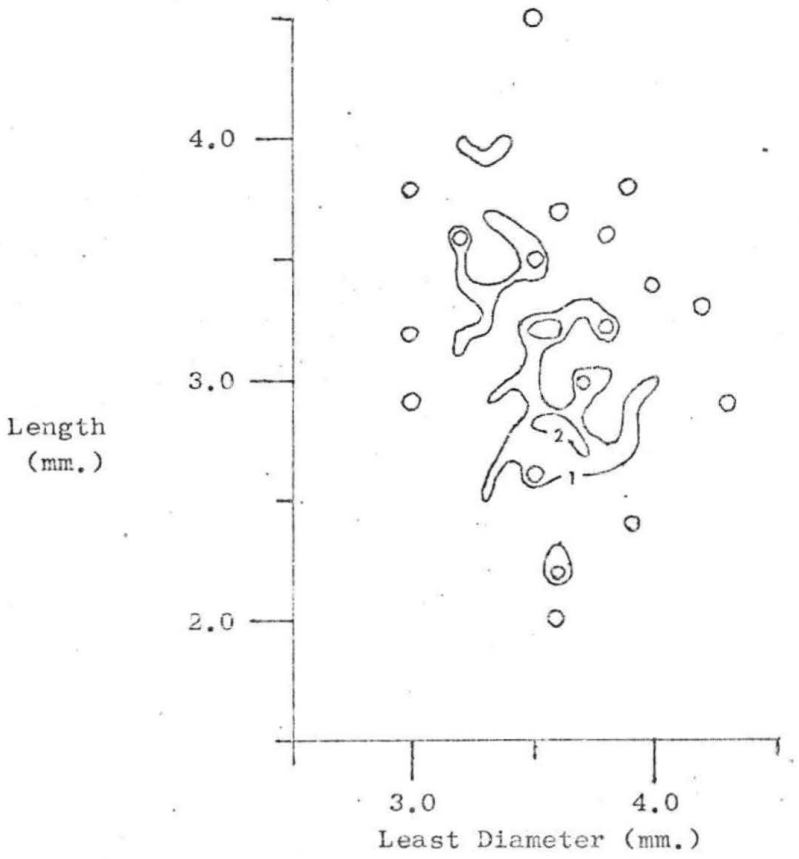


Fig. 42 - Isarithmic map of transparent colorless tube bead (FOVA Variety #1060) population as defined by the correlation of bead length with bead least diameter (N = 72 -- Contour intervals based upon the geometric sequence 1, 2, 4).

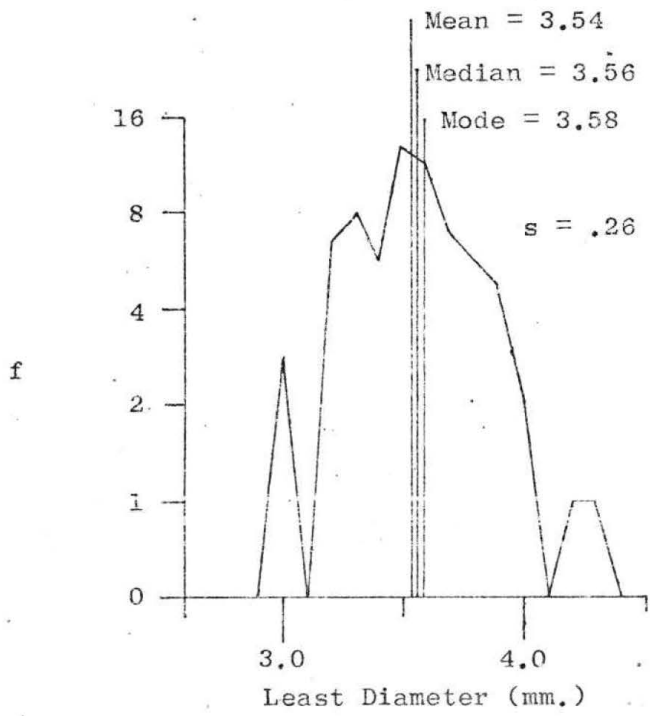


Fig. 43 - Transparent colorless tube bead (FOVA Variety #1060) population as identified by least diameters (N = 72).

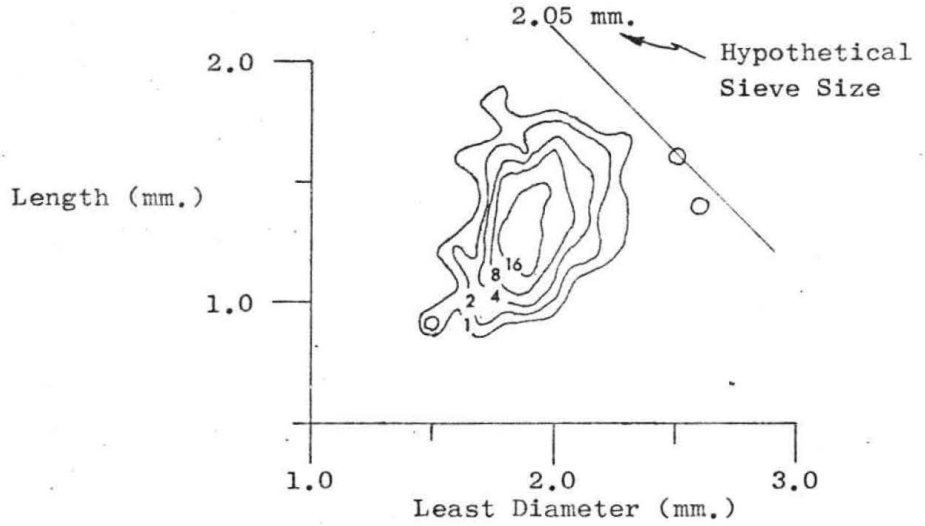


Fig. 44 - Isarithmic map of transparent red tube bead (FOVA Variety #1027) population as defined by the correlation of bead length with bead least diameter (N = 342 -- Contour intervals based upon the geometric sequence 1, 2, 4, 8, 16, 32).

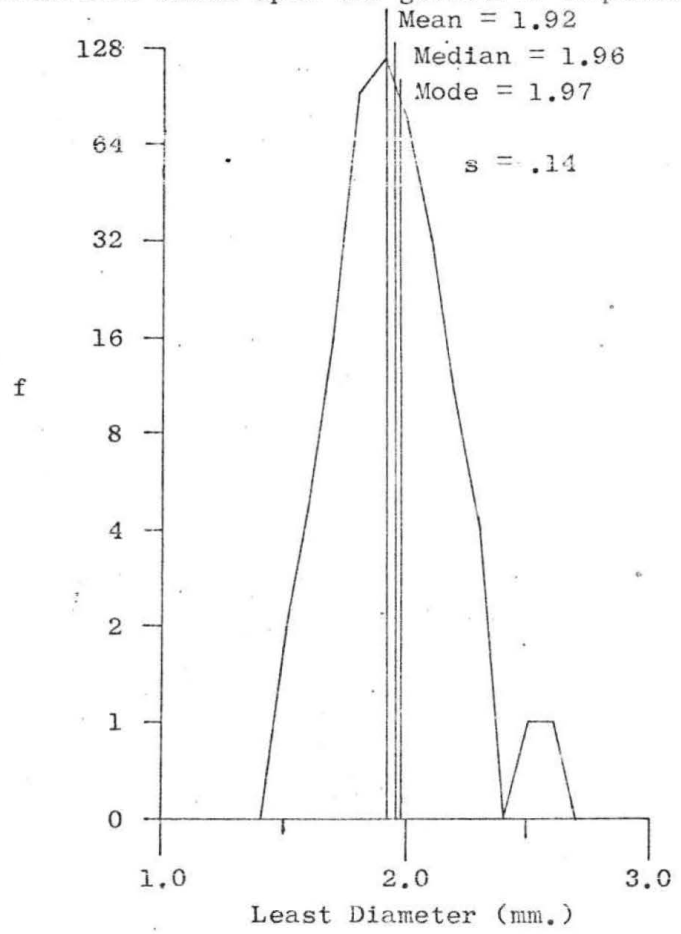


Fig. 45 - Transparent red tube bead (FOVA Variety #1027) population as identified by least diameters (N = 342).



Undecorated, Double Layered, Hot Tumbled, Short Tubular Beads -- This stylistic class is equivalent to the Kidds' Class IVa, and of the 4 varieties identified, only one could be found within the Kidds' system (IVa6). Of all the glass beads recovered from the Fur Store, 41% belonged to this class.

Opaque Cream on Opaque Cream Beads (FOVA Variety #1040) -- This variety was the most popular in the Fur Store and comprised 40.4% of all the tube beads recovered. On the basis of a 27.1% sample of beads from this variety, 2 size populations were defined (Figs. 46-47) and one sieve size hypothesized -- 1.8 mm. Population #2 probably represents a mixed population of multiple original populations, but these original populations cannot presently be identified. Beads from Population #1 appear to have only one layer of glass, but many of the larger specimens (from the same population) definitely do have 2 layers. Beads from this variety undoubtedly have been included with opaque white single layered beads at other archeological sites, but upon close examination they can consistently be separated. The exact reason for the double layering has yet to be determined. Two hypotheses are currently being considered: 1) there are 2 distinct glass layers created by dipping one glass bubble into another glass mixture; or 2) the layering is due to differential separation of the ingredients during cooling. The second hypothesis would seem to fit the observed characteristics of the smaller specimens -- i.e. they appear to have only one layer. Perhaps separation does not occur when the tubes reach a small diameter. No equivalent type was found in the Kidds' system.

Opaque Cream on Opaque Gray Beads (FOVA Variety #1089) -- Only one specimen was recovered and its size is recorded in Table 16. No equivalent type was found in the Kidds' system.

Opaque Light Blue on Translucent Blue Beads (FOVA Variety #1082) -- Only 2 specimens were recovered and the size population (Table 16) was not defined statistically. This variety may represent a deteriorated form of the translucent blue beads discussed above (FOVA Variety #1063). No equivalent type was found in the Kidds' system.

Opaque Brownish Red on Transparent Light Green Beads (FOVA Variety #1038) -- Beads of this variety are commonly called green centered "Cornaline d'Allepo" or "HBC" beads. The Kidds stated that "none of these (terms) has any precise significance" (1970:47); whereas Sprague argued that "such terms have been and will continue to be useful means of communication between archaeologists" (1971:129). Both statements are accurate and useful, and as the Kidds demonstrated with their use of such terms as "gooseberry" and "flushe eyes", traditional terms can be helpful. For this reason, when such terms are known they will be included within variety descriptions, but not as part of the definition. Two size populations were defined (Figs. 48-49) and one sieve

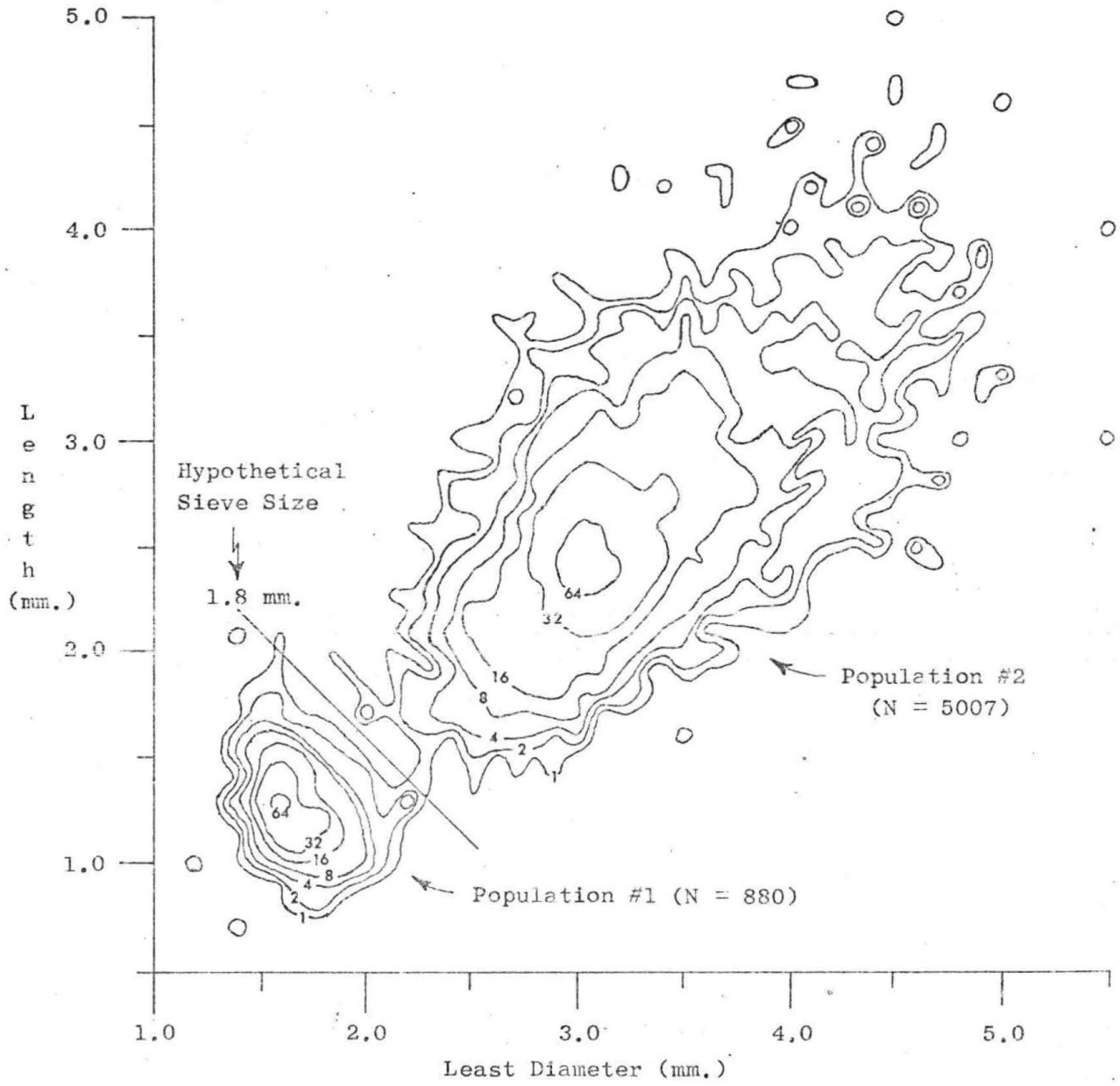


Fig. 46 - Isarithmic map of opaque cream-on-cream tube bead (FOVA Variety #1040) populations as defined by the correlation of bead length with bead least diameter (N = 5887 -- Contour intervals based upon the geometric sequence 1, 2, 4, 8, 16, 32, 64, 128).

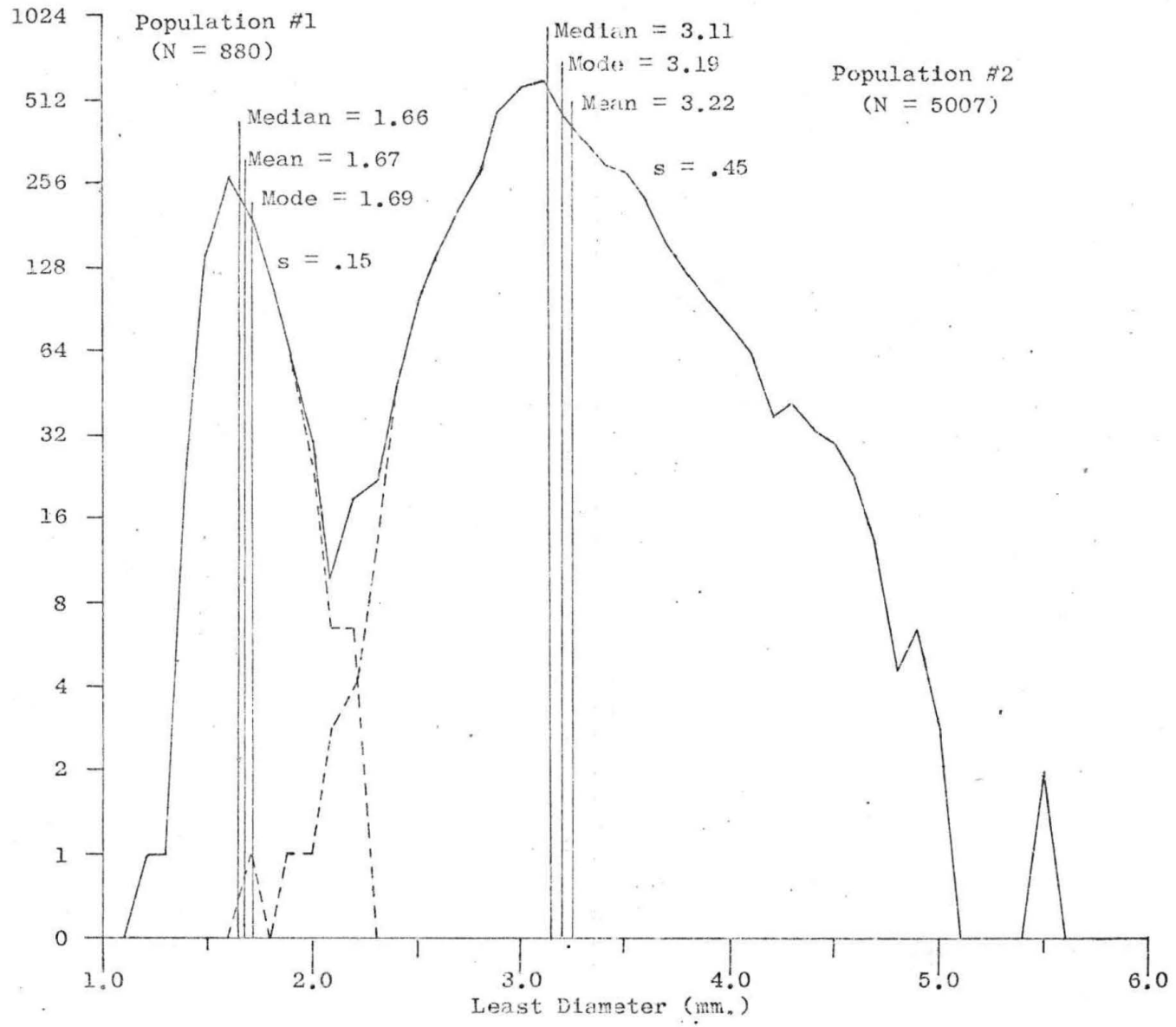


Fig. 47 - Opaque cream-on-cream tube bead (FOVA Variety #1040) populations as identified by least diameters (N = 5887).

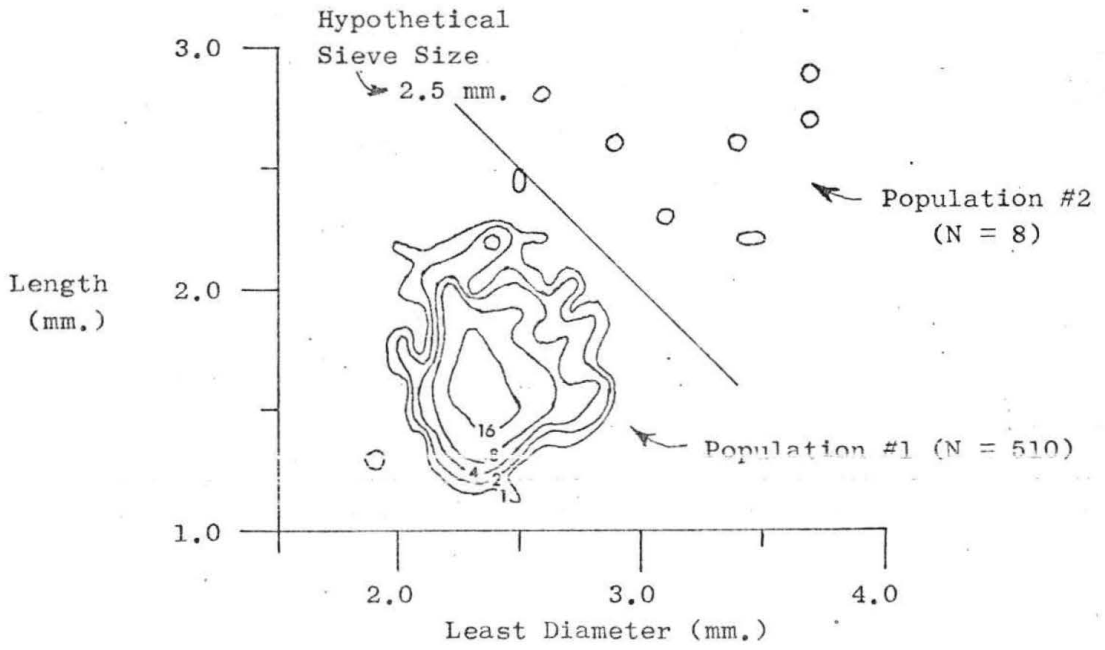


Fig. 48 - Isarithmic map of opaque brownish red-on-transparent green tube bead (FOVA Variety #1038) populations as defined by the correlation of bead length with bead least diameter (N = 518 -- Contour intervals based upon the geometric sequence 1, 2, 4, 8, 16, 32).

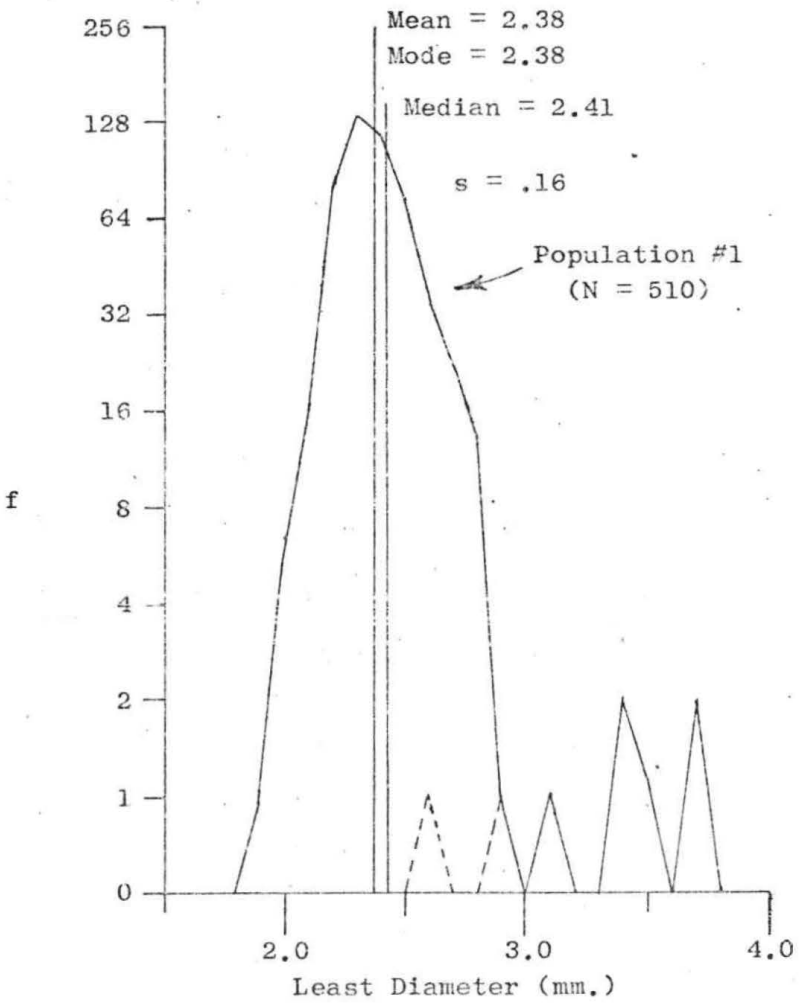


Fig. 49 - Opaque brownish red-on-transparent green tube bead (FOVA Variety #1038) populations as identified by least diameters (N = 518).

size hypothesized -- 2.5 mm. Obviously, population #2, with a frequency of 8, is a tenuous population and no statistical definition was attempted. This variety is equivalent to the Kidds' Type IVa6. The central glass layer of this bead variety is regarded as a light green in coloration, but could it really be colorless? Perhaps it only appears to be light green because of the surrounding red layer. Large specimens of this variety (if they exist) should be broken and the transparent layer separated from the red layer to see if the glass is colorless or light green.



Striped, Single Layered, Hot Tumbled, Short Tubular Beads -- This stylistic class is equivalent to the Kidds' Class IIv, but no equivalent type could be found for the FOVA variety.

Opaque White Beads with 4 Gray to Dark Purple Stripes (FOVA Variety #1028) -- One size population has been defined for this variety (Figs. 50-51) and a sieve size of 2.65 mm. has been hypothesized.



Striped, Double Layered, Hot Tumbled, Short Tubular Beads -- This stylistic class is equivalent to the Kidds' Class IVb, but no types could be found for the 3 FOVA varieties within this class.

Opaque White on Opaque Purplish Blue Bead with 4 Dark Purple Stripes (FOVA Variety #1070) -- Only one specimen was recovered and its size is recorded in Table 16.

Opaque Light Purplish White on Opaque Purplish Gray Bead with 4 Purple Stripes (FOVA Variety #1087) -- Only one specimen was recovered and its size is recorded in Table 16.

Opaque Light Purplish White on Opaque Purplish Gray Bead with 6 Purple Stripes (FOVA Variety #1086) -- Only one specimen was recovered and its size is recorded in Table 16.



Faceted, Single Layered, Short Tubular Beads -- This stylistic class is equivalent to the Kidds' Class If, but no equivalent types were found for the 4 FOVA varieties within this class. Two types of facets are found on each bead within this class -- "formed" and ground. "Formed" facets are the central facets on these beads and the total number of "formed" facets on these beads equals its number of sides. How these facets were manufactured cannot be stated, but two hypotheses have been suggested: 1) they were marvered on either the glass bubble or tube; or 2) they were formed by extruding glass through a shaped orifice. However, neither hypothesis adequately explains the presence of the parallel longitudinal lines (or ridges) on the surface of each facet. These lines appear quite similar to the marks which sometime appear on the necks of light green wine bottles of the mid-19th Century. These wine bottle necks were

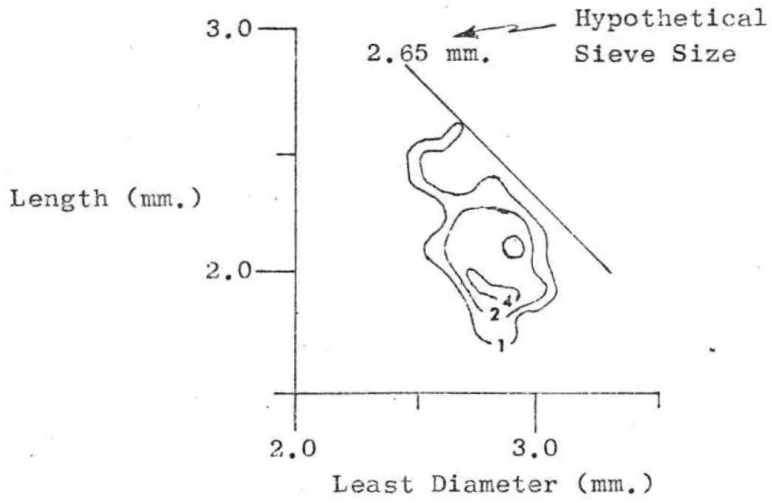


Fig. 50 - Isarithmic map of opaque white striped tube bead (FOVA Variety #1028) population as defined by the correlation of bead length with bead least diameter (N = 66 -- Contour intervals based upon the geometric sequence 1, 2, 4, 8).

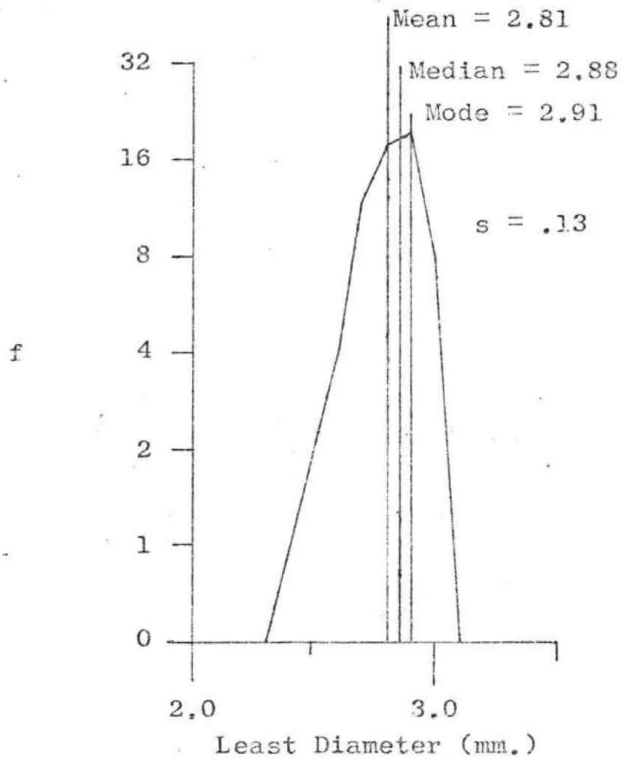


Fig. 51 - Opaque white striped tube bead (FOVA Variety #1028) population as identified by least diameters (N = 66).

neither marvered nor extruded, but were drawn. The second type of facets found on this class of beads were ground on the corners of each of the "formed" facets where they intersect the ends of the bead. Thus, normally, there are twice as many ground facets as "formed" facets. Shape of these beads tends to be short tubular although long tubular specimens are common.

Opaque Black to Translucent Dark Reddish Purple Beads (FOVA Variety #1057) -- As with other "black" beads at Fort Vancouver, when held up to a strong light, these beads are a translucent dark reddish purple. Two size populations were defined (Figs. 52-53) with the smaller population (#1) having 6 sides and the larger (#2) having 7 sides. In reality, these populations may represent one original population, but because of the faceting attribute, it was decided to separate the specimens into 2 populations.

Transparent Colorless Beads (FOVA Variety #1067) -- Only 2 specimens were recovered and their size range is recorded in Table 16. Both specimens were 6-sided.

Transparent Amber Bead (FOVA Variety #1043) -- Only 20 specimens representing 2 sizes (Table 16) were recovered; but due to the relatively low frequency of these populations, they were not defined statistically. Beads from population #1 have 6 sides, and those from population #2 have 7 sides.



Faceted, Single Layered, Hot Tumbled, Short Tubular Beads -- This stylistic class was not represented in the Kidds' system. Beads in this class are undecorated, single layered, hot tumbled beads which have had facets randomly ground on their outer surface.

Transparent Red Beads (FOVA Variety #1058) -- Only one size population was defined (Figs. 54-55) and a 2.4 mm. sieve size was hypothesized. The counterpart of this bead variety without facets would be FOVA Variety #1027.

Transparent Dark Reddish Purple Beads (FOVA Variety #1059) -- From measurements obtained on a 66% sample, one size population was defined (Figs. 56-57) and a 3.4 mm. sieve size hypothesized. The remaining 33% of the beads from this variety were fused in pairs. Pairs did not Have identical faceting, so they were not ground while paired; and hot tumbling occurred before grinding. The material which fused the beads does not appear to be melted glass, but its identification remains undetermined.



Faceted, Double Layered, Short Tubular Beads -- This stylistic class is equivalent to the Kidds' Class IIIf, but neither of the 2 FOVA varieties could be found in the Kidds' system. As with the faceted, single layered beads, there are 2 types of facets present -- "formed" and ground.

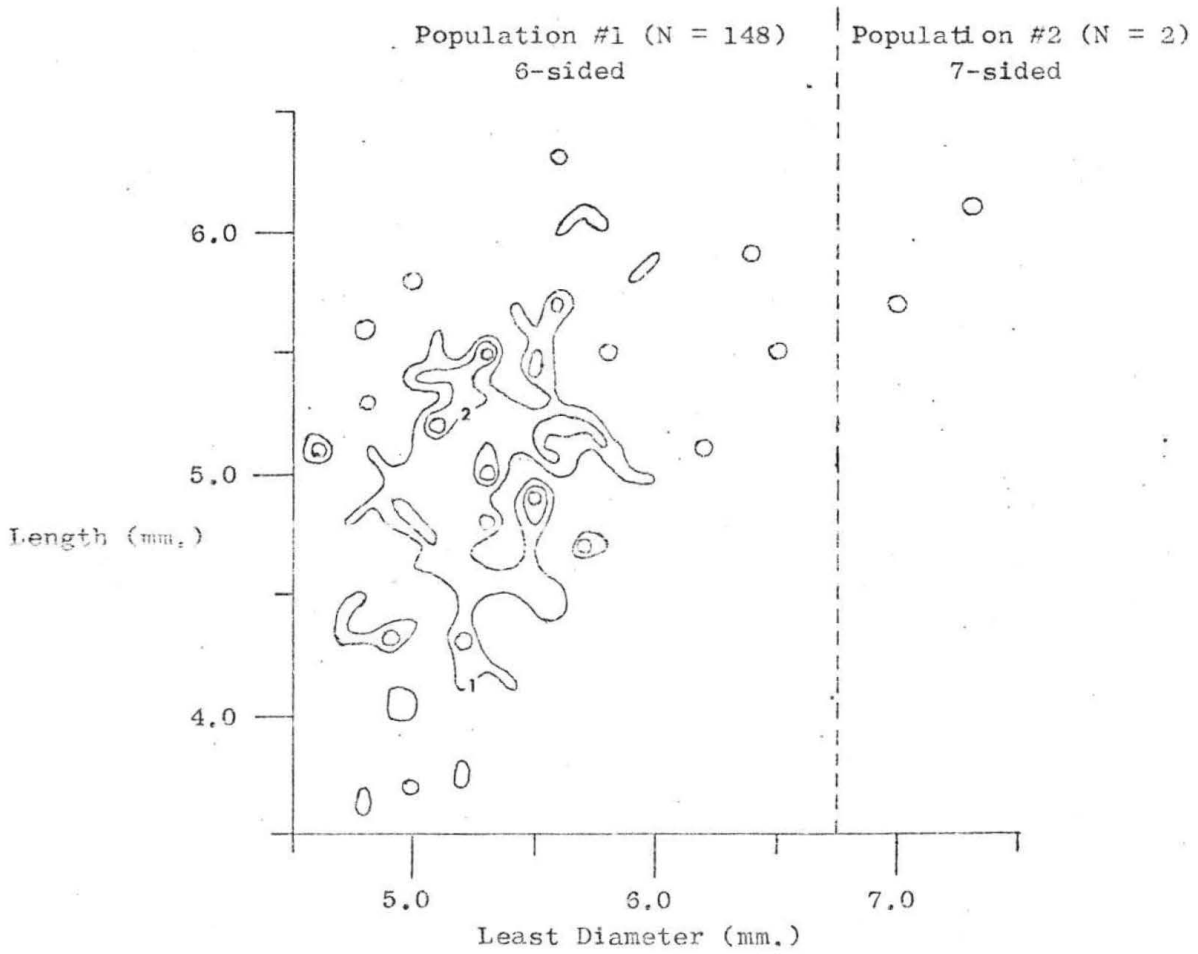


Fig. 52 - Isarithmic map of opaque black faceted tube bead (FOVA Variety #1057) populations as defined by the correlation of bead length with bead least diameter (N = 150 -- Contour intervals based upon the geometric sequence 1, 2, 4, 8).

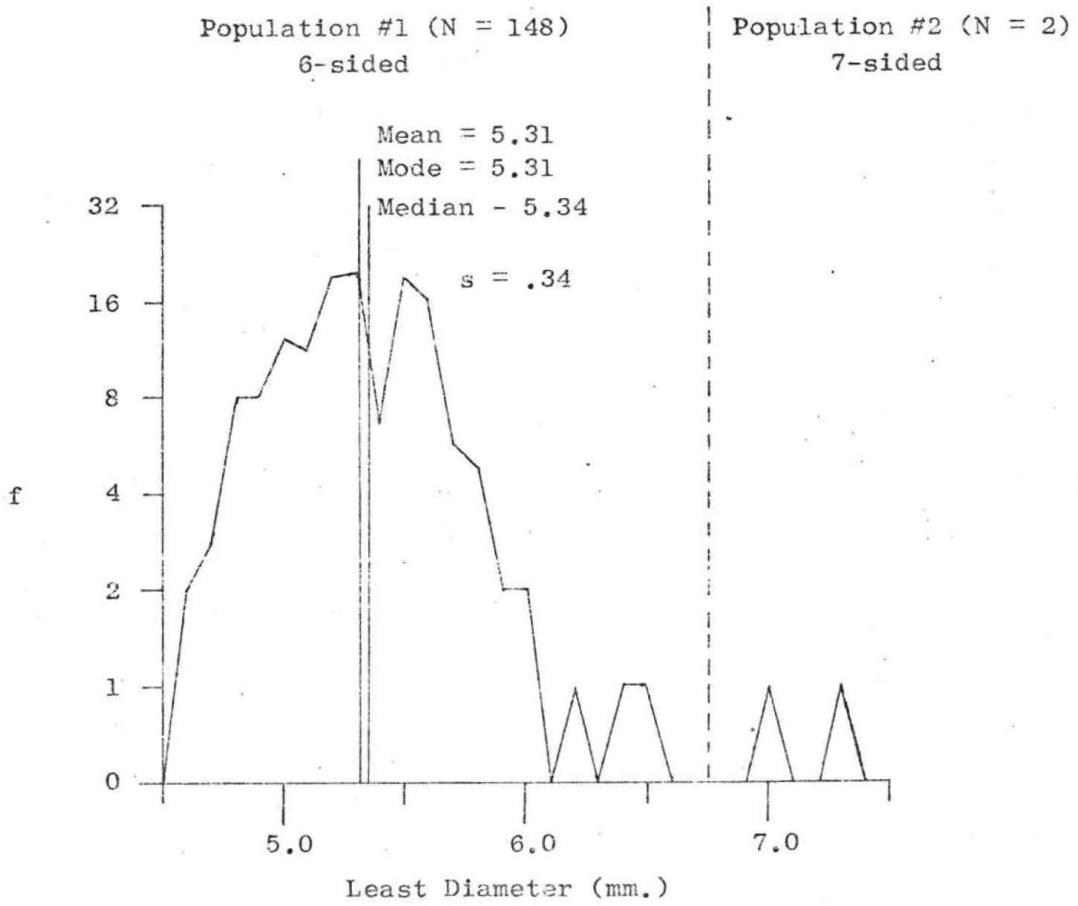


Fig. 53 - Opaque black faceted tube bead (FOVA Variety #1057) populations as identified by least diameters (N = 150).

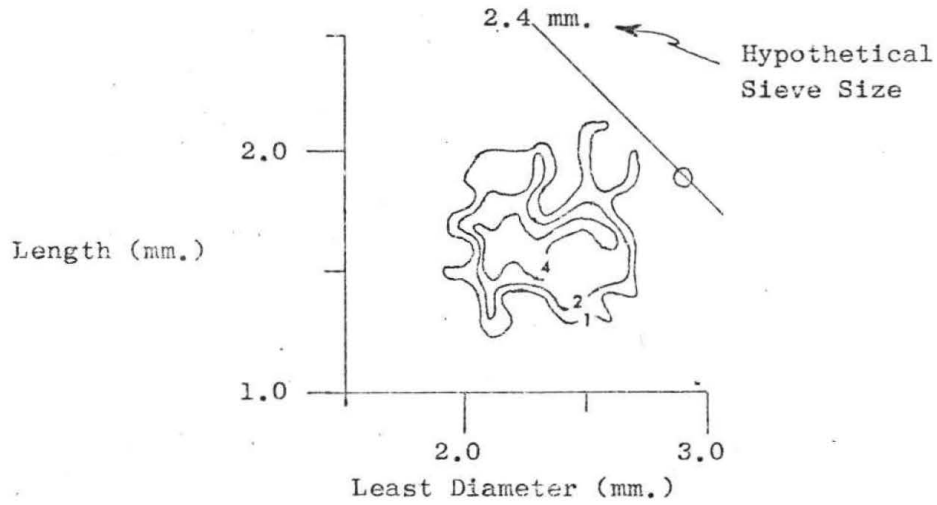


Fig.54 - Isarithmic map of transparent red faceted tube bead (FOVA Variety #1058) population as defined by the correlation of bead length with bead least diameter (N = 106 -- Contour intervals based upon the geometric sequence 1, 2, 4, 8).

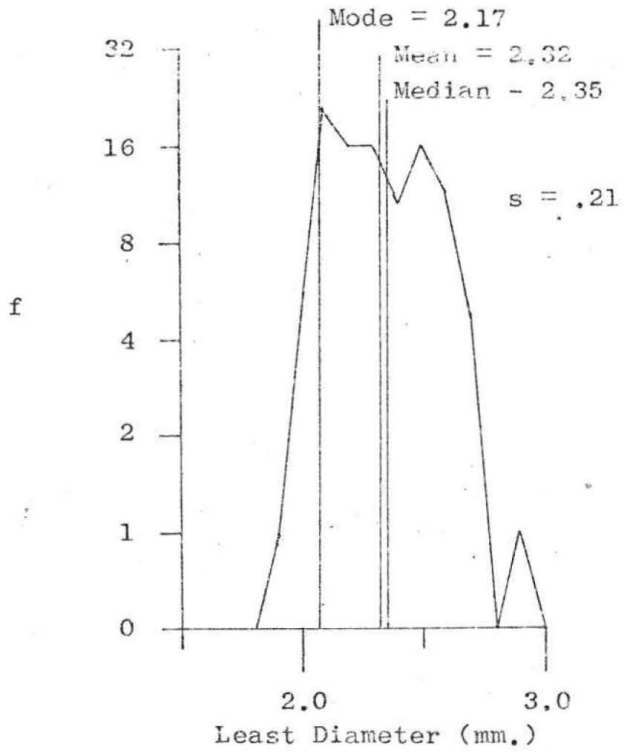


Fig. 55 - Transparent red faceted tube bead (FOVA Variety #1058) population as identified by least diameters (N = 106).

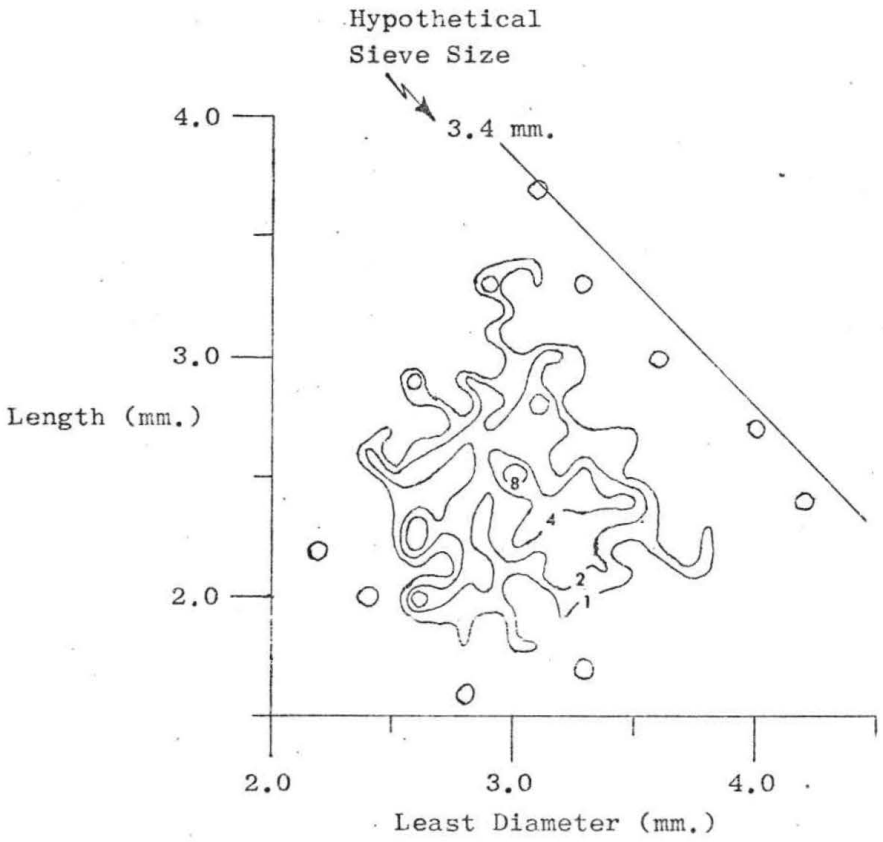


Fig. 56 - Isarithmic map of transparent dk. reddish purple faceted tube bead (FOVA Variety #1059) population as defined by the correlation of bead length with bead least diameter (N = 234 -- Contour intervals based upon the geometric sequence 1, 2, 4, 8, 16).

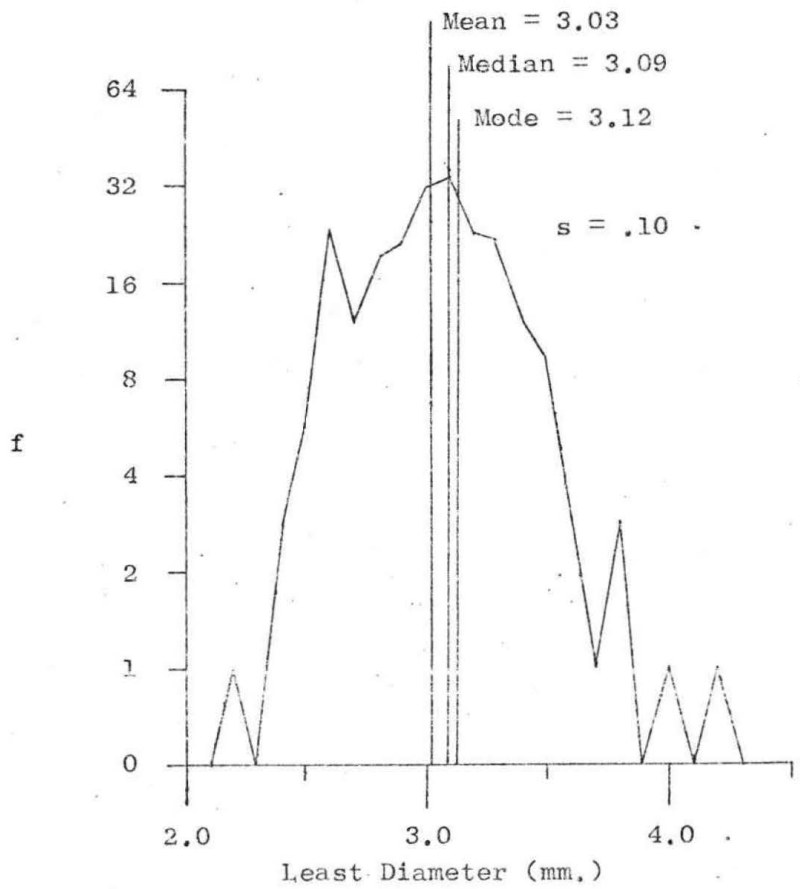


Fig. 57 - Transparent dk. reddish purple faceted tube bead (FOVA Variety #1059) population as identified by least diameters (N = 234).

Opaque Purple on Opaque Light Purple Beads (FOVA Variety #1032) -- Only one specimen was recovered and its size is recorded in Table 16.

Transparent Purple on Translucent Light Purple Beads (FOVA Variety #1077) -- Only one specimen was recovered and its size is recorded in Table 16.

Wire Wound Beads. The 588 wire wound beads recovered represented 1.082% of the total number of beads recovered from the Fur Store. Five stylistic classes were identified representing 10 descriptive varieties and 10 size populations (Tables 17-18).



Undecorated, Single Layered, Spherical Beads -- This stylistic class is equivalent to the Kidds' Class WIb, and of the 4 varieties defined (Tables 17-18), only one equivalent type could be found in the Kidds' system -- WIb11. Of all the wire wound beads recovered from the Fur Store, 96% belonged to this class with the most common color being blue.

Opaque Blue Beads (FOVA Variety #2002) -- Only 13 specimens were recovered representing one size population (Table 18). No equivalent type was found in the Kidds' system.

Opaque Dark Bluish Purple Beads (FOVA Variety #2006) -- Only one fragment was recovered and its original size was not obtainable. No equivalent type was found in the Kidds' system.

Opaque to Translucent Blue Beads (FOVA Variety #2018) -- The second most popular wire wound bead variety from the Fur Store (comprising 13.4%), this variety is quite variable in its color reflection, shape and size (Tables 17-18 and Figs. 58-59). Shape varied from slightly barrel to oblate, but the majority tend to be spherical. Within the Kidds' system, the equivalent type is WIb11.

Transparent Greenish Blue Beads (FOVA Variety #2005) -- The most popular wire wound bead from the Fur Store was this variety which comprised 80.1% of the total. This variety varied greatly in color and size (Tables 17-18 and Figs. 60-61), but reflection and shape were relatively consistent. One outstanding attribute with beads of this variety were the relative abundance of air bubbles within the glass. No equivalent type was found within the Kidds' system.



Undecorated, Single Layered, Bi-spherical Beads -- This stylistic class has no equivalent in the Kidds' system. Only one variety was defined on the basis of one specimen, and undoubtedly this specimen represents a manufacturing error.

Table 17 - Stylistic classes and descriptive varieties of wire wound beads from the Fur Store.

Stylistic Class and Variety Description	FOVA Variety	Variety Frequency	Class Frequency	Class %
UNDECORATED SINGLE LAYERED, SPHERICAL BEADS			564	95.9
Opaque				
Blue (7.5-10 B 4-5/6-8)	2002	13		
Dk. Bluish Purple (5-7.5 PB 2-3/8-10)	2006	1		
Opaque to Translucent				
Blue (2.5-7.5 B 4-6/4-8)	2018	79		
Transparent				
Greenish Blue (10 BG - 2.5-5 B 3-4/4-6)	2005	471		
UNDECORATED SINGLE LAYERED BI-SPHERICAL BEADS			1	0.2
Transparent				
Dk. Blue (10 B 3/8)	2050	1		
UNDECORATED SINGLE LAYERED ELLIPSOIDAL BEADS			15	2.5
Opaque				
White (N 9.5/)	2009	8		
Translucent				
Yellow (7.5 Y 7/6)	2021	1		
Transparent				
Red (5 R 2/8)	2032	6		
UNDECORATED SINGLE LAYERED, CYLINDRICAL BEADS			7	1.2
Translucent				
Greenish Blue (2.5 B 4/6)	2013	7		
UNDECORATED SINGLE LAYERED, CONICAL BEADS			1	0.2
Opaque				
White (N 9.5/)	2048	1		
TOTAL FREQUENCY			588	100.0

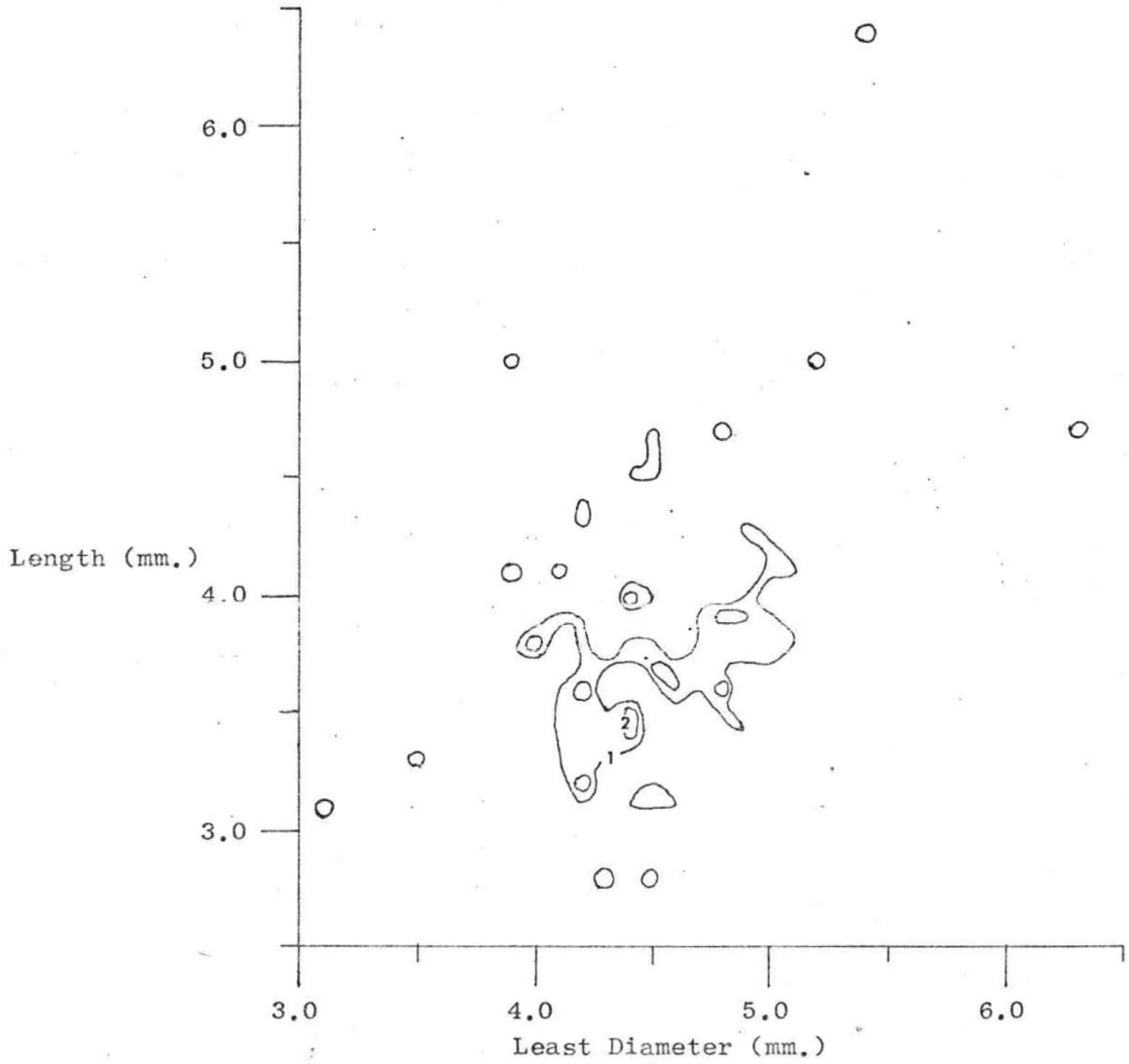


Fig. 58 - Isarithmic map of opaque to translucent blue wire wound bead (FOVA Variety #2018) population as defined by the correlation of bead length with bead least diameter (N = 79 -- Contour intervals based upon the geometric sequence 1, 2, 4).

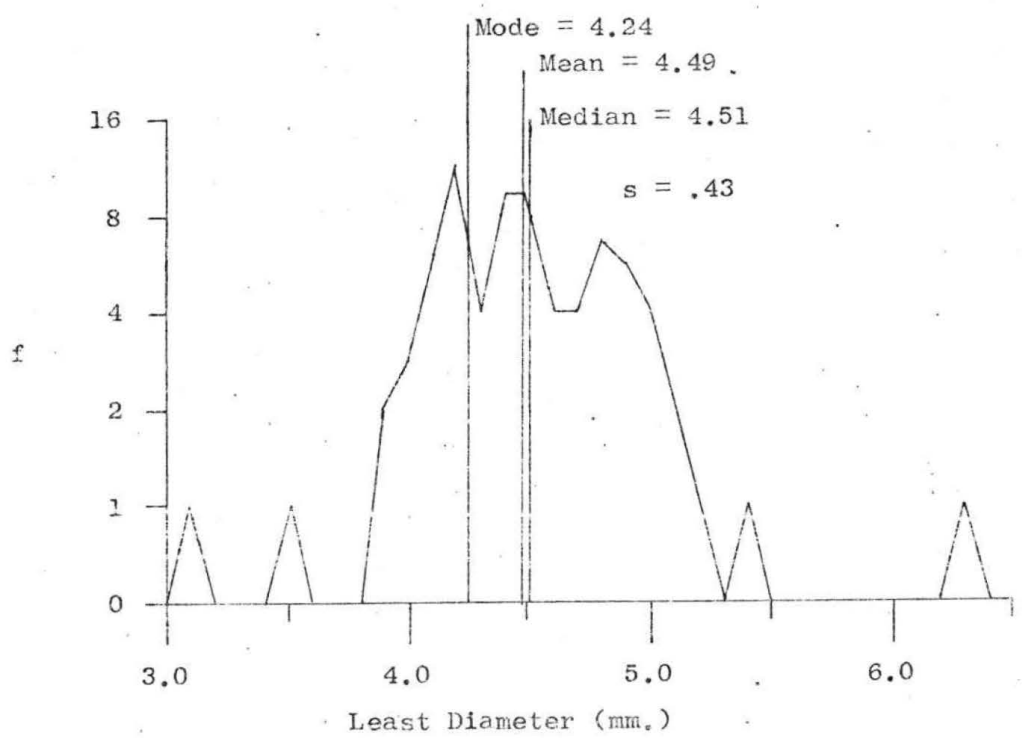


Fig. 59 - Opaque to translucent blue wire wound bead (FOVA Variety #2018) population as identified by least diameters (N = 79).

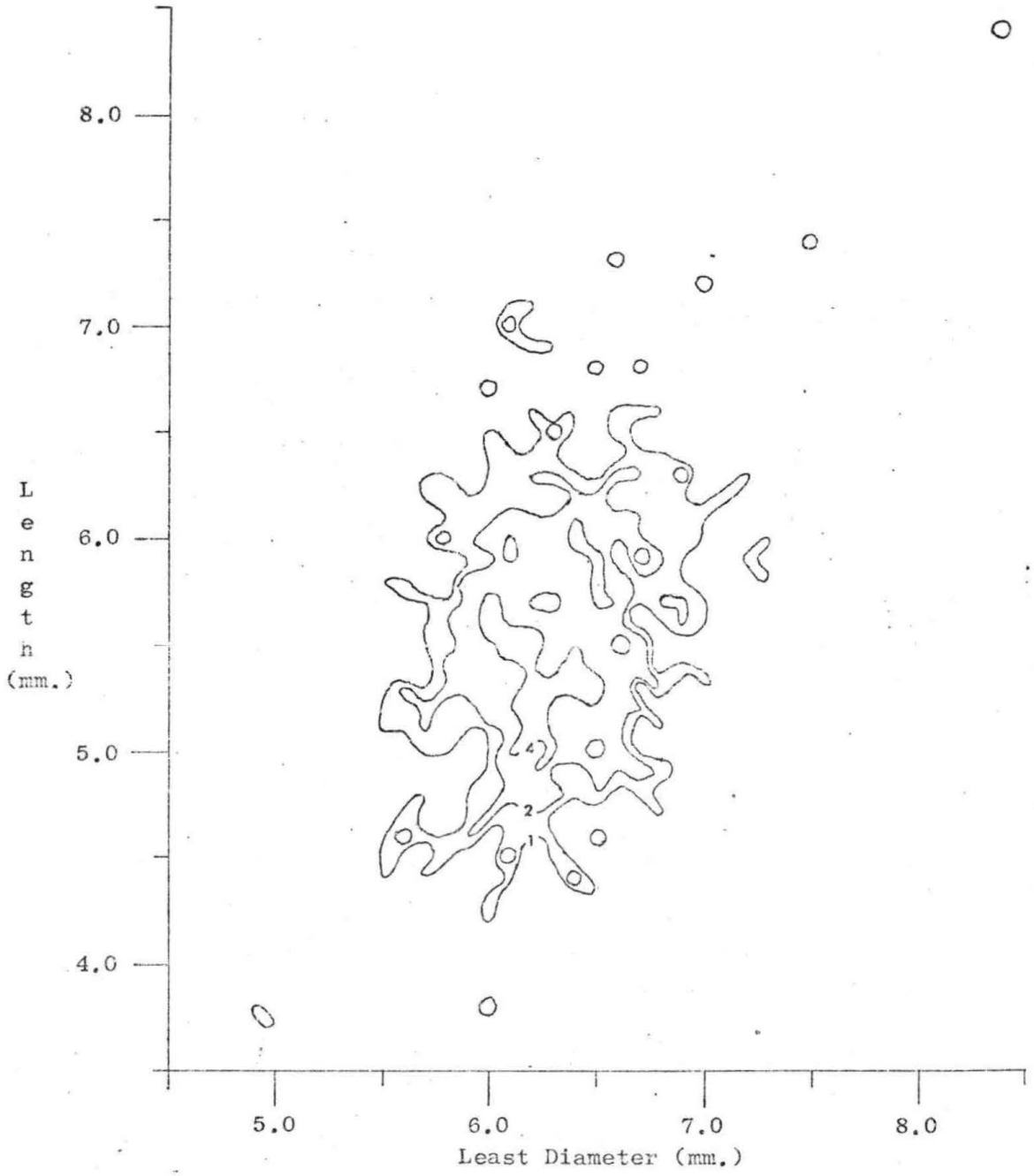


Fig. 60 - Isarithmic map of translucent blue wire wound bead (FOVA Variety #2005) population as defined by the correlation of bead length with bead least diameter (N = 471 -- Contour intervals based upon the geometric sequence 1, 2, 4, 8).

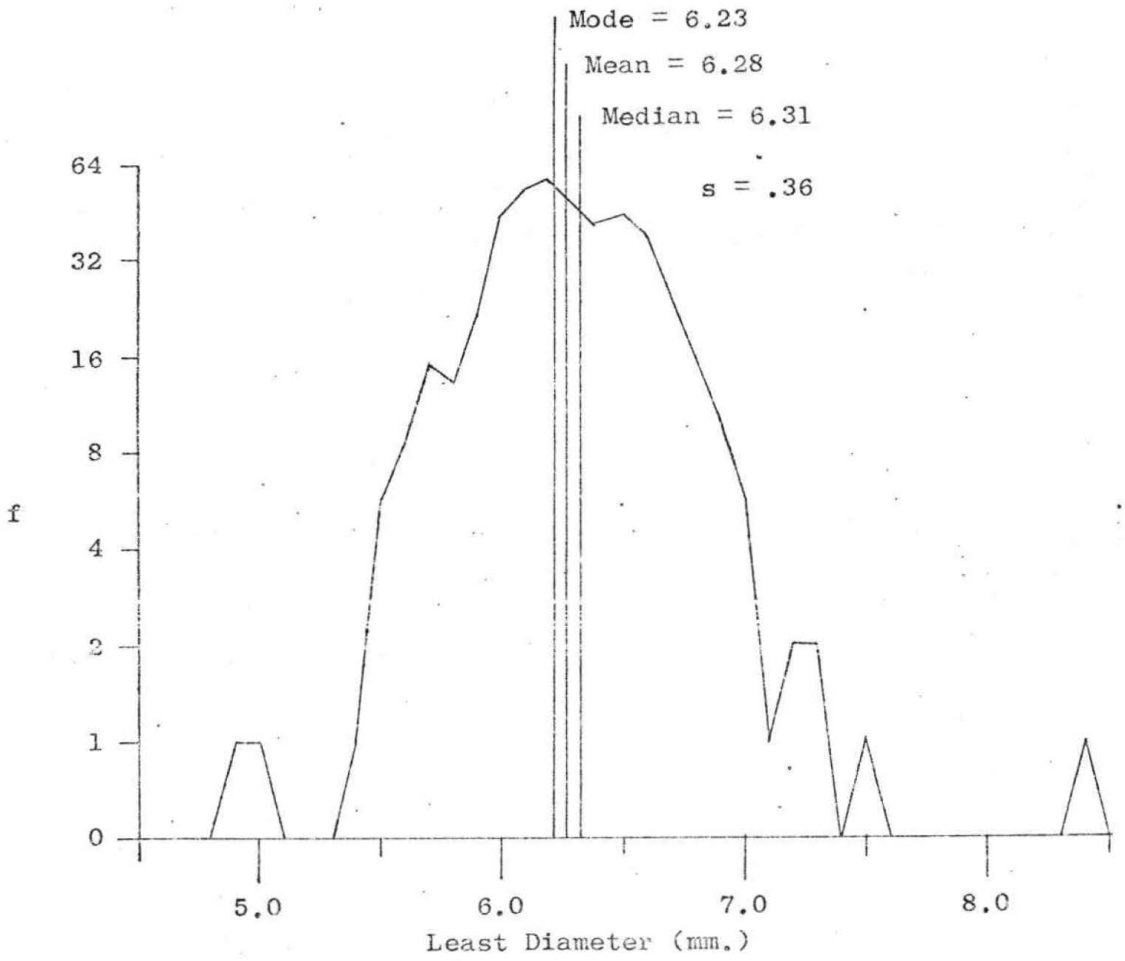


Fig. 61 - Translucent blue wire wound bead (FOVA Variety #2005) population as identified by least diameters (N = 471).

Table 18 - Hypothetical wire wound bead size populations from the Fur Store.

FOVA Variety #	Hypothetical Size Population		Variety Frequency	Variety %
	Least Diameter (mm.)	Length (mm.)		
2002	8.5-10.4	7.3-9.5	13	2.2
2005	4.9-8.4	3.7-8.4	471	80.1
2006	-	-	1	0.2
2009	4.6-5.4	7.8-9.2	8	1.3
2013	8.1-8.9	6.0-10.3	7	1.2
2018	3.1-6.3	2.8-6.4	79	13.4
2021	5.3	9.5	1	0.2
2032	4.7-5.5	7.2-9.2	6	1.0
2048	5.3	6.7	1	0.2
2050	6.7	12.3	1	0.2
TOTAL FREQUENCY			588	100.0

Translucent Dark Blue Bead (FOVA Variety #2050) -- Only one specimen was recovered and its size is recorded in Table 18. This variety probably represents a manufacturing error of FOVA Variety #2033 (a variety not found in the Fur Store).



Undecorated, Single Layered, Ellipsoidal Beads -- This stylistic class is equivalent to the Kidds' Class Wlc, and of the 3 varieties defined (Tables 17-18), only one equivalent type was found in the Kidds' system -- Wlc1.

Opaque White Beads (FOVA Variety #2009) - Only 8 specimens were recovered, and the size range is recorded in Table 18. Within the Kidds' system, the equivalent type is Wlc1.

Translucent Yellow Bead (FOVA Variety #2021) -- Only one specimen was recovered, and its size is recorded in Table 18. No equivalent type was found within the Kidds' system.

Transparent Red Beads (FOVA Variety #2032) -- Only 6 specimens were recovered, and the size range is recorded in Table 18. No equivalent type was found within the Kidds' system.



Undecorated, Single Layered, Cylindrical Beads -- This stylistic class is equivalent to the Kidds' Class Wla, and the only variety defined was not found in the Kidds' system.

Translucent Greenish Blue Beads (FOVA Variety #2013) -- Only 7 specimens were recovered, and the size range is recorded in Table 18.

As such, the term nail will incorporate our previous terms tack, sprig, brad and spike (Hoffman and Ross 1973b:107); and when these terms are used, they will denote generalized references to specific varieties (e.g. "pump tack," "railroad spike," etc.)

Of the 11,126 nail fragments recovered, there were 2696 wrought rod, 5292 machine cut sheet, 754 machine cut wire, 11 cast and 2373 unidentified nail fragments. Disregarding machine cut wire nails (due to their association with USA deposits), 71 nail varieties were identified; and for each variety, size populations were hypothesized, defined and identified by the correlation of nail shank thickness and length (see Tables 21-23 for the corresponding penny sizes of length in inches for each variety). Nine size populations belonging to 5 varieties have been statistically identified on the basis of nail length. The percentage of nails within 1, 2 and 3 standard deviations of each population mean has been computed (Table 19), and the average percentage for these populations is presented in Table 20. On the basis of the population observations, nail size populations at Fort Vancouver can be regarded as relatively "normal" with a tendency toward peakedness -- a condition called leptokurtic. In other words, nails within a single size population tend to cluster tightly about a centroid measurement.

Table 19 - Percentage of nails measured which fall within 1, 2 and 3 standard deviations of each population mean.

FOVA Variety # (Penny Size)	Standard Deviation			Population Frequency
	1s	2s	3s	
1002 (4d)	79.2%	95.1%	99.7%	308
1060 (18d)	71.4%	99.0%	100.0%	98
2001 (4d)	84.4%	93.8%	99.7%	289
2001 (10d)	83.6%	94.5%	96.4%	55
2002 (6d)	72.3%	96.4%	100.0%	137
2002 (8d)	79.7%	94.8%	100.0%	153
2002 (10d)	72.2%	96.7%	100.0%	180
2004 (4d)	77.4%	96.2%	100.0%	106
2004 (9d)	72.7%	100.0%	100.0%	99

Table 20 - Average percentage of nails within 1, 2 and 3 standard deviations of each population mean as compared to the average percentages expected for a normal population (following Spiegel 1961:71-72).

Standard Deviation	Percentage Range for FOVA Nails	Average Percentage $\pm s$ for FOVA Nails	Percentage for Normal Distribution
1s	71.4 - 84.4%	77.0 $\pm$ 4.8%	68.3%
2s	93.8 - 100.0%	96.3 $\pm$ 2.0%	95.5%
3s	96.4 - 100.0%	99.5 $\pm$ 1.1%	99.7%

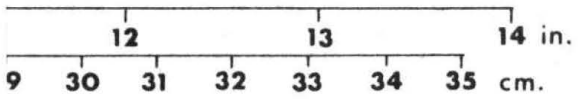
Fewer wrought rod nails than machine cut sheet nails were recovered from the Fur Store area. All buildings previously excavated contained more wrought rod nails than machine cut sheet nails, and this reversed nail ratio is presumably due to the use of the Fur Store building by the U.S. Army from 1849-1860 (Hussey 1957:185-186). This addition of USA nails is best exemplified by the "shingling" nails. Three varieties of "shingling" nails were recovered -- #1002, #2001 and #2004. Variety #1002 is discussed in the section on wrought rod nails and Varieties #2001 and #2004 are discussed in the section on machine cut sheet nails. Varieties #1002, #2001 and #2004 were found elsewhere in the Fort when shingling was accomplished. Variety #1002 "shingling" nails were the most common for the Sales Shop (91% of identified "shingling" nails) which was shingled in 1845 (Hoffman and Ross 1974:37), and Variety #2001 were the most common for the Chief Factor's House (72.3% of identified "shingling" nails) which was shingled in 1846 (Hoffman and Ross 1973b: 107). The exact shingling date for the Fur Store is not known, but on the basis of the above comparisons and the distributional evidence (see Chapter IV), at least one shingling event using Variety #2001 nails is hypothesized as occurring ca. 1845-1846. The presence of Variety #1002 "shingling" nails in the blacksmith and cooperage areas may indicate either shingling or barrel making and the presence of Variety #2004 "shingling" nails within the Fur Store is hypothesized as indicating a repair shingling event undertaken by the U.S. Army sometime after 1849.

Wrought Rod Nail Fragments. Wrought rod nails are manufactured from square, rectangular or round nail rods (usually iron), and have a tapered tip produced by compressive techniques. Such nails may be produced by hand and/or machine, and the terms hand and machine wrought will be used to identify such manufacturing techniques when known. In previous reports, wrought rod nails have been referred to as "hand forged" nails, but due to its confusing conotation, this term will be dropped.

Of the 2696 wrought rod nail fragments recovered, 932 were complete nails and 52 varieties were identified (Table 21 and Fig. 62). Wrought rod nail varieties previously illustrated (Hoffman and Ross 1973b:109-111; 1974:39, 41) are not reproduced within this report, but new varieties have been illustrated in Figs. 63-65.

As noted in earlier reports, machine cut sheet nails were rarely longer than 5 inches at Fort Vancouver; and wrought rod nails were commonly found in sizes up to 10 inches. In the Fur Store area, clusters of large wrought rod nails were observed in 4 sizes (Fig. 62) -- 16-20d, 40d, 6-8 inch and 9-10 inch.

The 16-20d nails were primarily Variety #1060 nails. Stylistically, this nail variety is identical to, but longer than, the siding nails (Variety #1002c) reported from the Sales Shop (Hoffman and Ross 1974:37).





ıts)

Table 21 - Varieties and hypothesized populations for wrought rod nails from the Fur Store area.

Variety # (Population)	Penny Size or inches	Length (cm)	Thickness (mm)	Number Measured	Total Frequency
1001	8d-20d	6.2-10.2	4.0-4.8	12	40
1002	3d-7 1/2"	3.2-19.3	2.8-8.1	515	803
(1)	3d-6d	3.2-5.3	2.8-4.0	(308)	
1004	10d	7.6	4.4	1	2
1005	3d	2.9-3.1	3.8-3.9	2	5
1007	10d-20d	7.2-10.3	5.3-7.1	15	17
(1)	10d-16d	7.2-8.7	5.3-5.4	(4)	
(2)	16d-20d	8.9-10.3	6.4-7.1	(11)	
1009	8d-7"	6.2-17.5	5.1-9.4	45	47
(1)	8d-10d	6.2-7.2	5.1-5.3	(3)	
(2)	16d-30d	9.4-11.0	5.8-6.7	(8)	
(3)	30d-40d	11.5-13.0	6.3-7.0	(18)	
(4)	5"-5 1/2"	12.7-14.1	7.7-8.3	(8)	
(5)	6 1/4-6 1/2"	15.8-16.5	8.1-8.9	(4)	
1014	5"-7 3/4"	12.7-19.8	7.9-11.0	25	43
(1)	5"-5 1/4"	12.7-13.6	7.9-8.4	(11)	
(2)	5 3/4-6"	14.6-15.2	9.0-9.5	(3)	
(3)	6 1/2"	16.3	9.5-9.6	(2)	
(4)	6 3/4-7"	17.2-17.9	9.3-9.7	(4)	
(5)	7 1/2-7 3/4	19.1-19.8	8.4-8.5	(4)	
1016	10 1/4"	26.2	13.1	1	1
1022	8d	6.1	6.6-6.7	2	2
1026	9d-18d	7.0-9.6	8.8-11.9	3	3
1027	7d	5.8	7.9	1	1
1038	7d	5.8	5.2	1	1
1043	7"-10"	17.7-25.0	9.8-17.6	8	8
(1)	7"-7 1/2"	17.7-18.8	9.8-10.3	(4)	
(2)	9"-10"	22.8-25.0	10.3-17.6	(4)	
1050	5 1/2"	13.7	8.5	1	1
1051	2d	2.7	3.5	1	1
1055	5"	12.5-12.7	7.1-7.6	2	2
1059	4d-6d	4.0-5.2	3.1-3.5	2	2
1060	6d-5 1/2"	5.4-14.2	4.4-7.4	161	161
(1)	8d-10d	6.7-7.8	4.5-5.2	(32)	
(2)	16d-20d	8.7-10.2	5.0-6.0	(98)	
1061	9d	6.7-7.3	7.2-7.4	2	2
1062	9 1/4"	23.4	17.2	1	1
1063	7 1/4-7 3/4"	18.3-19.8	17.0-17.3	2	2
1064	18d-20d	9.8	8.2	1	1
1065	16d-18d	9.2	8.5	1	1
1066	6"-8"	15.3-19.8	5.8-6.5	19	19
1068	7d	5.6	5.6	1	1

Table 21 (cont'd.)

Variety # (Population)	Penny Size or Inches	Length (cm)	Thickness (mm)	Number Measured	Total Frequency
1073	5d	4.7	3.4	1	1
1075	30d-40d	11.8-13.3	10.3-10.9	2	2
1081	9 1/2-10$\frac{1}{4}$"	23.6-25.8	13.0-14.6	8	8
1082	10"	24.7	12.7	1	1
1083	6 3/4"	17.0	6.8	1	1
1084	6 3/4-7 1/4"	17.0-18.6	6.1-7.2	10	10
1085	10 1/2"	26.7	13.5	1	1
1086	8d-9d	6.4-6.7	6.8-6.9	2	2
1087	20d	10.0	6.0-6.9	2	2
1088	5 1/4-13"	13.6-33.5	13.5-15.1	3	3
1089	18d-20d	9.8	9.7	1	1
1090	7d-18d	5.9-9.7	7.1-9.7	12	13
(1)	7d-9d	5.9-7.1	7.1-7.8	(10)	
(2)	18d	9.5-9.7	9.6-9.7	(2)	
1091	6d-10d	5.3-7.5	4.3-5.4	5	5
1092	12d-16d	8.6	4.3	1	1
1093	3d	3.2-3.3	5.0-5.3	2	2
1094	16d-18d	9.2	6.2	1	1
1095	11"-12"	28.2-29.8	21.7-22.2	2	2
1096	8d-9d	6.8	7.3	1	1
1097	9 3/4"	24.3	13.3	1	1
1098	36d	12.3	6.6	1	1
1099	7d	5.7	6.6	1	1
1100	5 3/4"	14.5	6.0	1	1
1101	3d	3.2	4.3	1	1
1102	16d-18d	9.2	8.5	1	1
1103	10 1/4"	25.5-25.7	9.7-10.0	3	3
1104	1 1/2-2 1/2"	4.0-6.4	4.3-6.4	45	154
Unid.	-	-	-	-	1309
TOTAL					2696

Fig. 63 - New wrought rod nail varieties from the Fur Store area.

a - Variety #1007 (FOVA 17375) -- L=8.8 cm.

b - Variety #1043 (FOVA 17498) -- L=25.0 cm.

c - Variety #1061 (FOVA 14099) -- L=7.3 cm.

d - Variety #1062 (FOVA 16746a) -- L=23.5 cm.

e - Variety #1063 (FOVA 17851) -- L=19.8 cm.

f - Variety #1065 (FOVA 16111) -- L=9.5 cm.

g - Variety #1066 (FOVA 17584) -- L=15.3 cm.

h - Variety #1068 (FOVA 16659) -- L=5.5 cm.

i - Variety #1073 (FOVA 15186) -- L=4.7 cm.

j - Variety #1075 (FOVA 15870) -- L=13.3 cm.

k - Variety #1081 (FOVA 15042) -- L=24.8 cm.

l - Variety #1082 (FOVA 14557) -- L=24.3 cm.

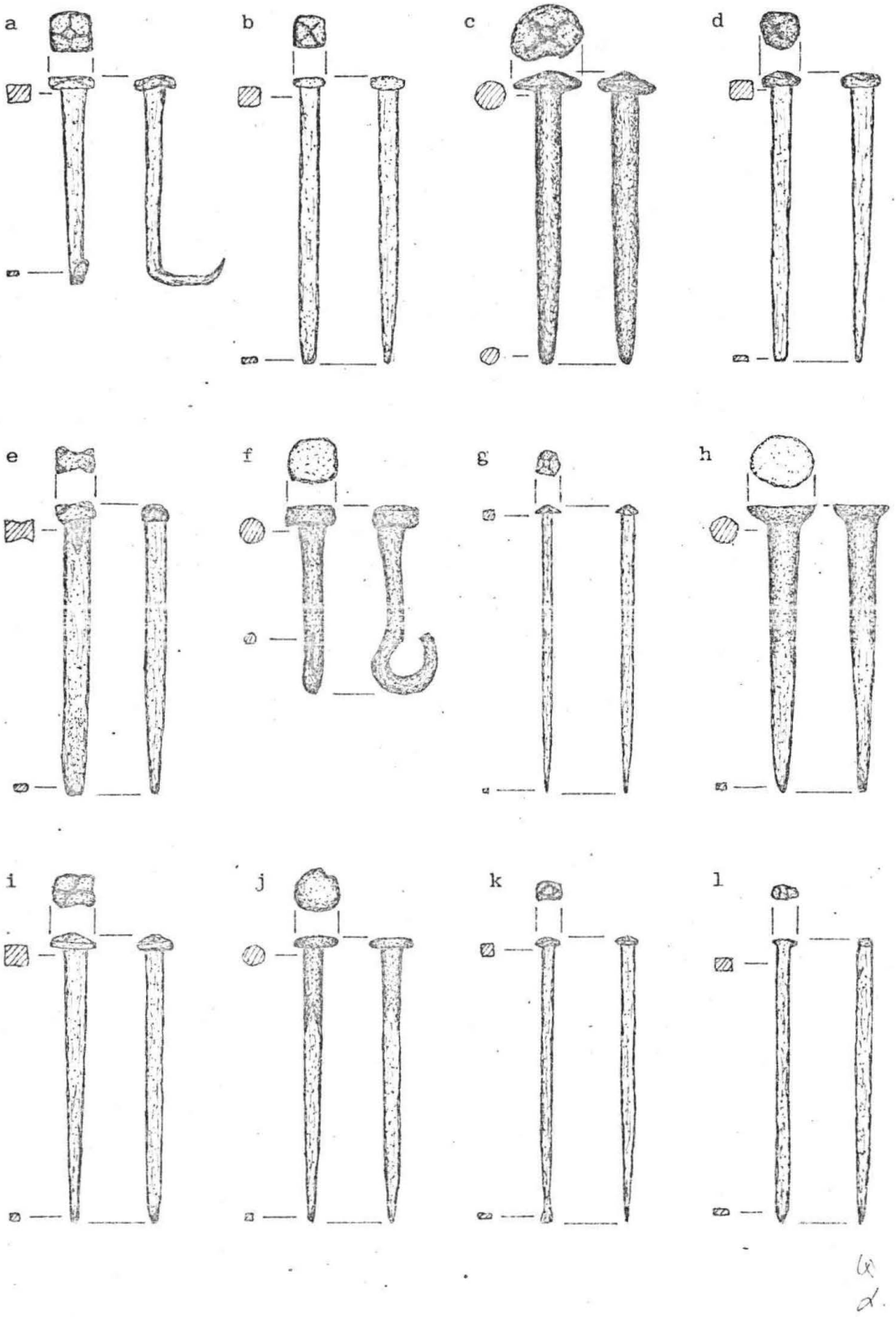

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Fig. 64 - New wrought rod nail varieties from the Fur Store area.

a - Variety #1083 (FOVA 14958) -- L=17.0 cm.

b - Variety #1084 (FOVA 17474) -- L=17.8 cm.

c - Variety #1085 (FOVA 15314) -- L=26.7 cm.

d - Variety #1086 (FOVA 15476) -- L=6.7 cm.

e - Variety #1087 (FOVA 15662) -- L=10.1 cm.

f - Variety #1088 (FOVA 16833) -- L=14.7 cm.

g - Variety #1089 (FOVA 15870) -- L=9.8 cm.

h - Variety #1090 (FOVA 17424) -- L=6.5 cm.

i - Variety #1091 (FOVA 16111) -- L=7.4 cm.

j - Variety #1092 (FOVA 16111) -- L=8.5 cm.

k - Variety #1093 (FOVA 17941a) -- L=3.2 cm.

l - Variety #1094 (FOVA 16238) -- L=9.2 cm.

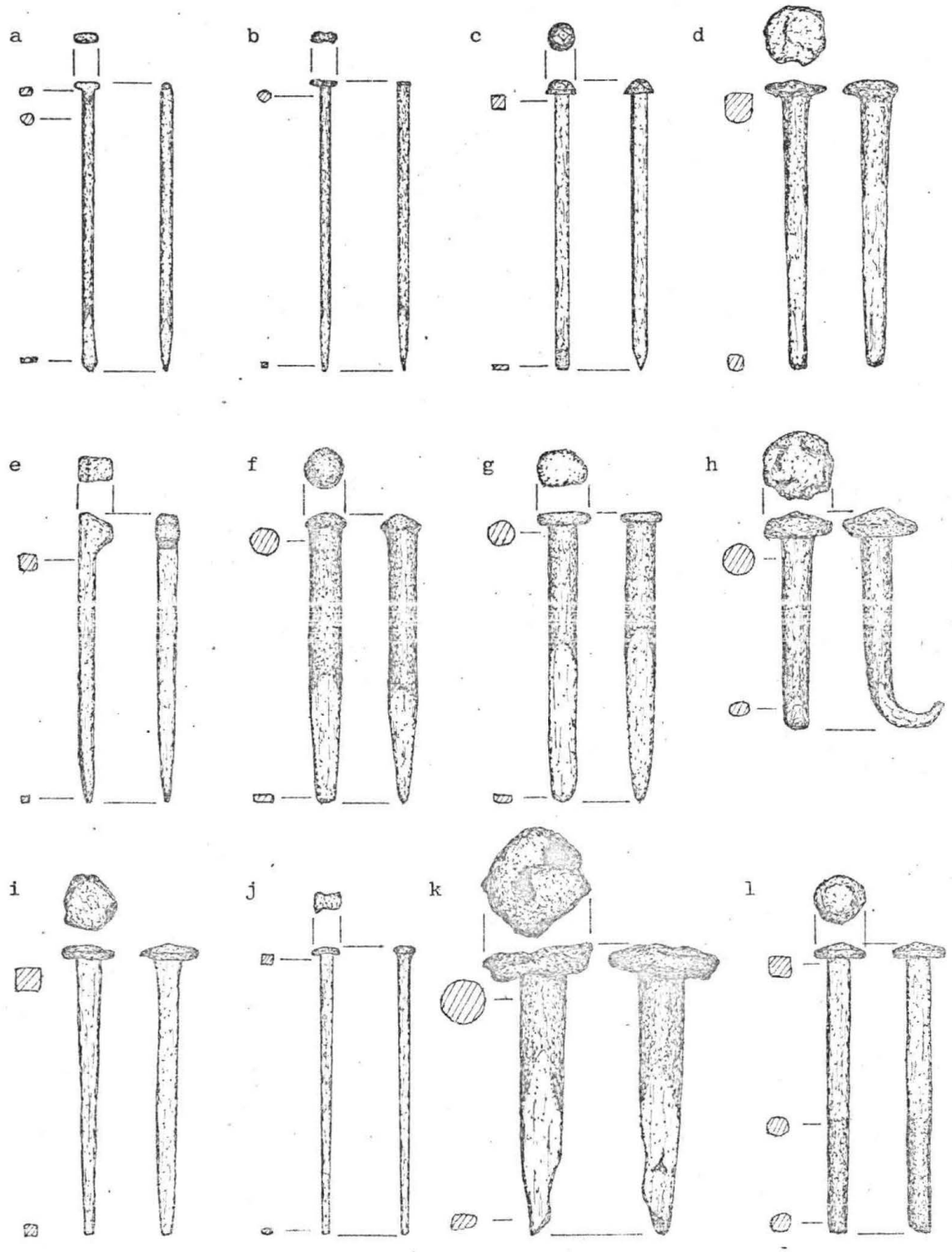

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Fig. 65 - New wrought rod nail varieties from the Fur Store area.

a - Variety #1095 (FOVA 16769) -- L=28.3 cm.

b - Variety #1096 (FOVA 16963) -- L=6.8 cm.

c - Variety #1097 (FOVA 17108) -- L=23.9 cm.

d - Variety #1098 (FOVA 17375) -- L=12.3 cm.

e - Variety #1099 (FOVA 17525) -- L=5.7 cm.

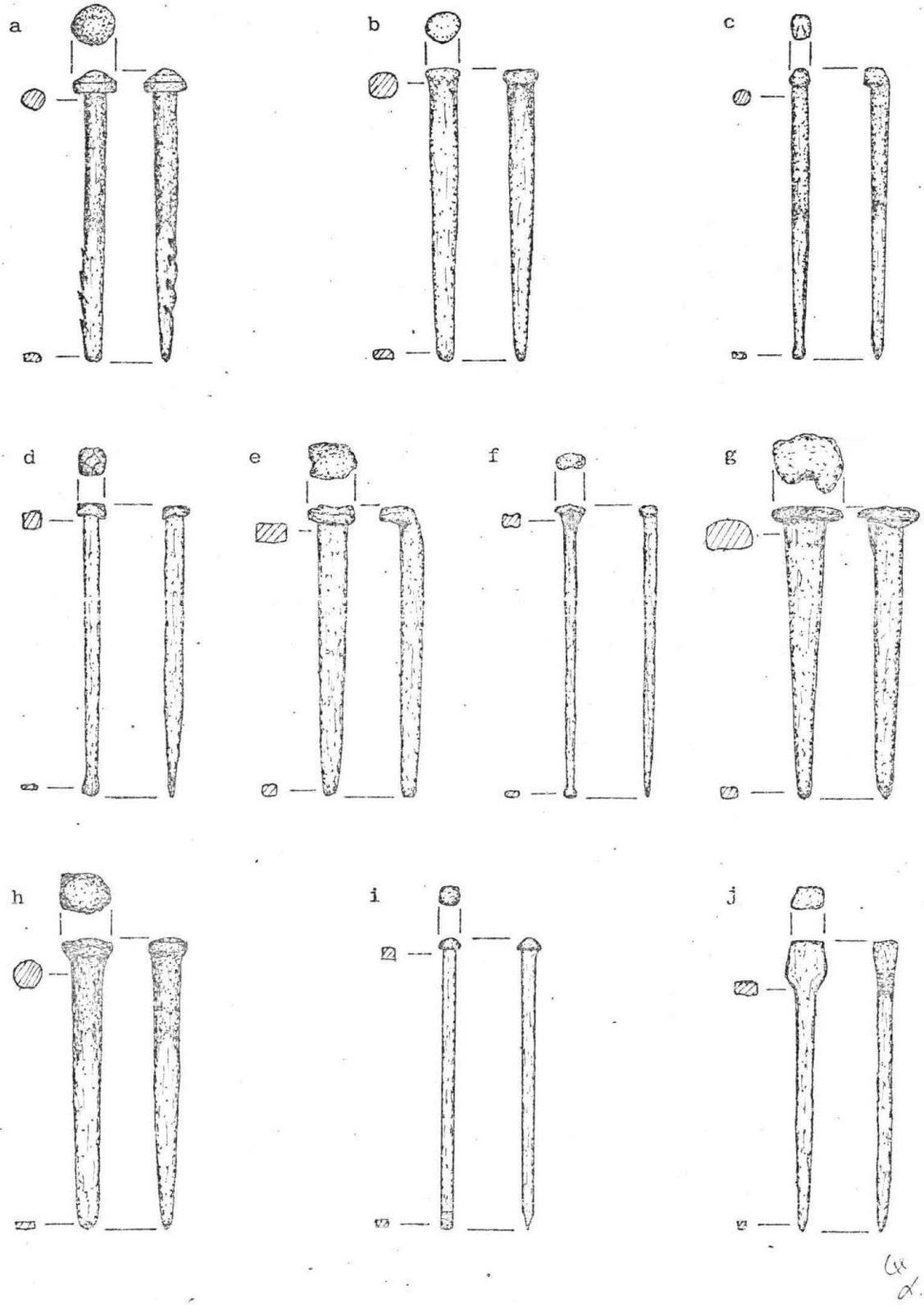
f - Variety #1100 (FOVA 17564) -- L=14.5 cm.

g - Variety #1101 (FOVA 17564) -- L=3.2 cm.

h - Variety #1102 (FOVA 17842) -- L=9.4 cm.

i - Variety #1103 (FOVA 17881) -- L=25.6 cm.

j - Variety #1104 (FOVA 17498) -- L=6.3 cm.


a
b
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e
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g
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j

Variety #1002c has now been assigned its own separate variety number -- #1060. The longer length of the specimens from the Fur Store cannot be completely explained, and there is no evidence to suggest that siding was ever put on the Fur Store. Presently, it is hypothesized that this variety may have been utilized in the construction of the interior floors or partitions.

The 40d nails were represented by 3 varieties -- #1002, #1009 and #1014. These varieties tended to occur around footings of the Fur Store and may have been utilized in toe nailing post or flooring joists to sills. However, no direct evidence of this practice is known from historical accounts, and past archeological research has not produced similar hypotheses.

The 6-8 inch nails were primarily Variety #1066 nails, and most of these specimens were found in association with the wooden roadway west of the Fur Store. It is hypothesized that this variety of nail was utilized to fasten wooden planks to the underlying roadway foundation.

The 9-10 inch nails were primarily Variety #1081 nails, and all were found driven into the wooden footings of the Fur Store. These nails were driven into the footings from a variety of angles, and from their location and orientation, many could not have been driven once the footing was laid. For this reason, it is hypothesized that the footings originally came from lumber previously used in an earlier structure; and once this structure was torn down, its "aged" lumber was sawn into footing-sized blocks and used for the Fur Store foundation. Presently, no structure has been reported, either historically or archeologically, which utilized 9-10 inch spikes, and one functional interpretation has been that the "aged" lumber represented old stockade walers which may have been spiked to stockade posts. Historically, walers were attached to posts by wooden doweling (Hussey 1957:130), but they could just as easily have been nailed.

Specific wrought rod nail varieties which provide significant interpretive information are individually discussed below.

Variety #1002 -- Commonly referred to as a "rosette head, sharps" nail, and in HBC terminology probably includes the categories "sharps" and "fine-drawn rose" nails (Hussey 1972:271). This variety was manufactured in England in quantity throughout the 19th Century, and probably imported to Fort Vancouver until at least ca. 1852. It was manufactured from square-rectangular nail rods with the tip being tapered on four sides to a sharp point. Distal portions of the shank were peened or thinned prior to the formation of a multiple faceted (3 or more facets) "rosette" head. This is the most common wrought rod nail variety recovered at Fort Vancouver and has been illustrated in FOVA reports #IV and VI (Hoffman and Ross 1973b:Fig. 24b; 1974: Fig. 12b).

On the basis of the correlation of nail length with average shank thickness, a 4d nail size has been identified (Figs. 66-67) and constitutes 59.8% of all measurable Variety #1002 nails (Table 21). This 4d nail size has previously been correlated with historic shingling activities of the Sales Shop (Hoffman and Ross 1974:37), but the larger sizes in the Fur Store (Table 21) suggest the variety may also have been utilized for heavier construction. The Sales Shop was presumably shingled with Variety #1002 nails in 1845 (Hoffman and Ross 1974:37), and it is suggested that Variety #1002 "shingling" nails from the blacksmithing area may represent a shingling event dated ca. 1829-1836. However, the "shingling" nails from the cooperage area may have been utilized as a "cooper's" nail.

Variety #1007 -- This variety was manufactured from square nail rods with the shank being uniformly tapered on 4 sides to a sharp point (Fig. 63). The head was faceted with at least 4 hammer blows to form a "rosette" type head, slightly assymetrical on the shank. On the basis of the correlation of nail length with average shank thickness, 2 tentative populations have been defined, ca. 10d and 16d, encompassing all measurable nails (Table 21). The illustrated specimen reported for the Chief Factor's House (Hoffman and Ross 1973b:Fig. 24a) has been judged not representative of this variety and subsequently assigned to Variety #1064. The correct illustration of Variety #1007 appears in the present report (Fig. 63a). Of the 35 specimens recovered from all excavations, 30 have been clenched at a point 2 1/2 inches from the base of the head. This variety may have been used for door or shutter construction, and its function would have been to laminate 2 or more wooden planks together to form a complete door or shutter with a thickness of 2 1/2 inches. These nails were probably not used to fasten building hardware to wood since iron work usually required a round-shanked fastener.

Variety #1009 -- Commonly termed "rosette-head, flat tip" nails or spikes, this variety was manufactured in the same manner as Variety #1002 with the exception that the tip was worked to a spade or spatulate form. HBC may have termed this variety "fine-drawn rose" (as with nail Variety #1002, the term "fine-drawn" was merely a shank thickness descriptive term), or "spike nail". The nail was probably manufactured in England in quantity until at least 1870 and was imported to Fort Vancouver until ca. 1852. Variety #1009 has been recovered in quantity throughout the Fort and has been illustrated in Report IV (Hoffman and Ross 1973b:Fig. 24i). Correlation of nail length to average shank thickness suggested that at least 5 sizes were represented in the Fur Store area and ranged from 10d (3 inches) through ca. 6 inches in size (Table 21). This variety of nail or spike was probably utilized in heavy construction such as securing joists and/or posts to sills.

Variety #1014 -- This nail variety was only found in spike sizes and at least 5 metric populations have been identified (Table 21). It has

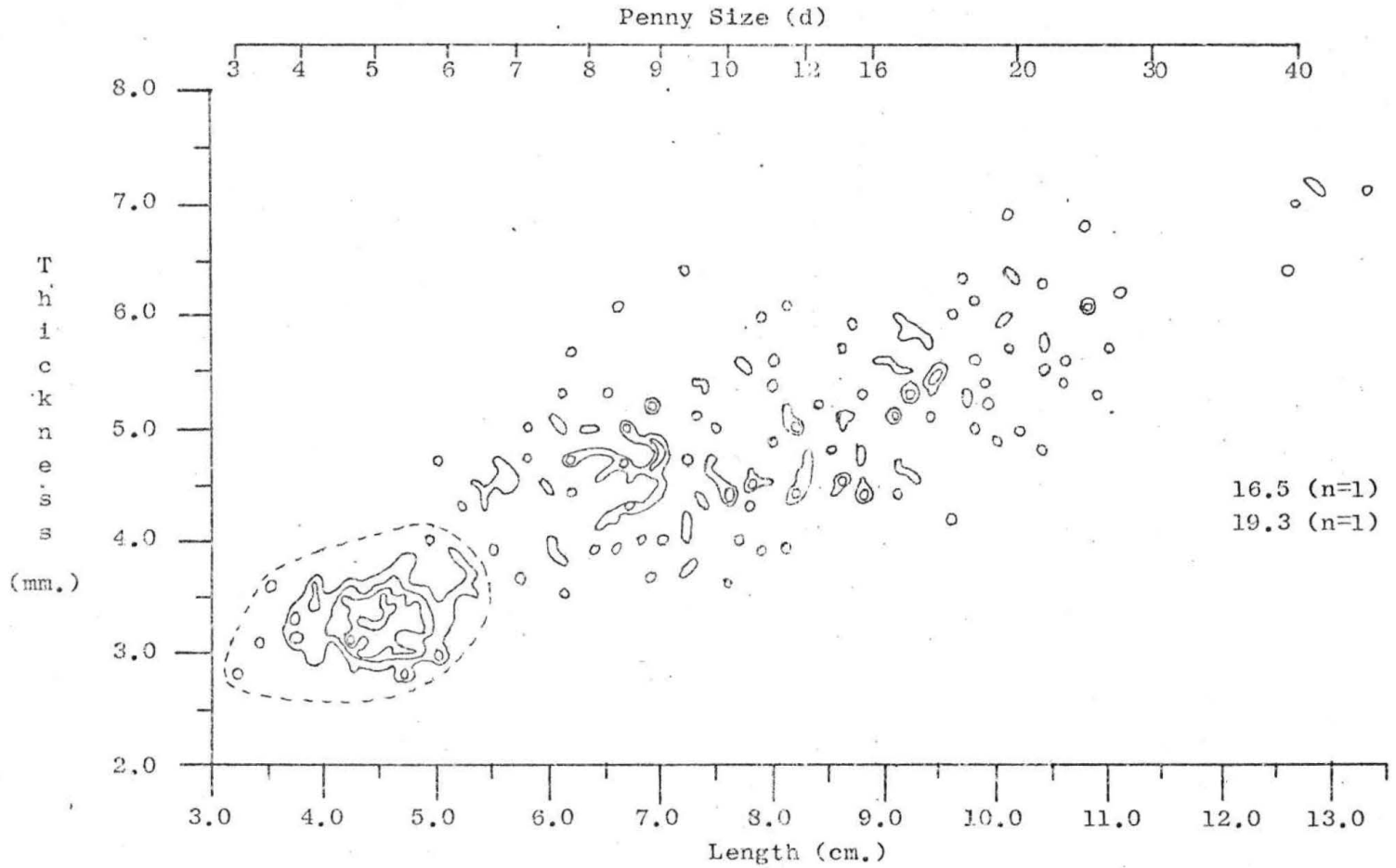


Fig. 66 - Isarithmic map of wrought "rosette sharps" nail (FOVA Variety #1002) populations as defined by the correlation of nail length with average stock thickness (N = 515 -- contour intervals based upon the geometric sequence 1, 2, 4, 8, 16).

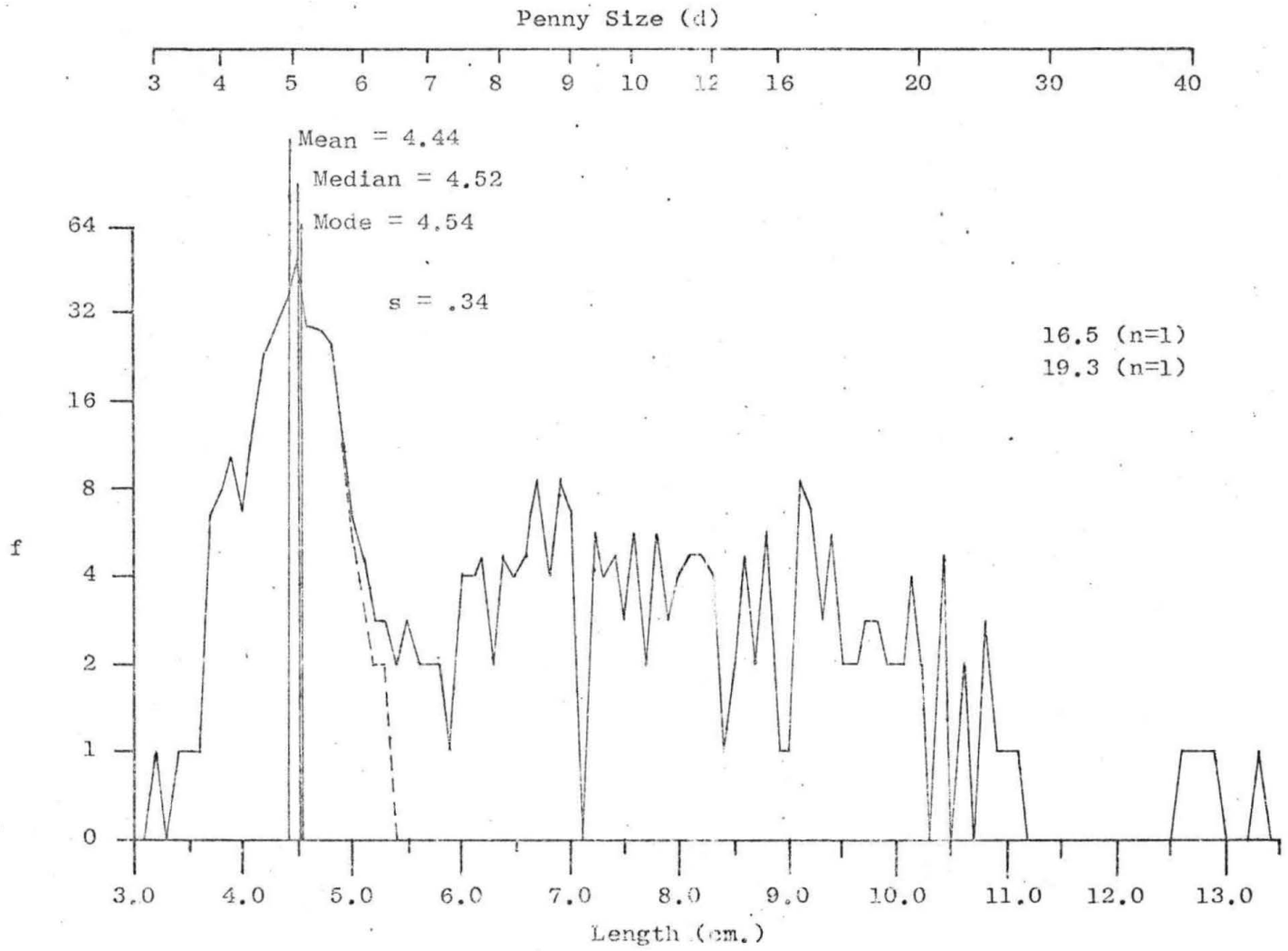


Fig. 67 - Wrought "rosette sharps" nail (FOVA Variety #1002) populations as identified by nail length (N = 515).

has been called a "T- or diamond head" spike (Tomlinson 1851; Nelson 1968). This variety of spike was manufactured from square nail rods, the tip being tapered primarily on 2 sides to a spade or "flat" tip. The characteristic head shape was accomplished in 2 stages: 1) the metal was upset by multiple hammer blows directed at the nail rod corners to form a rosette, 4-faceted head; and 2) the head was then struck on 3 or 4 sides to form a rectangular-shaped, domed head. Representative examples have been illustrated in FOVA Report IV (Hoffman and Ross 1973b:Fig. 25c-d). Following Report IV, the previously designated Varieties #1014 and #1015 were combined within Variety #1014. This variety was probably utilized in heavy construction in the Fur Store, stockade and plank roadway; and until at least ca. 1850 it was manufactured in England (Tomlinson 1851).

Variety #1059 -- A hand forged, rosette-sharps nail of shingling size range. In the Sales Shop report, this variety was reported and illustrated as Variety #1002 (Hoffman and Ross 1974:Fig. 12a). It has since been assigned Variety #1059 due to the existence of shank neck attributes recognized following cleaning of the nail.

Variety #1060 -- Originally, this variety was designated as Variety #1002c and was observed to have slight differences in the nail shank. These differences are formalized as "variations" and illustrated in the Sales Shop report (Hoffman and Ross 1974:Fig. 12b-c). The basic attribute distinguishing #1002c (now #1060) from #1002 nails is its unique "clipped" tip. This variety has been functionally associated with the application of sheathing or siding (Ibid.:37) and has been historically identified as being manufactured in England until at least ca. 1850 (Tomlinson 1851). Correlation of nail length to average shank thickness indicates both a size population comparable to that found in the Sales Shop as well as a larger 16d-20d population (Table 21 and Figs. 68-69). As yet there is no explanation as to the utilization of Variety #1060 nails in the Fur Store since historically, the building did not appear to have been sheathed. This variety may in fact have been utilized in either floor construction or in constructing interior partitions.

Variety #1064 -- Reported and illustrated as Variety #1007 in the Chief Factor's House report (Hoffman and Ross 1973b:Fig. 24g), the specimen illustrated (in that report) has since been recognized as not representative of that variety and reassigned to Variety #1064. One specimen was recovered from the Fur Store area.

Variety #1066 -- Manufactured from square nail rods, this variety has a "rosette" head and "sharps" tip. It differs from Variety #1002 in that distal shank peening or thinning is absent. The variety was initially recognized following the cleaning of specimens from the Chief Factor's area but has not yet been reported or illustrated. It is

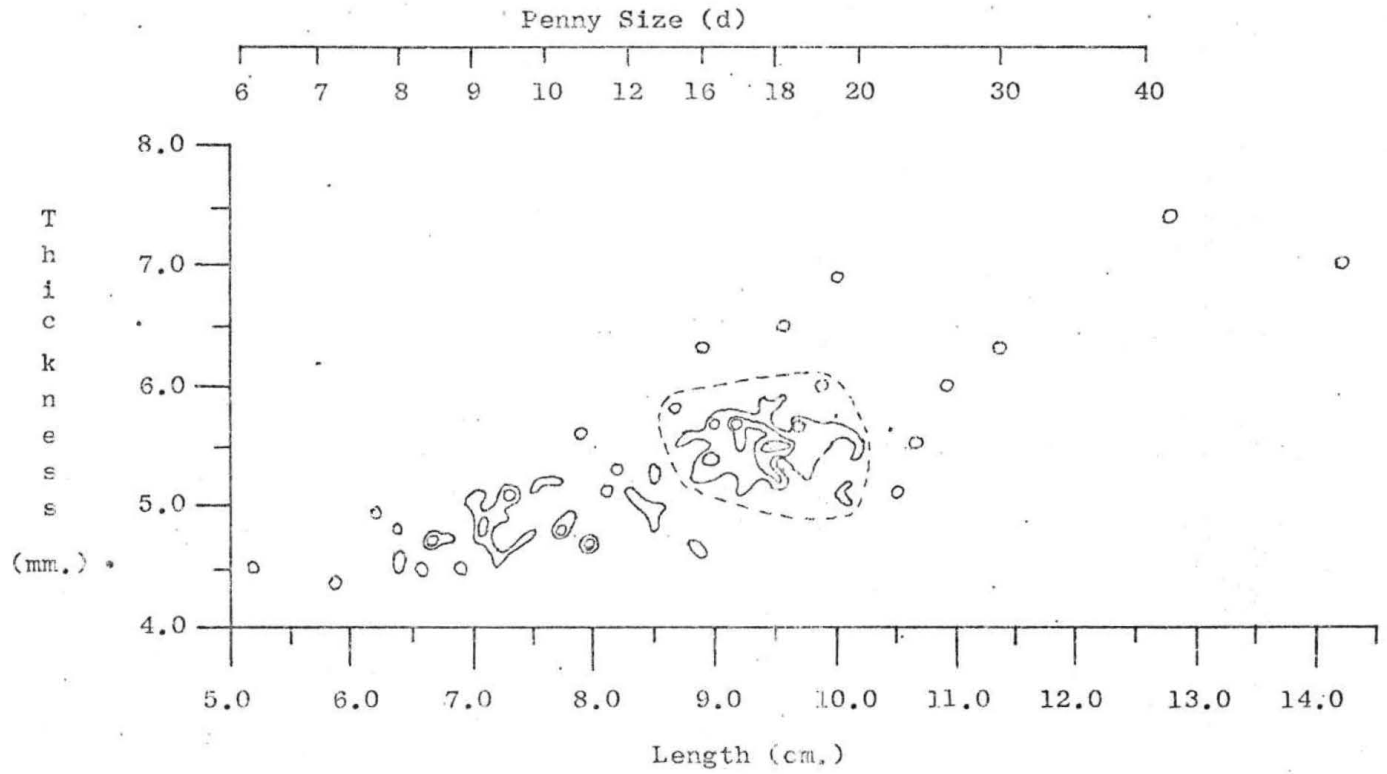


Fig. 68 - Isarithmic map of wrought "sheathing" nail (FOVA Variety #1060) populations as defined by the correlation of nail length with average stock thickness (N = 161 -- contour intervals based upon the geometric sequence 1, 2, 4, 8).

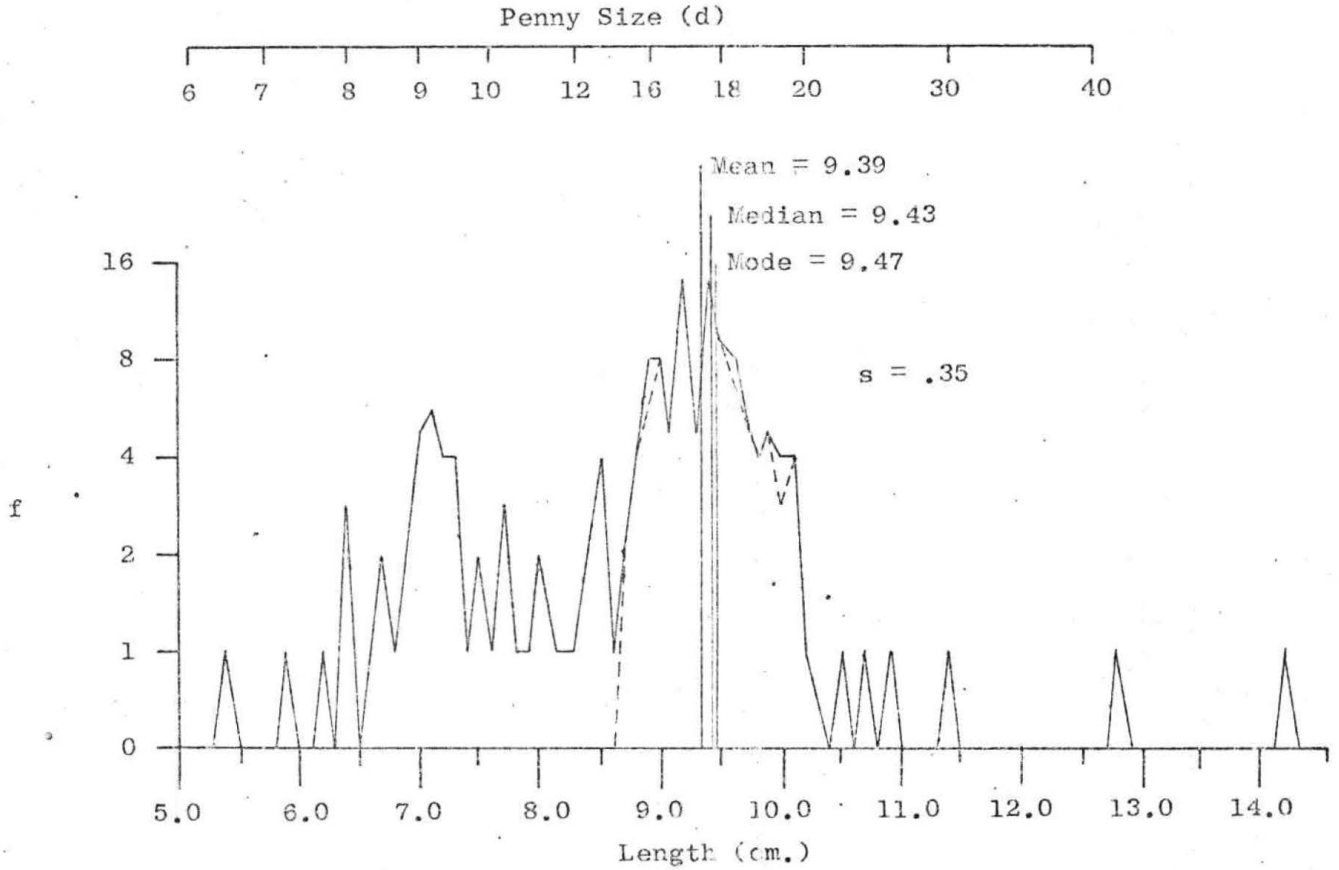


Fig. 69 - Wrought "sheathing" nail (FOVA Variety #1060) population as identified by nail length (N = 161).

illustrated as Fig. 63g in this report. Correlation of nail length to average shank thickness suggests that this variety was limited to sizes greater than 6 inches and well within "spike" length range (Table 21). However, shank thickness is identical to varieties normally called "nails," and this variety may represent the HBC equivalent of a "fine-drawn" nail or spike. Functionally, this variety has been correlated with the construction of the plank roadway through the southwest gate, and was probably utilized to fasten 2-3 inch planks to the wooden foundations.

Variety #1081 -- Thus far, this variety has only been recovered from the Fur Store area, and all specimens were found in situ in the wood block footings of the Fur Store. The variety was manufactured from square-rectangular nail rods, the shank being tapered on 4 sides to a tip which is flat and spatulate in shape. The head was struck and domed over a shank-holding device that was rigid on 2 opposing sides such that a rectangular-shaped head was formed. A representative specimen is illustrated as Fig. 63k. The size range is consistent for a ca. 10 inch spike (Table 21). The context and stylistic/metric regularity of the spike suggests that all were associated with timbers of a structure predating the construction of the Fur Store. These timbers containing the spikes were cut to appropriate lengths for use as footings in the Fur Store.

Variety #1090 -- This variety was manufactured from round iron nail rods with the round cross section being retained during shank tapering. The tip was formed by squaring the round stock to 4 sides and tapering to a "sharps" tip. The head was faceted with 4 blows to form a rosette-type head of circular form. The variety is thus far unique to the Fur Store area and is illustrated as Fig. 64h. The correlation of nail length to average shank thickness suggests that 2 populations are represented in the area (Table 21). As in nail Variety #1007, this variety was almost always found clenched. Measurements of the length from head base to the point of clenching for 10 of the 13 complete specimens indicates that each nail was driven through a total thickness of 1 5/8 inches of material. Round shanked nails were usually utilized where metal work was involved, and it is suggested that Variety #1090 nails were used to fasten building hardware, probably strap hinges, to doors, shutters or walls with a total thickness of ca. 1 1/2 inches.

Variety #1104 -- This variety is commonly known as a horse or horseshoe nail and is thus far unique to the Fur Store area. There is as yet no evidence that this nail variety was manufactured within the stockade. The variety was manufactured from rectangular stock with the shank and tip being drawn from the distal or head end of the nail rod to a sharp lanceolate tip. The variety differs from previous horseshoe nail Variety #1032 (Hoffman and Ross 1973b:Fig. 26i) by the addition of pronounced shouldering and heightening of the head. A representative

specimen is illustrated as Fig. 65i. Correlation of nail lengths to average shank thickness (taken in the head region) indicates that this variety ranged in size from 1 1/2 to 2 1/2 inches (Table 21). Examination of horse and muleshoes indicates that this variety was probably utilized in shoeing mules, and therefore may be associated with USA activities.

Machine Cut Sheet Nail Fragments. Machine cut sheet nails are manufactured by cutting nail blanks from flat nail sheets (usually iron). Nail blanks have 2 tapered edges resulting from the cutting process, and no additional tip formation is needed for the finished nail. Nail shank thickness is uniform from head to tip, except for those portions of the shank which become altered during the heading process by gripping, wedging or crimping.

Of the 5292 machine cut sheet nail fragments recovered, 1316 were complete nails and 13 varieties were identified (Table 22; Fig. 62). Machine cut sheet nail varieties previously illustrated (Hoffman and Ross 1973b:113; 1974:41) are not reproduced within this report, but new varieties have been illustrated in Figs. 70a-c.

Machine cut sheet nails from the Fur Store represented 47.6% of all nails recovered, nearly doubling the "normal" percentage (ca. 27%) from building locations discussed in earlier reports. This increase is hypothesized as resulting from the U.S. Army utilization of the Fur Store building from 1849-1860.

Variety #2001 -- Historically, this variety was termed a "clasp" nail for its characteristic head shape which represents one of three head styles manufactured in England from the mid-19th until at least the early 20th Century (Aitken 1878:40). This variety appears to have been imported to Fort Vancouver by at least 1845-46 for shingling and common construction purposes. Variety #2001 nails were manufactured from nail blanks cut from common sides of iron sheets. In the heading process, the cut nail blank was gripped on the 2 thickness sides of the shank and struck with a die to form 2 facets and the characteristic bonnet-shaped head. A representative specimen has been previously illustrated (Hoffman and Ross 1973b:Fig. 27a). In the Fur Store area, at least 2 metric populations are represented (Table 22). Based upon the correlation of nail length to nail blank thickness, 4d and 8-12d nail size populations have been identified (Figs. 71-72), with the 4d size representing 81.4% of all Variety #2001 nails measured. Previously, the Variety #2001 4d nails were associated with the shingling of the Chief Factor's House in the Fall of 1846. The quantity recovered from the Fur Store area, together with the fact that Variety #1002 nails were utilized as shingling nails until at least mid-1845 (Hoffman and Ross 1974:37), indicates that the Fur Store may have been shingled at about the same time as the Chief Factor's House, ca. 1845-46.

Table 22 - Varieties and hypothesized populations for machine cut sheet nails from the Fur Store area.

Variety # (Population)	Penny Size or Inches	Length (cm)	Thickness (mm)	Number Measured	Total Frequency
2001	3d-5 1/2"	3.1-14.0	1.5-5.5	355	1266
(1)	4d	3.1-4.3	1.5-3.0	(289)	
(2)	8d-12d	6.5-8.2	2.1-4.0	(55)	
2002	4d-36d	3.6-12.2	2.1-6.5	500	2084
(1)	6d-7d	4.8-5.7	2.4-4.1	(137)	
(2)	7d-9d	5.8-6.9	2.6-4.6	(153)	
(3)	9d-16d	7.0-8.8	3.0-5.0	(180)	
(4)	36d	11.9-12.2	5.4-6.5	(5)	
2003	7d-10d	5.6-7.8	3.2-4.0	12	14
(1)	8d	6.1-6.2	3.2-3.8	(3)	
(2)	10d	7.2-7.8	3.2-4.0	(7)	
2004	1d-10d	1.9-7.8	1.6-4.7	309	912
(1)	3d-4d	2.9-4.0	2.2-3.7	(106)	
(2)	7d-10d	5.8-7.8	2.7-4.7	(99)	
2005	4d-10d	3.5-7.3	2.8-3.9	12	28
(1)	8d-10d	6.2-7.3	3.5-3.9	(8)	
2006	8d-9d	6.7	3.1	1	2
2007	10d-16d	7.4-9.0	3.6-4.0	2	3
2010	1d-2d	1.7-2.5	1.3-2.1	2	2
2020	4d-5d	4.1	3.2	1	8
2024	1/4"-1/2"	0.9-1.1	1.8-2.0	2	2
2025	7d-10d	6.0-7.8	3.5-3.8	2	3
2026	1/2"-2d	1.3-2.7	1.4-2.7	4	4
Unid.	-	-	-	-	964
TOTAL					5292

Fig. 70 - New machine cut sheet and cast nail varieties from the Fur Store area.

a - Variety #2025 (Variation #1) (FOVA 16963) -- L=6.0 cm.

b - Variety #2025 (Variation #2) (FOVA 17424) -- L=7.7 cm.

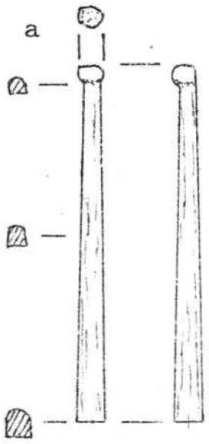
c - Variety #2026 (FOVA 17085) -- L=1.5 cm.

d - Variety #2027 (FOVA 17662) -- L=1.9 cm.

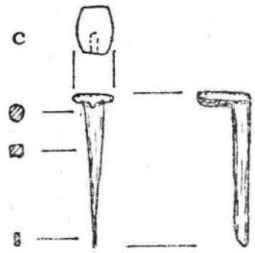
e - Variety #4012 (FOVA 16564) -- L=3.1 cm.

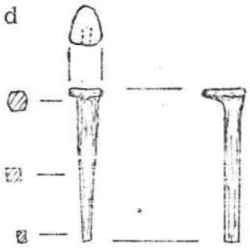
f - Variety #4013 (FOVA 16732) -- L=5.7 cm.

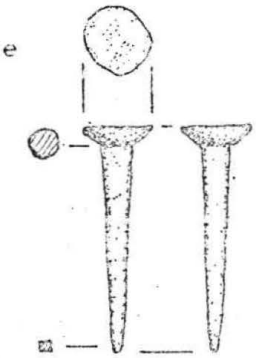
g - Variety #4014 (FOVA 17790) -- L=3.4 cm.

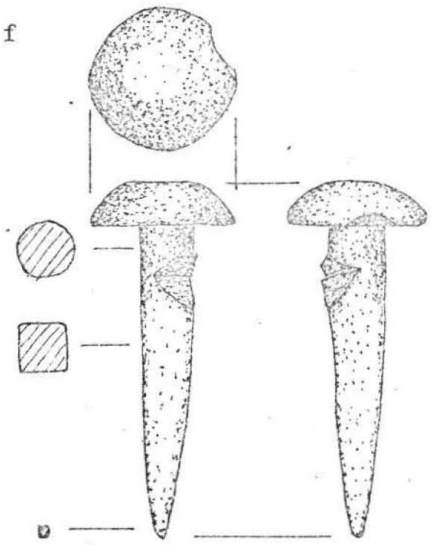

a

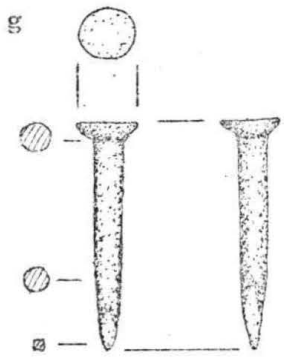

b


c


d


e


f


g

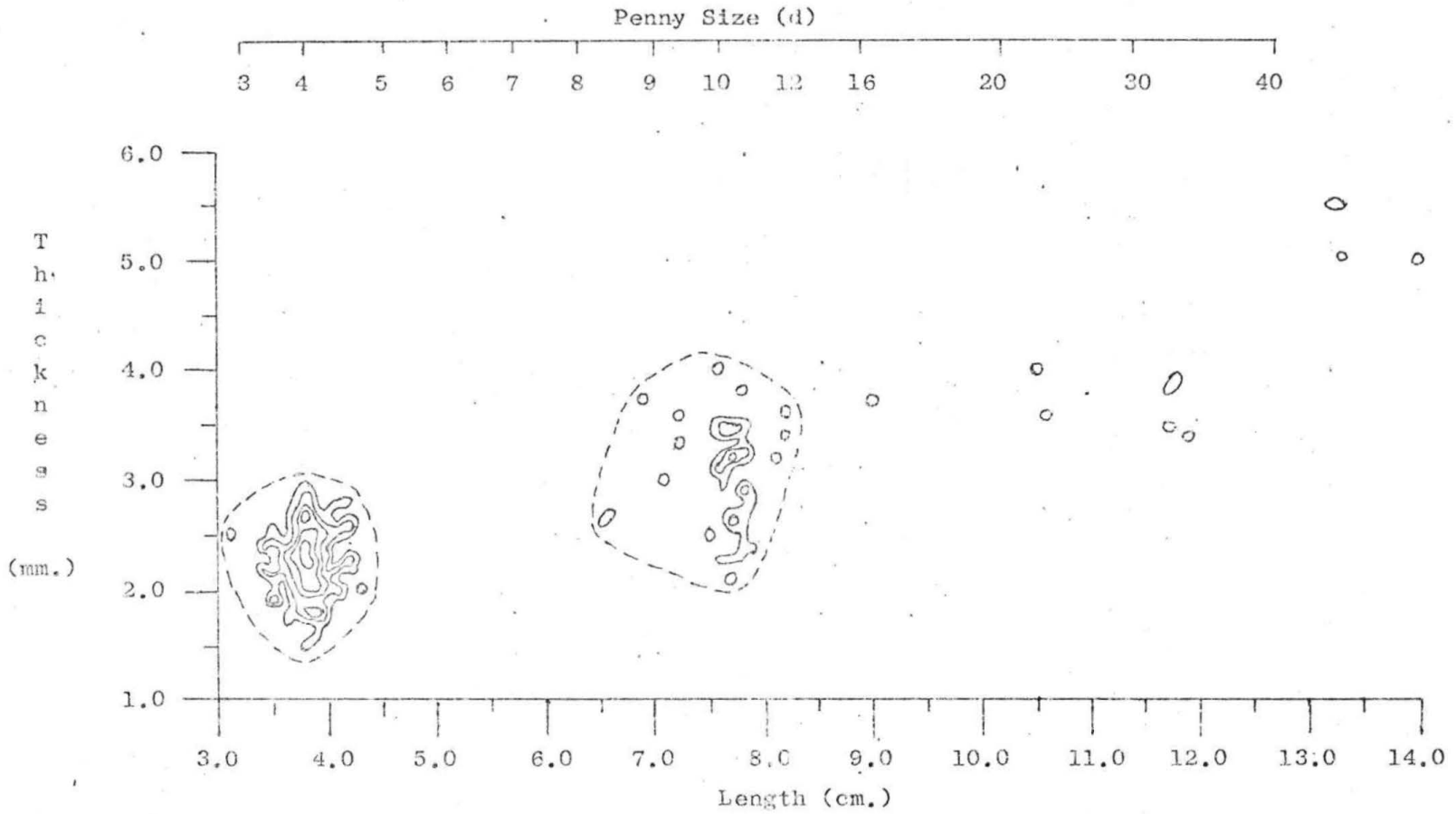


Fig. 71 - Isarithmic map of machine cut "clasp" nail (FOVA Variety #2001) populations as defined by the correlation of nail length with stock thickness (N = 355 -- contour intervals based upon the geometric sequence 1, 2, 4, 8, 16, 32).

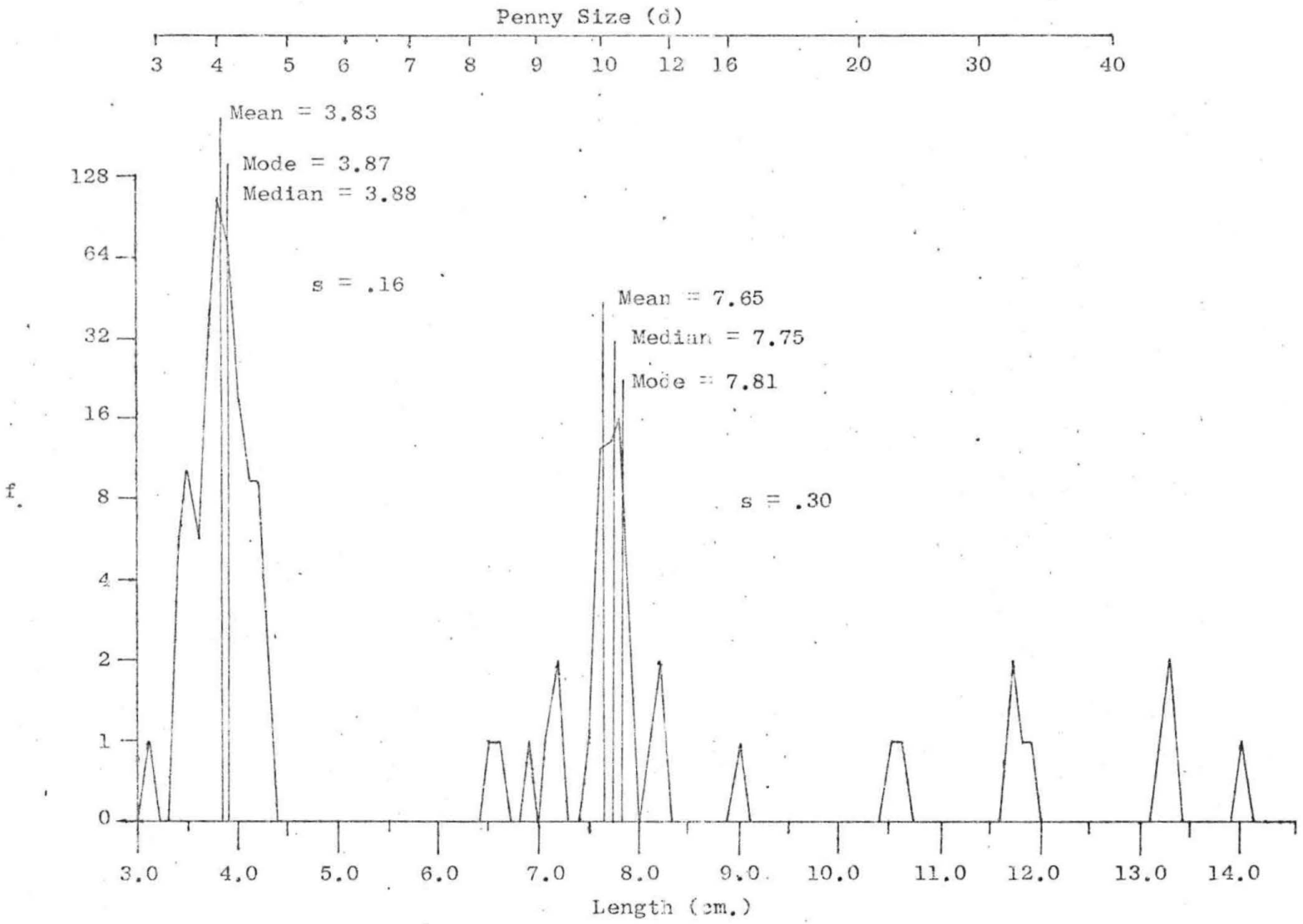


Fig. 72 - Machine cut "clasp" nail (FOVA Variety #2001) populations as identified by nail length (N = 355).

Historically, the clasp nail was also utilized to fasten flooring, and the 8d-12d population may have functioned in a similar manner.

Variety #2002 -- This variety is generally termed a "machine-cut common" nail. Historically, it was manufactured in the United States beginning ca. 1838; and there is no indication that the "common" nail was ever manufactured in England. At Fort Vancouver, this nail variety appears to have been imported as early as ca. 1845, representing one of the earliest transitions from British to American manufactures. The nail was manufactured by cutting the nail blank from opposite sides of the sheet, holding or wedging the blank in an oval receptacle and striking the head with a flat-faced heading device. A representative specimen was previously illustrated in the Chief Factor's House report (Hoffman and Ross 1973b:Fig. 27b). In the Fur Store area, at least 3 metric populations have been identified (Figs. 73-74); and these populations are hypothesized as being related with post-1845 HBC repair construction activities and early utilization of the store by the U.S. Army.

Variety #2004 -- This variety was manufactured from nail blanks cut from iron sheets on 2 opposing sides. In the heading process the shank was held and crimped by 2 opposing elliptical-faced dies while the head was struck with a flat-faced heading device. A representative specimen has been illustrated in the Chief Factor's House report (Hoffman and Ross 1973b:Fig. 27d). In addition, Variety #2017 (Hoffman and Ross 1974:Fig. 13f) has been deleted as a descriptive variety and included within Variety #2004.

Two metric populations have been identified in the Fur Store area based upon the correlation of nail length to shank thickness (Figs. 75-76), representing both a 4d size identified historically as a shingling nail, and a 7d-10d common construction size. This variety was undoubtedly manufactured in the United States, and is still available in shingling and other specialized varieties.

Identifying the temporal and cultural affiliations of this variety at Fort Vancouver has been somewhat problematic since it was being manufactured in the U.S. at least by 1820 (Nelson 1968:7) and may have periodically filtered into Fort Vancouver throughout 1829-60. The large quantities recovered from the Fur Store suggest that the nail may have been affiliated with the arrival of the U.S. Army in 1849, and it probably continued in use as a repair nail throughout the period 1850-60.

Machine Cut Wire Nail Fragments. Machine cut wire nails are manufactured from round nail wire (usually iron), and the tip is formed as part of the wire cutting process.

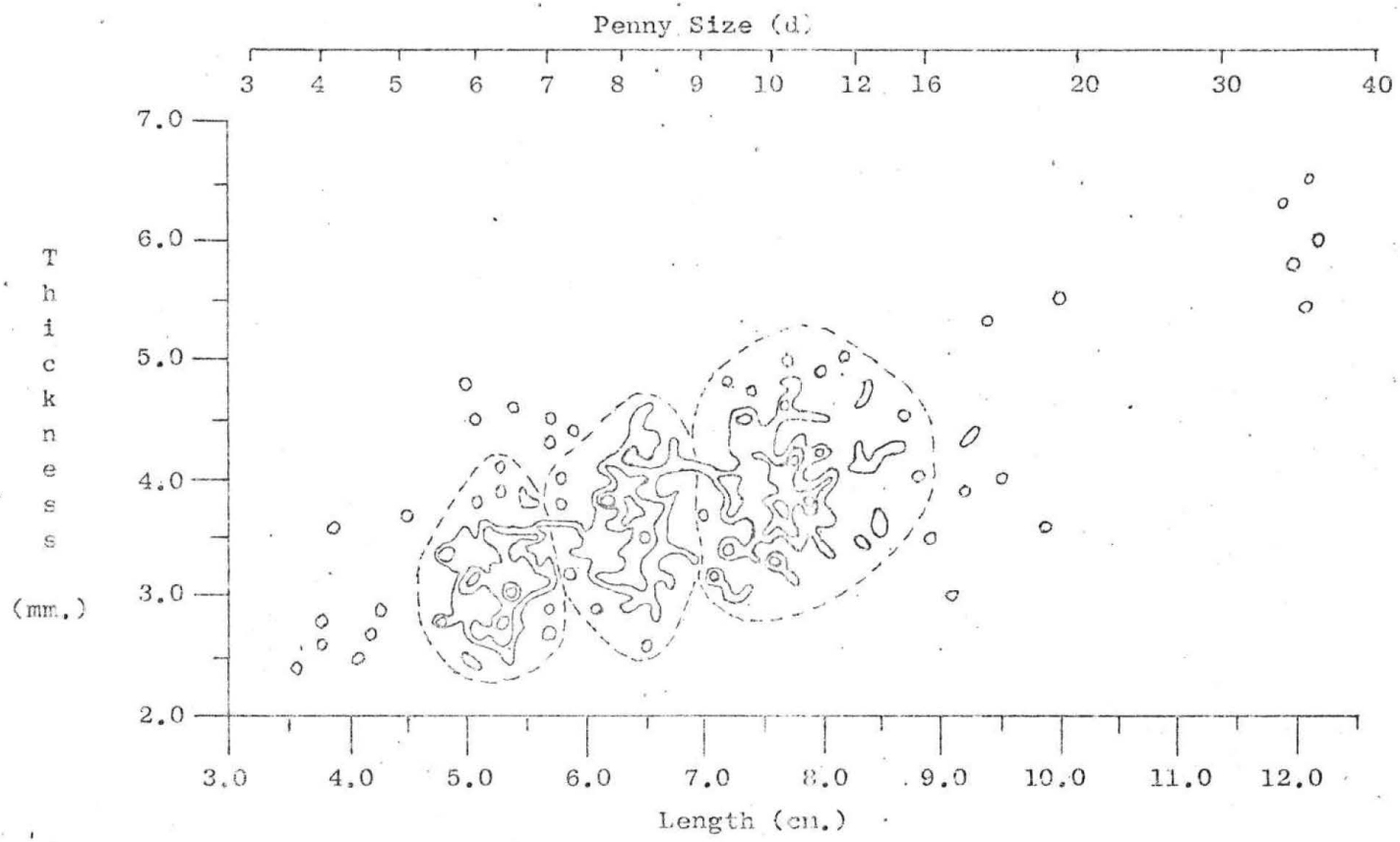


Fig. 73 - Isarithmic map of machine cut "common" nail (FOVA Variety #2002) populations as defined by the correlation of nail length with stock thickness (N = 500 -- contour intervals based upon the geometric sequence 1, 2, 4, 8, 16).

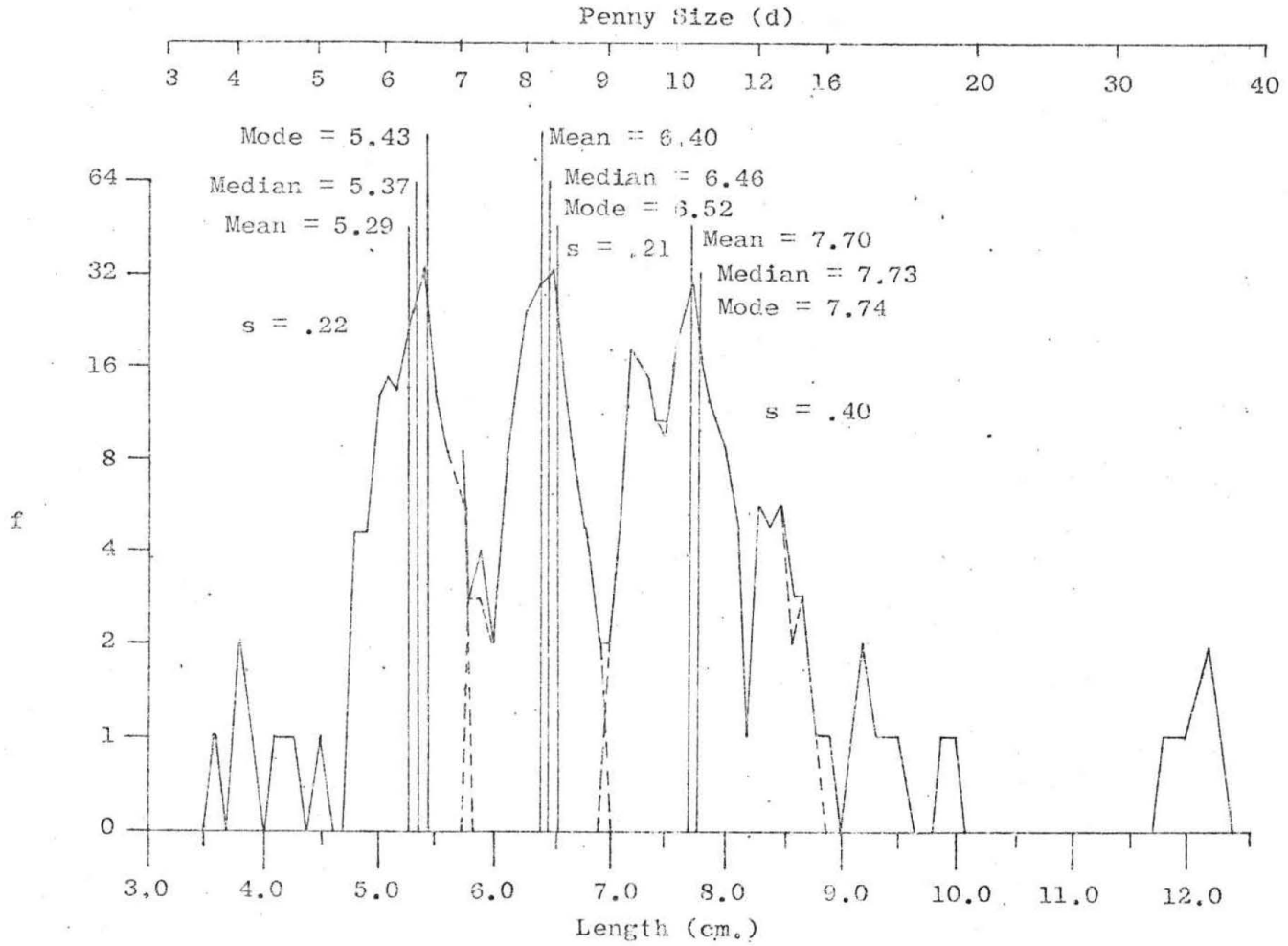


Fig. 74 - Machine cut "common" nail (FOVA Variety #2002) populations as defined by nail length (N = 500).

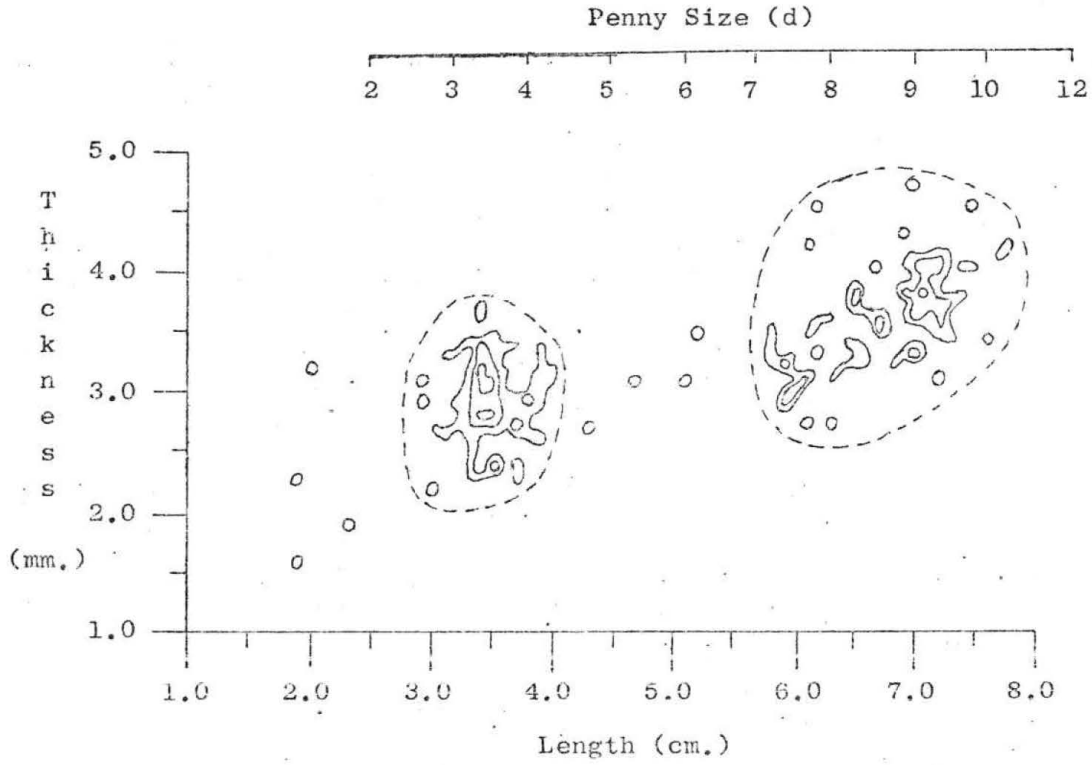


Fig. 75 - Isarithmic map of machine cut "Crimped Flathead" nail (FOVA Variety #2004) populations as defined by the correlation of nail length with stock thickness (N = 214 -- Contour intervals based upon the geometric sequence 1, 2, 4, 8).

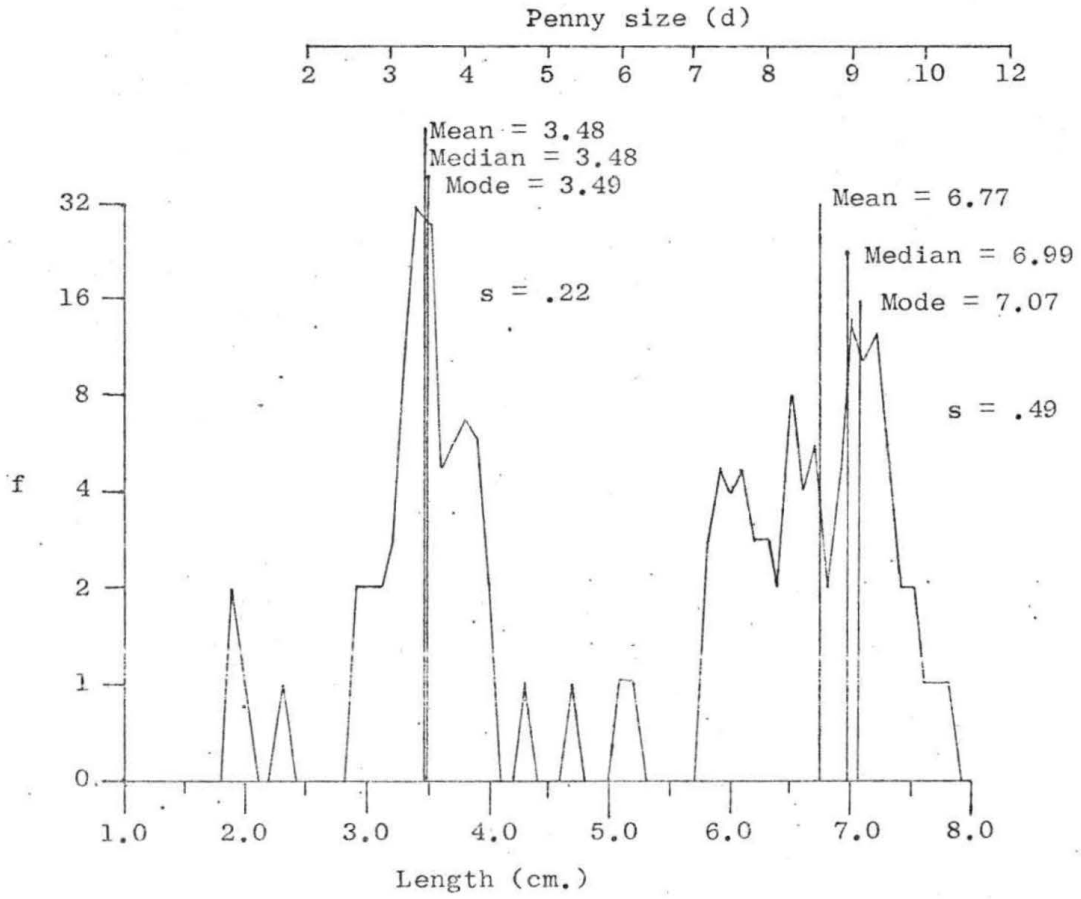


Fig. 76 - Machine cut "Crimped Flathead" nail (FOVA Variety #2004) populations as defined by length (N = 214).

All machine cut wire nails recovered from the Fur Store area are presumed to be associated with late 19th to early 20th Century activities, and time committments of our project will not permit a detailed analysis of this nail type.

Cast Nail Fragments. Cast nails are manufactured by casting molten metal (usually brass or copper) in a mold, and nail blanks produced by this method may or may not have a finished head. Heads on cast nails can either be cast along with the shank or stamped on the nail blank.

Of the 11 cast nail fragments, 10 were complete and 6 varieties were identified (Table 23). Cast nail varieties previously illustrated (Hoffman and Ross 1973b:114; 1974:41) are not reproduced within this report, but new varieties have been illustrated in Fig. 70d-f.

Table 23 - Varieties of cast nails from the Fur Store area.

Variety # (Population)	Penny Size or Inches	Length (cm.)	Thickness (mm.)	Number Measured	Total Frequency
4002	1"-1 1/4"	2.5-3.3	3.2-3.5	5	5
4004	1 1/2"	3.9	2.5	1	1
4007	1 1/4"	3.1	3.9	1	1
4012	1 1/4"	3.1	3.9	1	1
4013	2 1/4" (7d)	5.7	8.9	1	1
4014	1 1/2"	3.6	4.3	1	1
Unid.	-	-	-	-	1
TOTAL					11

Hinge Parts

Butt Hinges. Three fragments of butt hinges were recovered and 2 have been illustrated in Fig. 77a. Two fragments represent a door hinge, while the third specimen represents a furniture hinge.

Mortise Hinge. One fragment of a mortise hinge was recovered and has been illustrated in Fig. 77b. This type of hinge was used by laminating at least one hinge leaf between wood.

Door Lock Part, Escutcheons and Key Fragments

The lock part represents a dead bolt, probably from an HBC "fancy stock lock" (Hussey 1972:270), while the escutcheons and keys came from similar locks. Examples of these door locks are in the FOVA museum vault.

Fig. 77 - Hinges, rams-head nut, swivel preforms and axe wedges from the Fur Store area.

a - Butt hinge (FOVA 15528 & FOVA 17673c)

b - Mortised hinge (FOVA 15696)

c - Rams-head nut (FOVA 17965)

d - Swivel preform (FOVA 17324b)

e - Swivel preform (FOVA 17642c)

f - Axe wedge (FOVA 16849b)

g - Axe wedge (FOVA 16817b)

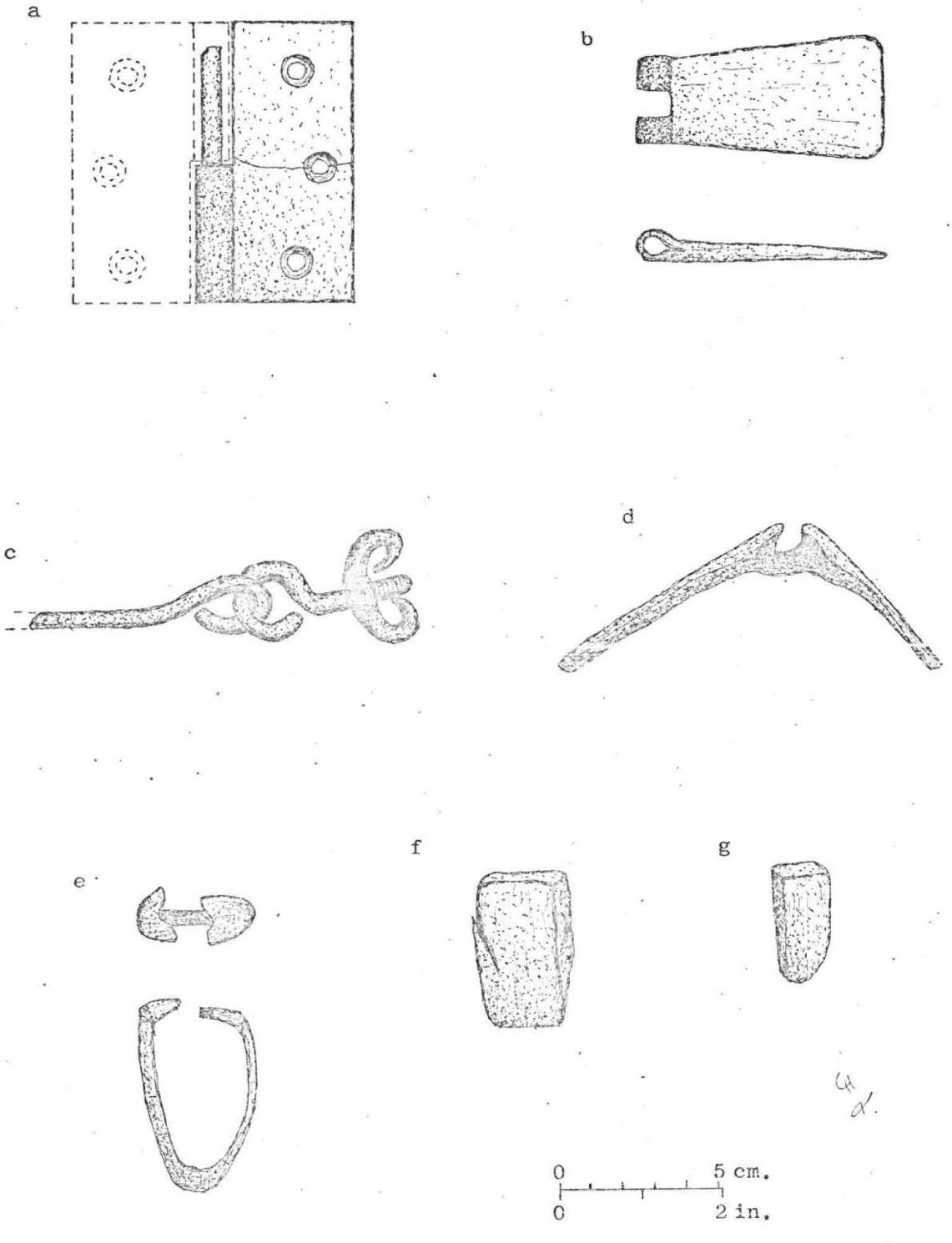

a
b
c
d
e
f
g
0
5 cm.
0
2 in.

Fig. 78 - Miscellaneous building hardware from the Fur Store area.

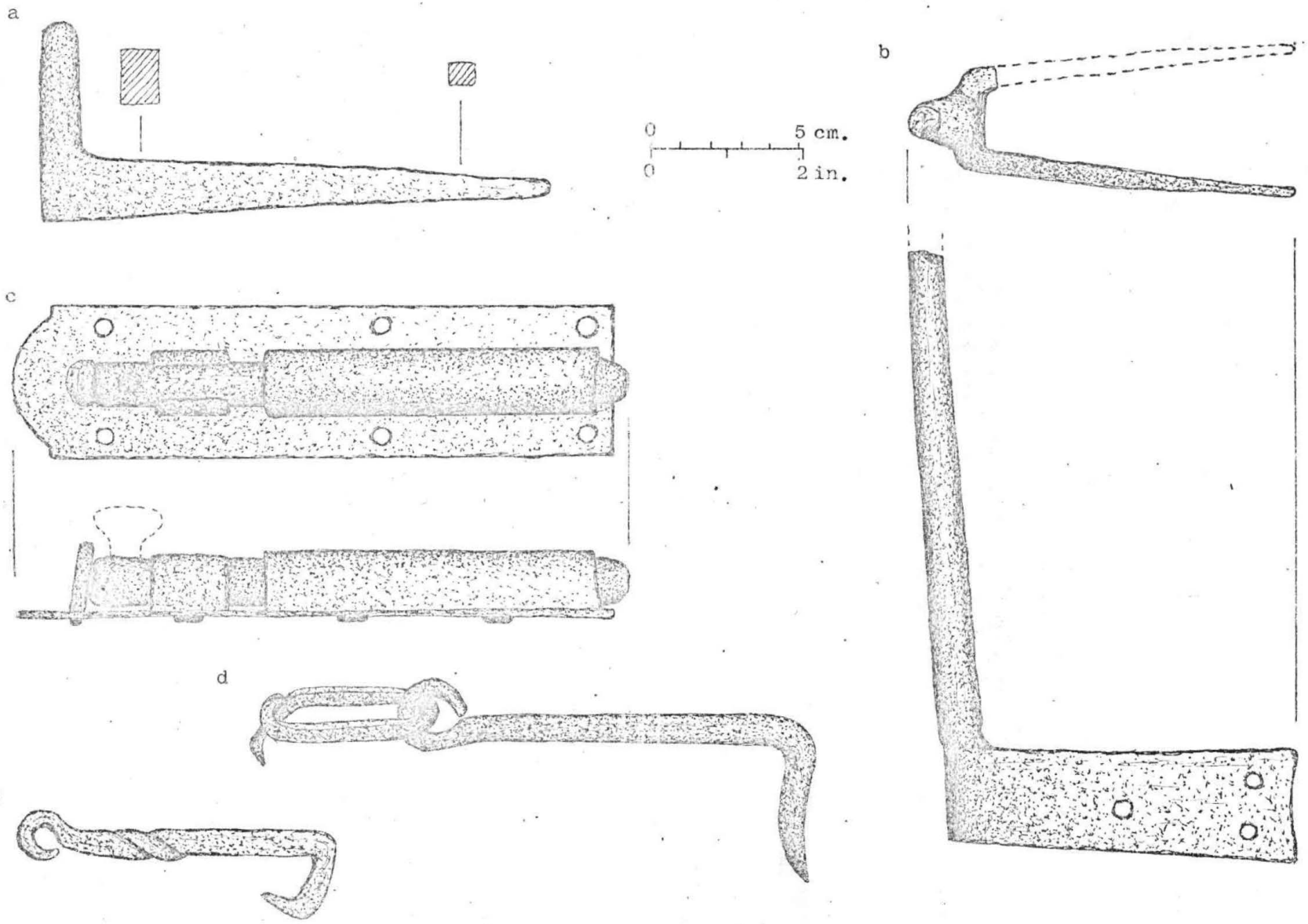
a - Pintle (FOVA 16123)

b - Pintle (FOVA 17332)

c - Sliding door bolt (FOVA 16016)

d - Gate hook & staple (FOVA 17024)

e - Gate hook (FOVA 17409)


a
b
c
d
e
0 5 cm.
0 2 in.

Swivel Preforms

Thirteen fragments of what are conjecturally regarded as preforms for swivels were recovered (Fig. 77d-e). Their use has yet to be determined, but because of their general association with trap preforms, they may represent swivels to be used in some fashion with trap chains.

Trap Parts

On the basis of the 310 trap parts recovered from the blacksmithing area, it has been possible to graphically reconstruct a 3-dimensional view of a complete trap (Fig. 79) as well as the individual views of each trap part (Fig. 80). The type of trap illustrated corresponds to what the HBC would have termed a "country-made" article; and by the remains present, it is safe to assume that this type of trap was manufactured by the blacksmiths working within the Fort.

Axe Parts

On the basis of the 33 axe parts recovered from the blacksmithing area, together with axe parts from other areas of the Fort, it has been possible to graphically reconstruct the various types of axes manufactured by the local HBC blacksmiths (Figs. 82-86). Axe parts are defined as finished axes, axe fragments, axe wedges and axe preforms (i.e. portions of axes in various stages of manufacture).

Axe wedges were used in fastening a wooden handle to the axe through the eyes, and wedges found in the blacksmithing area are illustrated in Fig. 77f-g.

HBC trade axes at Fort Vancouver (Fig. 81) are historically recorded as occurring in 2 styles -- "square head" and "round head" -- and in 3 sizes -- "large," "middling" (or "half") and "small" (Hussey 1972: 290, 291). Archeologically, 4 manufacturing types have presently been identified -- Axe Types 1, 2, 3 and 4 (Figs. 82-86) -- representing 2 styles -- polled (i.e. "square head") and non-polled (i.e. "round head"). These axes were normally manufactured from 3 sizes of rectangular stock measuring ca. 1 1/2, 2 1/2 and 3 1/2 inches in width.

Polls were cut (or clipped) from rectangular stock approximately the same width and thickness as the stock used to produce the axe body. They were attached to the axe stock at the point where the stock was bent to form the axe preform (Figs. 82a-b, 83a-b, 84a-b), and attachment was accomplished by welding with (Figs. 82a, 84a) or without (Fig. 83a) an iron pin.

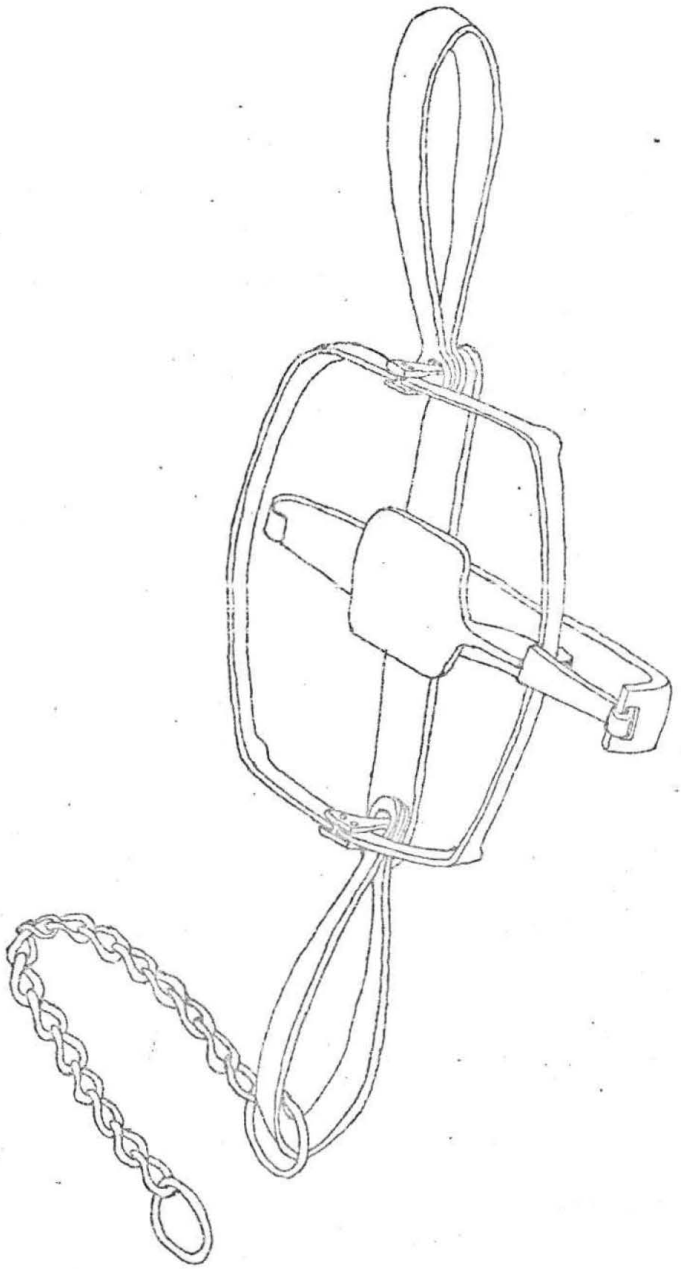


Fig. 79 - Hypothetical reconstruction of a "country-made" trap manufactured at Fort Vancouver.

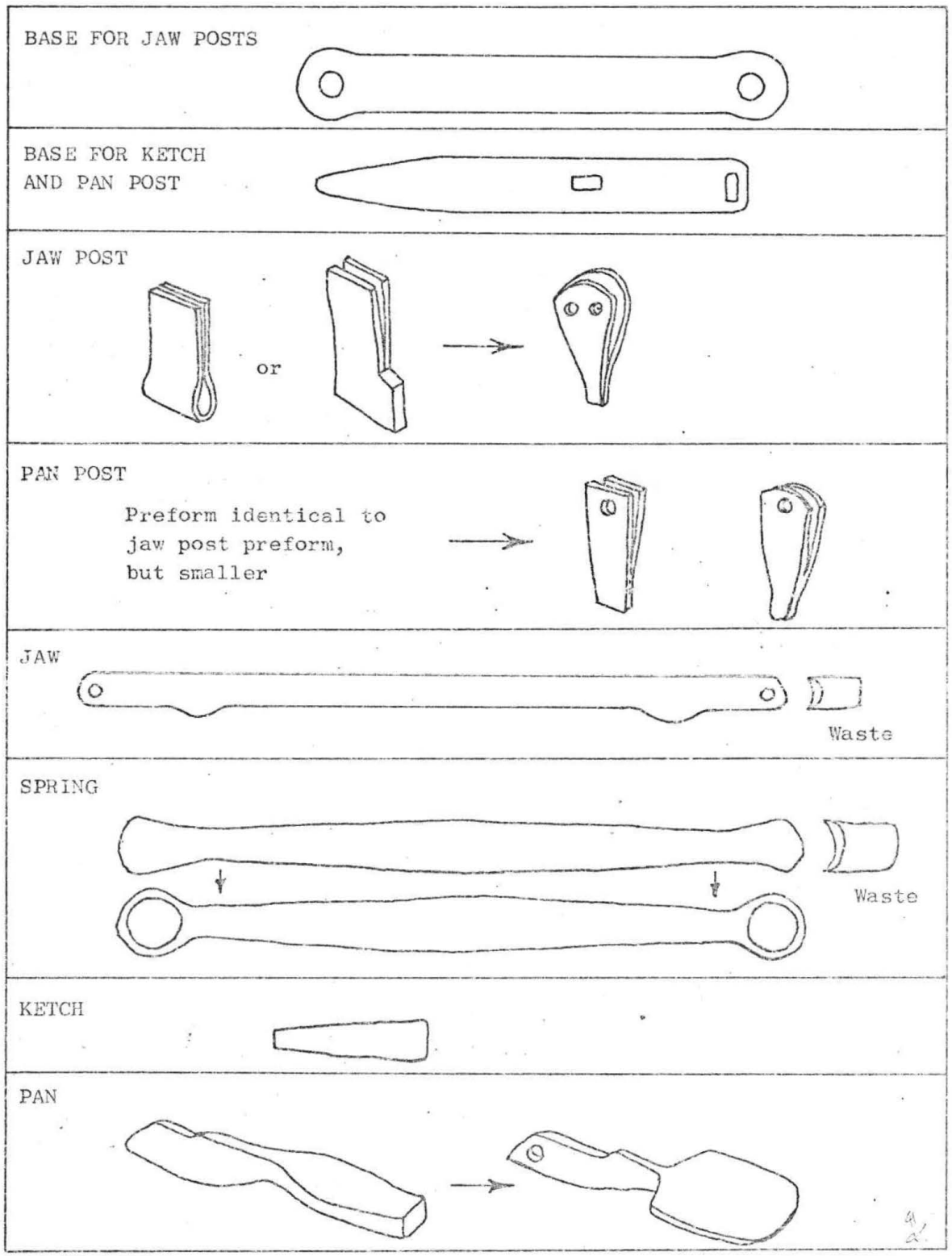


Fig. 80 - Trap parts, preforms and metal waste associated with the manufacturing of "country-made" traps from Fort Vancouver.

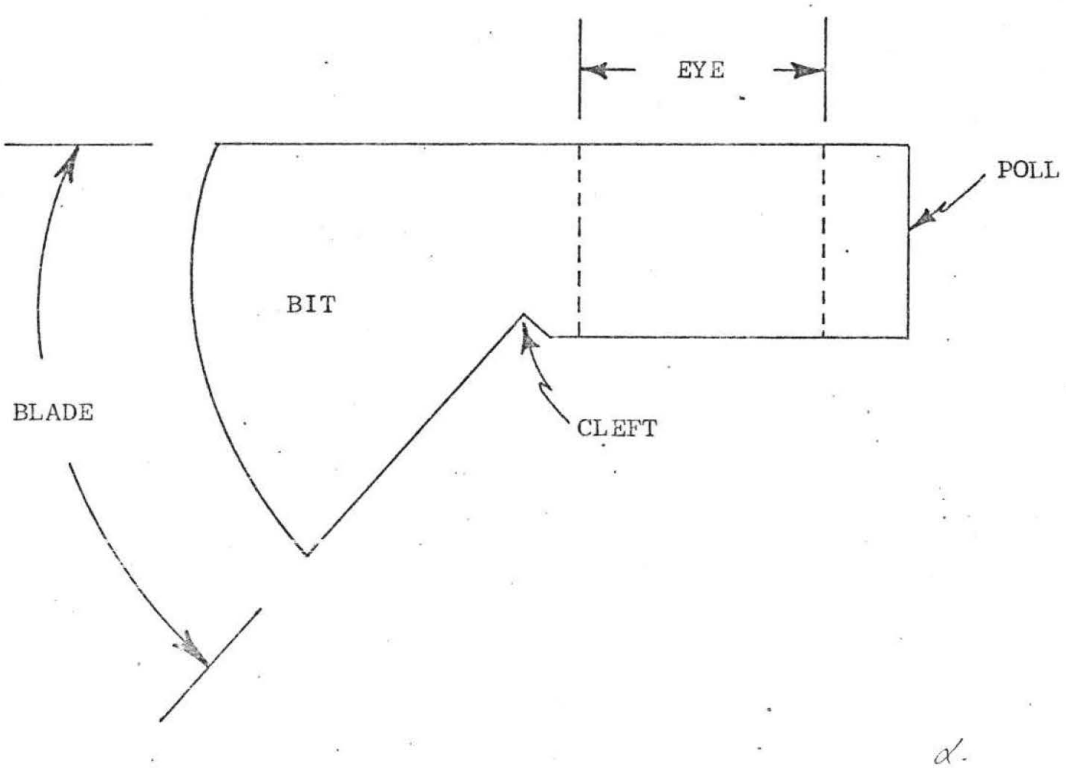


Fig. 81 - Schematic diagram of an HBC trade axe.

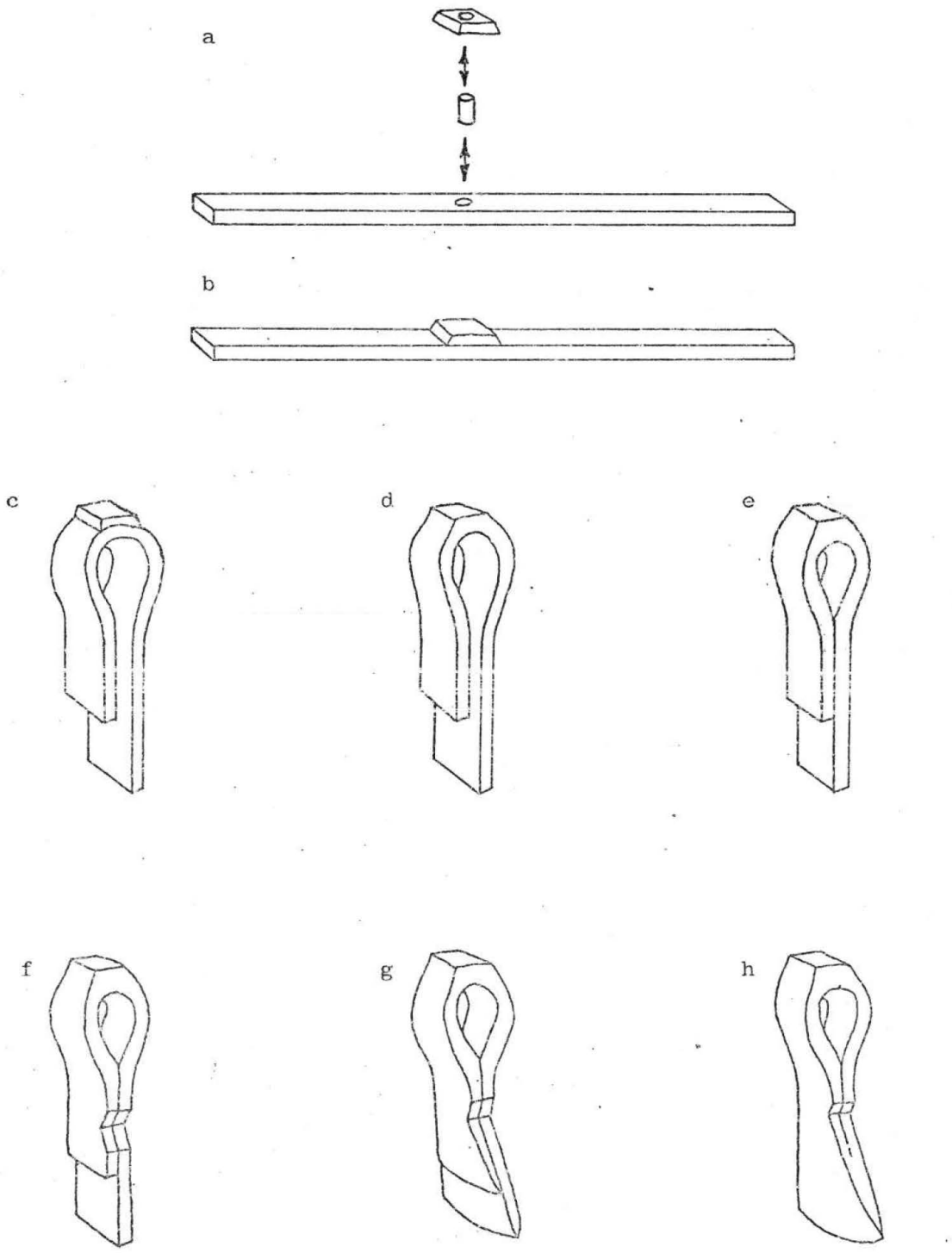


Fig. 82 - Square head, single-piece axe (FOVA Type 1).

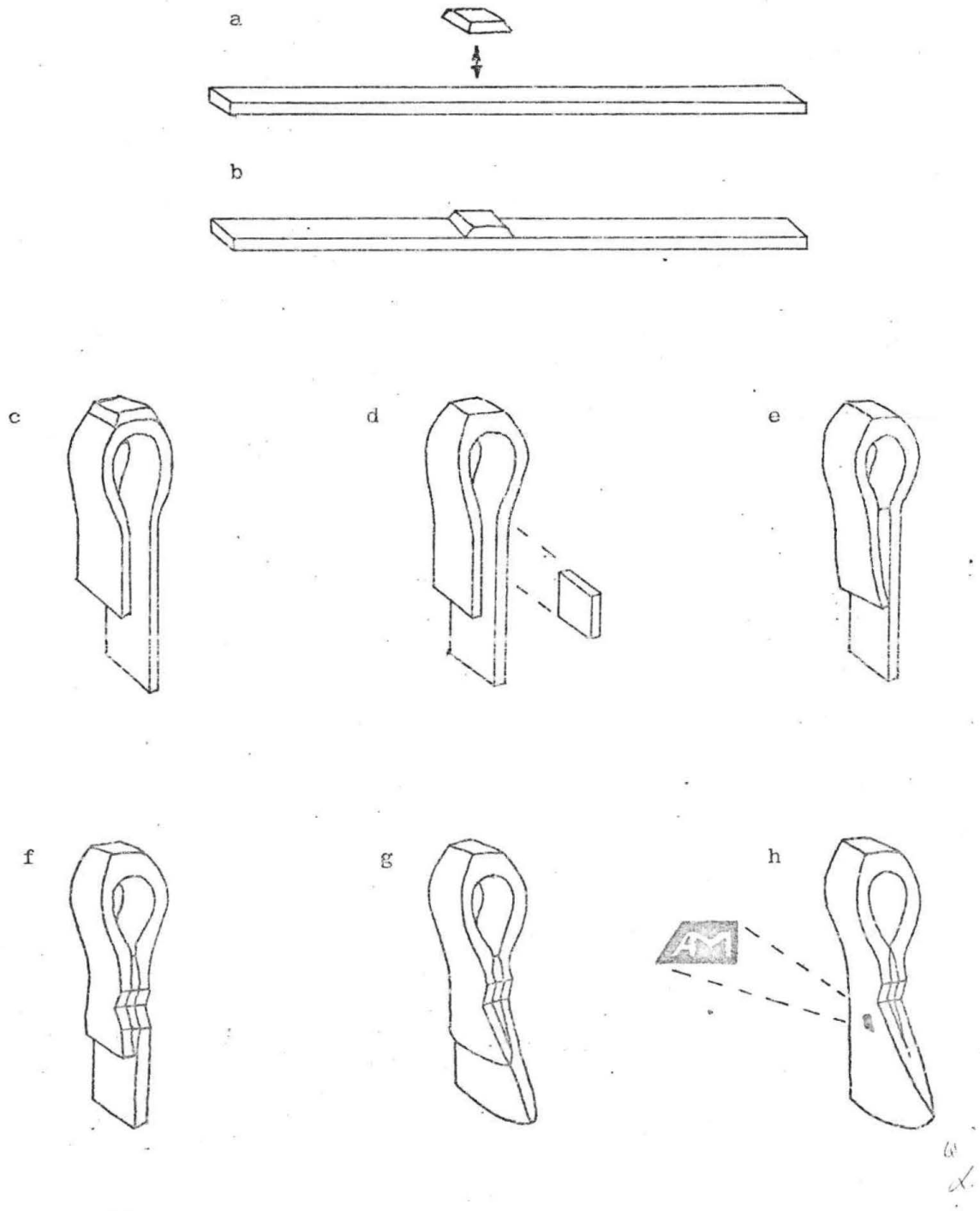


Fig. 83 - Square head, single-piece axe with manufacturing variations (FOVA Type 1).

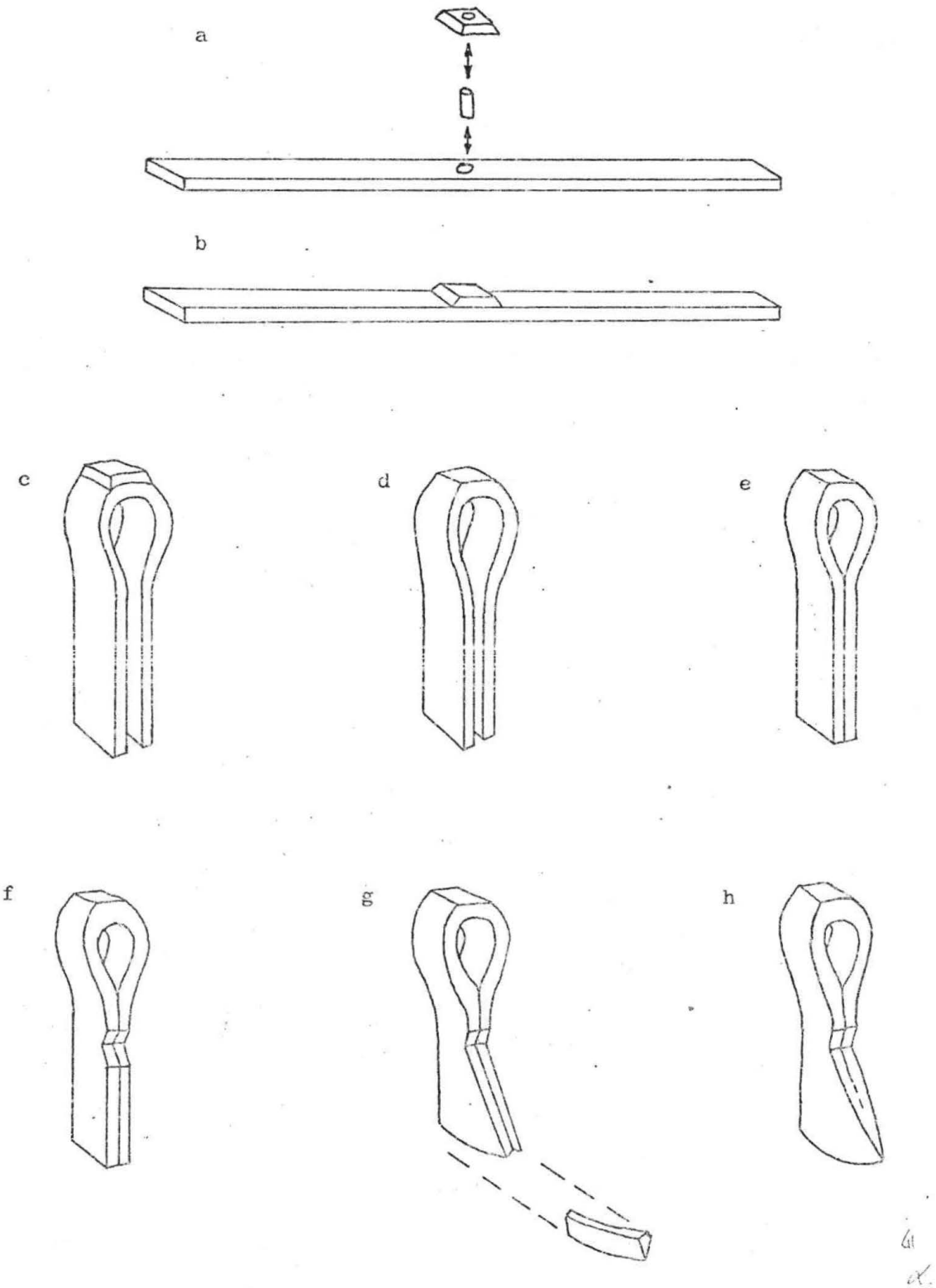


Fig. 84 - Square head, double-piece axe (FOVA Type 2).

Axe eyes varied in size with overall axe size but in all cases, the ratio of eye length to eye width was ca. 2:1. All axes had a cleft which was cut or hammered into the bottom edge of the bit between the blade and eye (e.g. Fig. 82f-h). The function of this cleft is unknown.

The top edges of all axes formed a straight line from poll to blade, whereas the bottom edges were formed by two angled edges intersecting at the cleft. The angle of intersection equals ca. 130°.

Axe Type 1. A polled (i.e. "square head"), single-piece axe (Figs. 82, 83) which is distinguished by the presence of an applied poll welded to the axe with or without a round iron pin. If a pin was present, it would have been driven through holes in both the poll and axe stock until it was flush with the upper surface of the poll and lower surface of the axe stock (Fig. 82a-b). The poll was placed assymetrically on the axe stock such that one axe stock extremity was shorter than the other (Fig. 82b). The bit was manufactured from the welded, cleft preform (Fig. 82) by thinning and spreading, and the shorter extremity was worked into the longer extremity approximately midway on the bit.

Variations of the above manufacturing techniques have been observed (Fig. 83), including the absence of a poll pin, addition of metal between the axe stock extremities forming the bit, and the presence of manufacturing marks.

Rather than placing a poll pin through both poll and axe stock, a poll pin might be butt welded to the bottom of the poll and then placed through a hole in the axe stock; or the poll pin could have been entirely eliminated (Fig. 83a). In one instance, a thin piece of strap stock was welded between the axe stock extremities at the point of clefting (Fig. 83d-e). Presumably, this was done to increase the overall strength of the axe, or perhaps to add additional weight behind the blade. Finally, stamped initials were observed on a few axes and included: "AM"; "DF" or "BF"; and "ID", "HD" or "JD". Presumably, the initials indicated the blacksmith who manufactured the axe.

Axe Type 2. A polled (i.e. "square head"), double-piece axe (Fig. 84) which is distinguished by both an applied poll and blade. The poll was welded as with Axe Type 1, but placed at the midpoint of the axe stock (Fig. 84b) such that the extremities, when formed over the anvil, terminated at a common point (Fig. 84c-e). After welding and clefting (Fig. 84), the blade extremities were thinned and spread to within 1-3 inches of the intended blade edge (Fig. 84g). A separate blade was welded onto the bit (Fig. 84g) and the welds smoothed to the finished form (Fig. 84h).

Axe Type 3. A non-polled (i.e. "round head"), single-piece axe (Fig. 85) similar to Axe Type 1 but without a poll. This axe type was manufactured from a single piece of strap stock (Fig. 85a) with formation of the axe preform being assymetrical such that one extremity was shorter than the other (Fig. 85b-c). This resulted in the formation of a "poll" end with approximately the same thickness as the remainder of the eye. The bit was welded, cleft and spread to a blade edge in the same manner as Axe Type 1 (Fig. 85d-g). The finished bit might be stamped with a manufacturing mark and in the only complete specimen thusfar observed, the mark occurred on the left bit face forward of the cleft (e.g. Fig. 83h).

Axe Type 4. A non-polled (i.e. "Round head"), double-piece axe (Fig. 86) similar to Axe Type 2 but without a poll. This axe type was manufactured with an applied blade as with Axe Type 2 and the axe body was manufactured by bending strap stock (Fig. 86a) over the anvil at the midpoint of the stock (Fig. 86b) such that the extremities terminated at a common point (Fig. 86 c-d). Welding, clefting bit formation and blade attachment were accomplished as with Axe Type 2 (Fig. 86 d-g). Completed specimens might have been stamped with a manufacturing mark, and in the only specimen observed, the mark was placed on the right bit near the eye.

Axe Types Found in the Fur Store Area. "Square head" axes and axe preforms together with "round head" axe preforms were found in the blacksmithing area adjacent to the Fur Store. No complete axes were recovered, so all that can be said is that specimens of Types 1 and/or 2 and specimens of Types 3 and/or 4 were observed.

Two axe sizes were observed -- "small" (ca. 1 1/2 inch stock width) and "middling" or "half" (ca. 2 1/2 inch stock width). "Square head" styles were found in both "small" and "middling" sizes, while the "round head" styles were only found in the "small" size. Of the polled axes, the ratio of "small" poll preforms to "middling" poll preforms approximates 20:1, thus suggesting a preference for small axes. However, in the 1844 and 1846 inventories reproduced by Hussey (1972: 290-291), the preference in square head axes is for middling-sized axes. This difference between the archeological and historical preferences may be temporal with the archeological remains from the Fur Store area representing the mid-1840's. This temporal difference should be tested against the archeological remains from the ca. 1836-1860 blacksmith shop area.

One axe poll fragment apparently represents a broad axe fragment, but a complete specimen has yet to be found and a graphic reconstruction could not be produced of this type.

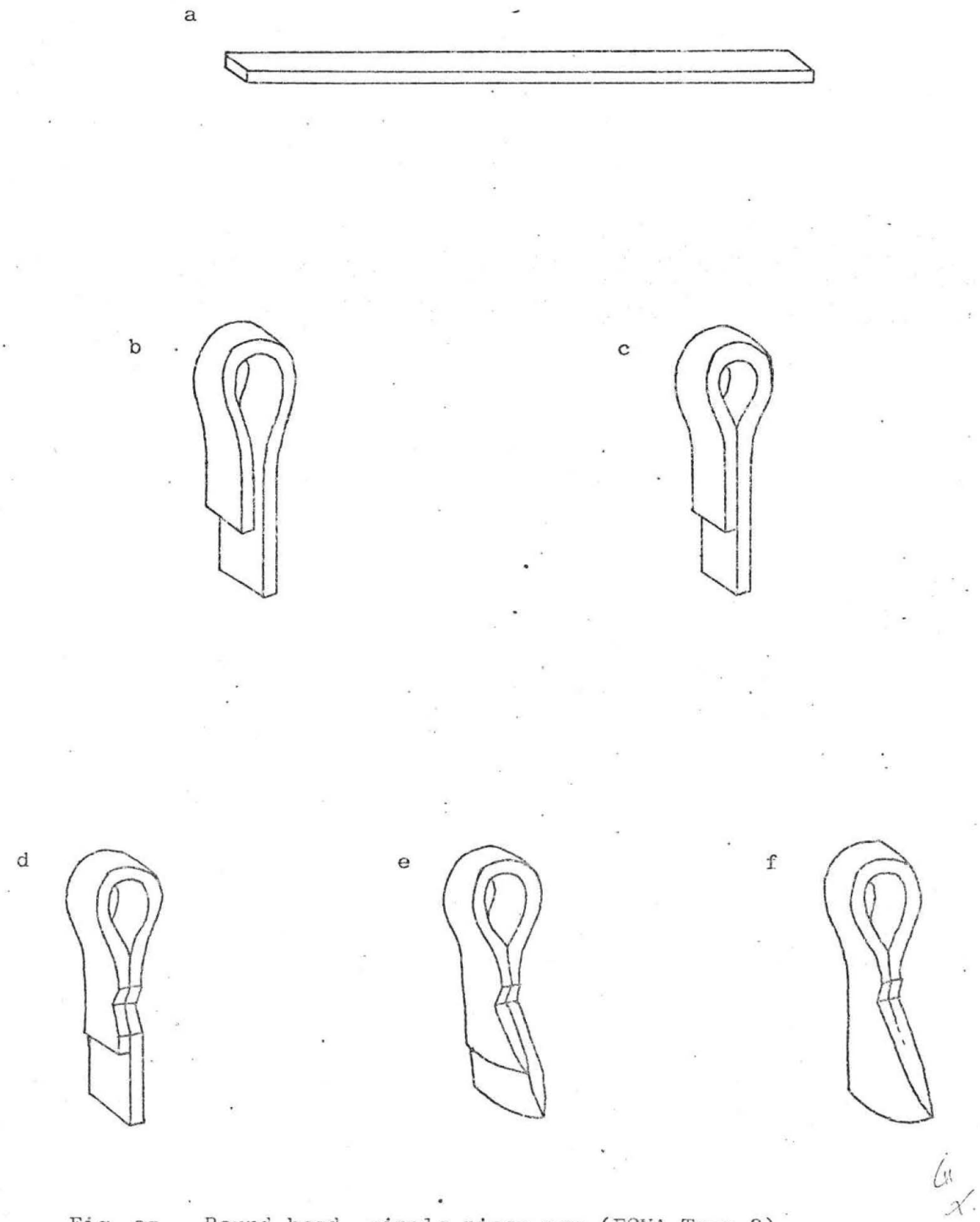


Fig. 85 - Round head, single-piece axe (FOWA Type 3).

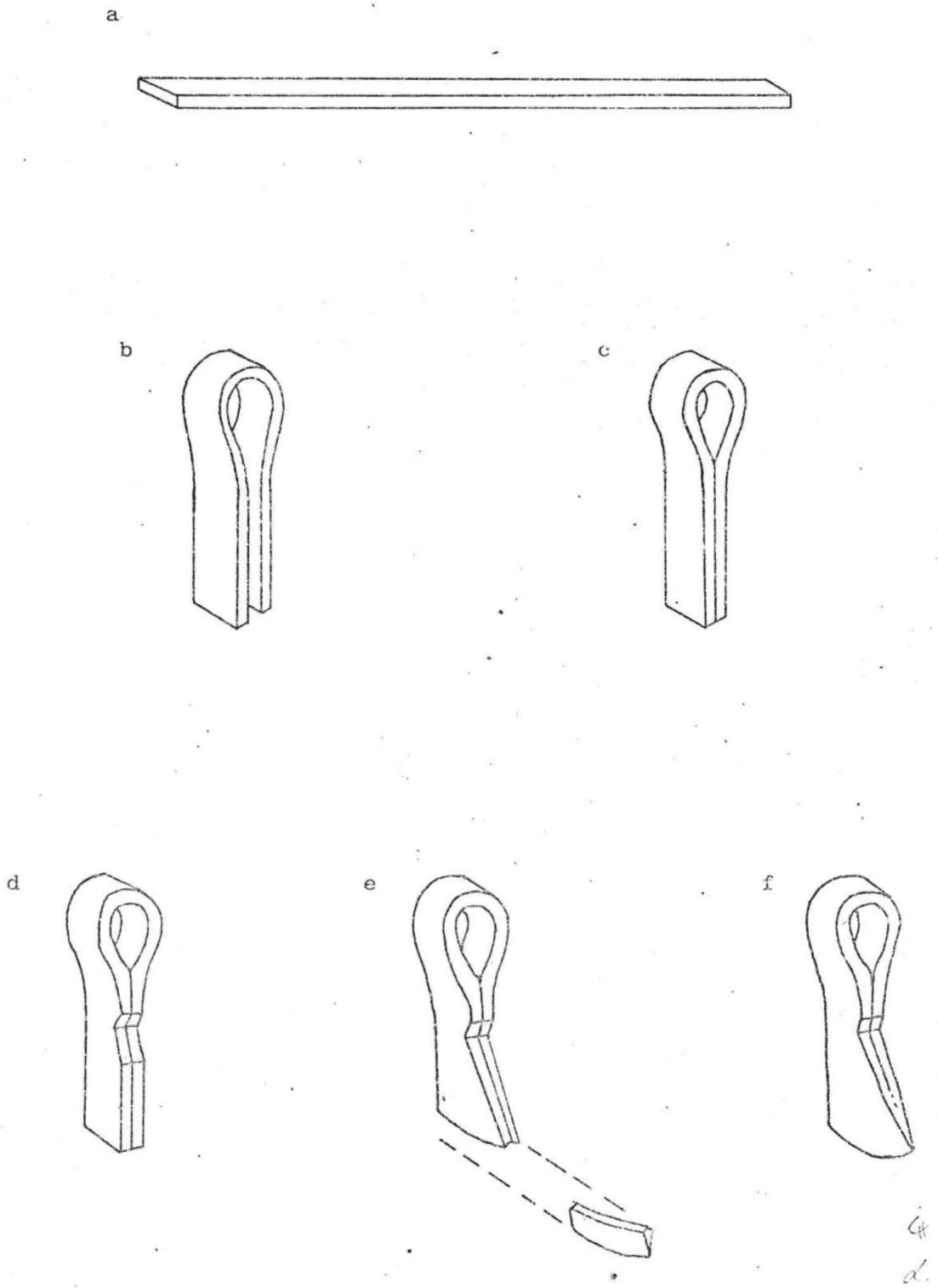


Fig. 86 - Round head, double-piece axe (FOVA Type 4).

Household and Personal Items

Buttons

Of the 17 buttons found, all were complete; 12 were single piece loop-shank buttons, 3 were composite loop-shank buttons and 2 were single piece 4-hole buttons (Table 24; Fig. 87). Button Types IB, IE, IF, IH and IVG have been previously illustrated (Hoffman and Ross 1973b: Fig. 33).

Table 24 - Types of buttons found in the Fur Store area.

Type	Dia. (mm.)	Frequency	Fig. 87
I. Single Piece Loop-Shank			
B. "Extra Plated..."	17.3	1	-
E.	14.7-15.3	4	-
F. (2 sizes)	15.5	1	-
	17.6	1	-
H.	21.0-21.2	2	-
N. USA General Staff	20.6-21.1	2	a
O. (Iron)	17.9	1	b
II. Composite Loop-Shank			
K. USA General Service	19.8	1	c
L. USA General Service	22.9	1	d
M. (Iron with wire tie)	-	1	e
IV. Single Piece 4-Hole			
G. Whitemetal	13.2	1	-
J.	-	1	f
TOTAL		17	

Weaponry Items

Cartridges and Bullets

.20 caliber Bullet. One lead bullet from an unidentified cartridge and firearm.

.30 caliber Krag-rimmed Cartridges and Bullets. Five cartridges and 64 bullets were recovered. One cartridge had a head stamp -- "U.M.C., 30, U.S.A." This ammunition was manufactured between 1894-1903 for use in the U.S. Krag Jorgensen rifle (Logan 1959:116).

.30 caliber Springfield Cartridges. Seven cartridges were recovered with the following head stamps:

"F, A, 2, 05" (N=2)
"F, A, 12, 05"
"F, A, 2, 06"

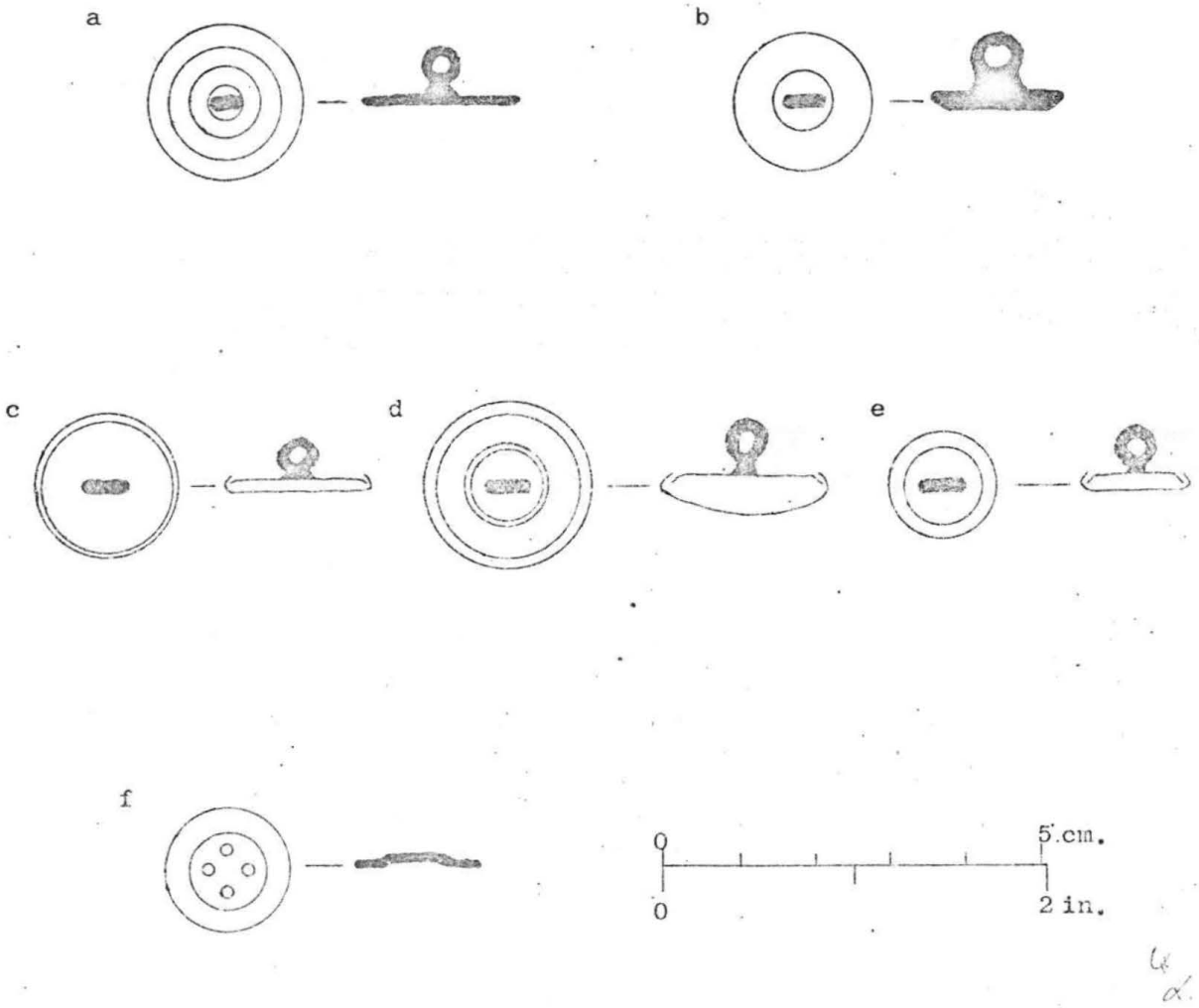


Fig. 87 - New metal button types from the Fur Store area.

a. Type IN (FOVA 15719)
b. Type IO (FOVA 17000a)
c. Type IIK (FOVA 17203)
d. Type IIL (FOVA 17229)
e. Type IIM (FOVA 17852)
f. Type IVJ (FOVA 16941)

"U.M.C., 1, 06"
"U.M.C., 2, 06" (N=2)

Based upon dates of manufacture from head stamps of other .30 caliber rimless cartridges found within the Fort, this ammunition was manufactured since 1903 for use in the 30-06 Springfield rifle.

.38 caliber Long Colt Cartridge and Bullets. One cartridge and 11 bullets were recovered. This ammunition was manufactured for the Colt .38 double action revolver, models of 1892-94-96 (Logan 1959:126).

.45 caliber Government Cartridges and Bullet. Three cartridges and one unfired cartridge with bullet were recovered. These cartridges measured 2 3/36 inches in length and correspond to 45-70-500 Government cartridges (Ibid.:142). Three cartridges had the following head stamps:

"R, 3, 84 F"
"F, 2, 88"
"F, 5, 89"

.45 caliber Cartridges. Two cartridges were recovered which appeared identical to 45-70-500 Government cartridges, but their case length was shorter -- 1 27/32 inches in length.

.58 caliber Cartridges. Two rim fired cartridges were recovered, and they roughly correspond to a .58 caliber cartridge. However, the specific type of cartridge could not be identified.

Lead Shot, Buckshot and Ball

Of the 6864 specimens recovered, better than 99% were shot (Table 25). There appeared to be 3 sizes of shot, roughly corresponding in diameter to 3, 4 and 5 mm.; but no populations were statistically defined.

Buckshot was found in one size (Table 25).

Lead musket balls were found in 3 sizes (Table 25) with 28 gauge the most common. A new size -- 14 gauge -- was found which is larger than the 16 gauge size previously found at Fort Vancouver.

Table 25 - Lead ball, buckshot and shot from the Fur Store.

Category	mm.	Gauge	Caliber	Subtotal	Total
Ball	17.6	14	.69	1	12
	13.5-14.4	27-29	.54-.55	9	
	10.1-10.2	72-74	.40	2	
Buckshot	6.6-8.3	-	-		12
Shot	3.0-5.7	-	-		6840
TOTAL					6864

Iron Grapeshot and Ball

The iron ammunition recovered consisted of one 6-lb. cannonball and 3 sizes of grapeshot (Table 26).

Table 26 - Iron ball and grapeshot from the Fur Store.

Category	Lbs.	Subtotal	Total
Ball	6		1
Grapeshot			5
	1/4	3	
	1/8	1	
	1/16	1	
TOTAL			6

Construction Material

Brick Fragments

Of the 414 brick fragments recovered, there were 345 imported, 37 local, and 32 unknown brick fragments (Table 27).

Table 27 - Identification of brick varieties on the basis of comparative composition

	Imported		Local					Unknown		
Attributes	1001	1002	1003	1004	1005	1012	1013	1007	1011	Unid.
Texture										
Clay			X			X				
Silt	X	X	X	X	X	X	X			
Sand	X	X		X	X		X		X	
Gravel								X		
Inclusions										
Gravel	X		X		X		X			
Charcoal	X									
Macro-silica Grains		X					X		X	
Clay Accretions				X		X				
Organic Matter			X							
Porosity										
Porous		X	X	X	X		X		X	
Non-porous	X					X		X		
FREQUENCY	344	1	14	7	2	1	13	1	4	27

IV - PRELIMINARY INTERPRETATIONS

The large amount of structural detail and artifactural material recovered from the Fur Store excavations reflect intensive and varied uses of the area. While our immediate concern is the appearance of the Fur Store circa 1845, prior and subsequent human events are an integral part of the archeological record at Fort Vancouver. In this chapter we assemble the archeological evidence and augment it with historical data to arrive at plausible interpretations.

Structural Evidence

Basic foundations of the Store consisted of subsurface wooden blocks that outlined the perimeter of the building and defined a longitudinal midline. Purpose of the footings was to support wooden sills that formed a plan 40 by 100 ft.

There was an attempt by the builders to set subsurface footings of the periphery at 10-ft. intervals. The data of Tables 3-6 indicate that the mean interval between peripheral footings is 10.65 $\pm$ 0.784 ft. at the one-sigma range. However, only 61.54% of the footings fall into this range, suggesting a less than ideal selection of intervals. The problem seems to be at the east, west and north walls where only 50 to 55.55% of the subsurface footing intervals fall into a normal distribution at the one-sigma range. By contrast, 77.77% of the south wall footings are within a normal distribution at the one-sigma range. This implies a greater care and selectivity at setting the southern peripheral footings.

Footings of the medial line were not aligned with those of the periphery. Rather, there was an attempt to offset the medial footings so that they were located midway between north and south footings (Figs. 2.1, 2.2). The attempt was not overly successful since the data of Table 2 indicate the mean interval to be 11.63 $\pm$ 1.00 ft. Despite this variance and lack of agreement with intervals of the peripheral footings, there is internal consistency to the medial footing intervals, 75% of which are in a normal distribution at the one-sigma range. It seems evident that setting of the medial footings was a well planned maneuver.

Superficially, the offset footings of the medial line and their divergent intervals suggest extensive repair or reconstruction of the Fur Store foundations; however, the suggestion is unsupported. Putative evidence of replacement is seen in footings at the east wall (Table 3, F351) and the south wall (Table 4, F413, 422, 424), but it is also seen in the medial line (Table 2, F333). Data of Tables 2-6 indicate little difference in the maximum depths of footing pits between the medial and peripheral lines. Where measurable, peripheral pits had a mean depth of 1.59 ft., while medial pits had a mean depth of

1.26 ft. Since these measurements were taken from a modern surface level rather than a consistent datum, the difference of 0.33 ft. between mean depths seems insignificant. While subsurface footings of the periphery were appreciably longer than those of the medial line, their mean widths were almost identical; mean thickness of peripheral footings was only 0.16 ft. greater than that of medial footings (Tables 2-6). Some unusual but salient characteristics were also shared by footings of the peripheral and medial lines. These include mortise cuts, tenon depressions, metal spikes and pins, and the presence of burned or scorched spots on the footings. Perhaps most telling was the common pit shared by the westernmost footing of the medial line and the central footing of the west wall (Fig. 3.2).

On balance, we believe that all subsurface footings of the Fur Store were set at the same time and formed part of the original construction. The unusual alignment lent itself to exceptionally strong floor joisting. After placing sills on footings, north-south oriented joists less than 20 ft. long could be notched flush into the sills. Because of the offset medial footings, joists were most likely run from the medial line to the periphery at intervals of 5 ft. The exception to this arrangment was in the southeast corner of the Store where the fur press was located. Since the press base was subsurface, one and perhaps 2 joists were omitted such as shown in the diagram of Fig. 88. This slight weakening of foundation rigidity may explain the presence of surface level repair footings in the southeast corner adjacent to the press base (Fig. 3.4).

Other repair footings were found at surface level along the east wall near the northeast corner, and near the center of the west wall (Figs. 2.1, 2.2). Position of the latter in relation to the adjacent footing south (Table 6) is suggestive of a doorway situation such as that found in the west wall of the Chief Factor's House (Hoffman and Ross 1973b: 35-36). However, it has been suggested that the security afforded the Fur Store would limit the number of doors not fully visible from the courtyard of the Fort (Hussey 1974b:44-45). Our interpretation of doorways will be further discussed in the section on distributional evidence. Two additional factors are of note here. There was nothing in the north wall foundations to indicate the positions of 3 large doors known to have been present in 1846-47 (Williams 1970:52). Neither were there any repair footings to the medial line. We doubt that repair of the medial line was beyond the technical capabilities of Fort Vancouver personnel (q.v. Hoffman and Ross 1973b:35). Either the medial line never required repair, or if all subsurface footings were contemporary, repair was not feasible.

The diagram of Fig. 88 would make it appear that sills were set directly on subsurface footings. But archeological evidence indicates this was not the case. Data of Tables 2-6 clearly show that, where measurable, remnant footing thicknesses are generally less than remnant

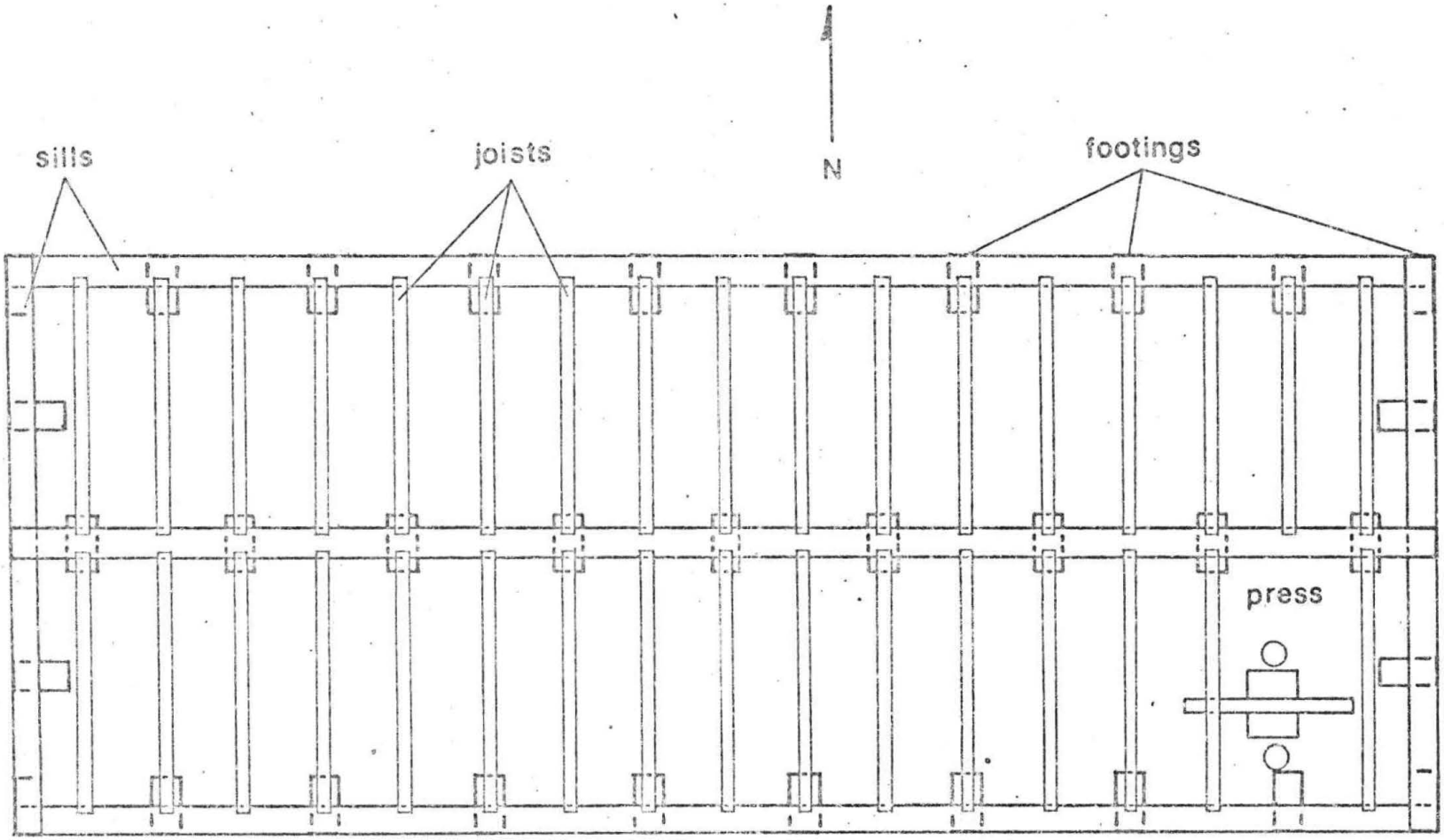


Fig. 88 - Hypothetical joisting at ground floor of the Fur Store. Footings are standardized at 2 by 4 ft., sills are arbitrarily 2 ft. square, and joists are one ft. square.

pit depths. This phenomenom is best seen in the medial line (Table 2) which had not been previously excavated and, thus, yielded more reliable pit and footing measurements. There was no direct evidence of sills or sill impressions left in the Store remains; that is, no casts or significant amounts of wood were found traversing the footing alignments. Therefore, we must infer that basal sills of the Store were elevated above the footing pits. We do not know the amount of elevation, but we are confident that it was accomplished by a series of shims set on the footings, a situation similar to that we noted in the foundations of the Sales Shop (Hoffman and Ross 1974:13). The effect of this arrangment was to make it appear that the basal sills rested on or near the ground, when they actually rested on shims set on the footings.

Elevation of the baling press base in the southeast corner of the Store indicates its contemporaneity with adjacent subsurface footings. As previously mentioned, the main wooden parts of the base were slightly higher than the surrounding surface. Trenches of the base were dug 1.0-1.2 to 1.7 ft. deep, excluding the 2 postholes, or very close to the pit depths of adjacent footings in the south and east walls (Tables 3, 4). Yet the main wooden parts rested on backfill within the trenches at a depth of 0.5 to 1.0 ft. which was slightly above the elevation range of adjacent surface level footings that lay 0.6 to 1.2 ft. deep. At this time we have no explanation for the prepared backfill in the trenches; we see no technological advantage to such arrangement. However, it is evident that if the press base was slightly above surface the press mounts were even higher. The lower mount, whose former presence is indicated by the linear depression in the base, may have been at the same elevation as the adjacent floor joists.

The "unusual characteristics" previously mentioned for certain footings present interpretive problems. Superficially, the mortise cuts, metal pins and tenon depressions suggest the attachment of framing uprights through the sills and into the footings. Yet Hussey (1970b:40) reminds us that such "...does not appear to have been a common Hudson's Bay Company construction technique..." A comparison of these characteristics with the archeological plan of the Store does not reveal any evident patterning. Further, the burned and scorched spots on certain footings were not accompanied by evidence of <u>in situ</u> burning. Most footings were not burned, and those that were showed no evident patterning. We must conclude that the unusual characteristics are not immediately relevent to the Store footings. By inference, it seems more likely that the footings were cut from salvaged parts of another building that had partially burned. The mortise cuts and metal fasteners specifically suggest framing plates of a post-in-sill style building. We do not know what structure was salvaged. It may have been part of the Phase I fort, or it may have been part of the earlier Fort Vancouver located on the hill (<u>q.v.</u> Hussey 1957:39-44).

The structural evidence of footing alignments and the inferences drawn from the alignments indicate that the Fur Store was a heavy timber structure built in the post-in-sill style generally favored by HBC and commonly used at Fort Vancouver. We note that the Fur Store was one of several similar buildings historically referenced to have been replaced or rebuilt ca. 1843-46 (Hussey 1957:147-148). There was no evidence of this in the footing alignments, and we can only assume that such reconstruction did not alter the foundations of the building. The probable appearance of the Store and its uses will be discussed further.

Other structural remains found in the excavated area include stockade lines, a flagstaff and a plank road over a drainage system. While extensive blacksmithing activity was noted in the area, no structural remains of a shop were identified. However, we assume that such a building did once exist previous to construction of the Fur Store. Structural remains of the flagstaff and adjacent stockades were discussed and interpreted in previous reports (Hoffman and Ross 1973c; Hoffman 1974).

Remains of the drainage system west of the Fur Store constitute a previously unknown aspect of Fort Vancouver technology. The function of such a system seems obvious in light of its position between 2 large warehouses. The archeological plan (Fig. 3.2) shows 4 short feeder trenches connecting to a central trench that led south towards the southwest gate of the stockade. Other feeder trenches may have been present in unexcavated areas. Terminal points of the central trench were not found. The southern terminus may have been the rock-filled trench of the southwest gate for the Phase IV Stockade. This feature appears to have been used as a sump by 1850 or possibly earlier (Hoffman 1974:36, 130).

The archeological map shows that the shallow trenches were hand dug and at least partially lined at the sides with 0.1 ft. (originally 1 1/2 inch?) stock boards of varying lengths. Board casts were well preserved at trench junctures, and collapsed portions of board liners were also noted within the trenches (Fig. 3.2). The plank road consisted of long, disjointed puncheons that lay parallel to the central drain and were spanned by wooden pieces. While only the eastern puncheon was found, its spatial relationship to the central drain suggests that the plank road was about 8 to 10 ft. wide, certainly sufficient for passage of a wagon of the period. A fragment of either a trench liner or a puncheon may have been found during excavations of 1952, as suggested by the mapping of an "out of line footing" by the investigator (Caywood 1955:sheet 5 of map 2).

FOVA Nail Varieties #1009, #1014 and #1066 were found concentrated in the area of the plank road. As discussed in Chapter III, the first 2 varieties are "rosette-head, flat tip" and "T-head" spikes commonly used for heavy-duty joining. Variety #1066 is also a wrought rod

spike with lengths in excess of 0.5 ft. (Table 21). Presently, we believe these fasteners were used for attaching the 8 to 10-ft. long planks to the puncheons. Although we do not know the plank widths, the spikes suggest that the planks were 2 to 3 inches thick, certainly sufficient to support a loaded wagon of the period.

The actual length of the drainage system and covering plank road cannot be stated on the basis of current information. Short of further excavation, there is no way of knowing whether the 2 lengths are equal or if one exceeds the other. We have suggested that the drain, and this case the covering road, had one terminus at the southwest gate of the Phase IV Stockade. In Chapter II we noted that the road was visible at the Fort interior by 1860 at the latest. This view clearly shows a northern terminus of the planks some distance north of the Fur Store (Hussey 1957:Pl. XXII). Based on the dimensions and structural positions of Fig. 1, we estimate that the roadway was at least 70 ft. long.

Distributional Evidence

Spatial distributions of material cultural remains within the excavated area indicate the presence of 4 functionally identifiable subareas or structures, and 6 historic activity areas as hypothesized from the archeological evidence. For convenience in reporting, we repeat our assumption that blacksmithing activities were conducted within a structure. While no remains of this structure were found, the data of Chapter III and the following discussion provide firm bases for our assumption.

Identifiable structures and activity areas are outlined in Table 28 and structural positions are shown on Fig. 89. Of immediate note are the 3 activity areas identified for the Fur Store. Two are based upon the spatial distribution of portable artifacts and the third is defined by remains of the baling press.

Material distributions are somewhat complex as might be expected from the documented history of Fur Store usage. As a matter of clarity, we discuss the distributions in sequence of the artifact categories defined in Chapter III. Distributional data are available for all cultural remains found in the area including recent USA materials. But for purposes of this report we discuss only items of immediate interpretive significance to our study. Due to mixing of materials from Hudson's Bay Company and Vancouver Barracks occupations our distributions are calculated as frequencies per square ft. rather than the volume calculations used in past reports. Frequency diagrams of the most pertinent materials are shown as Figs. 90-133.

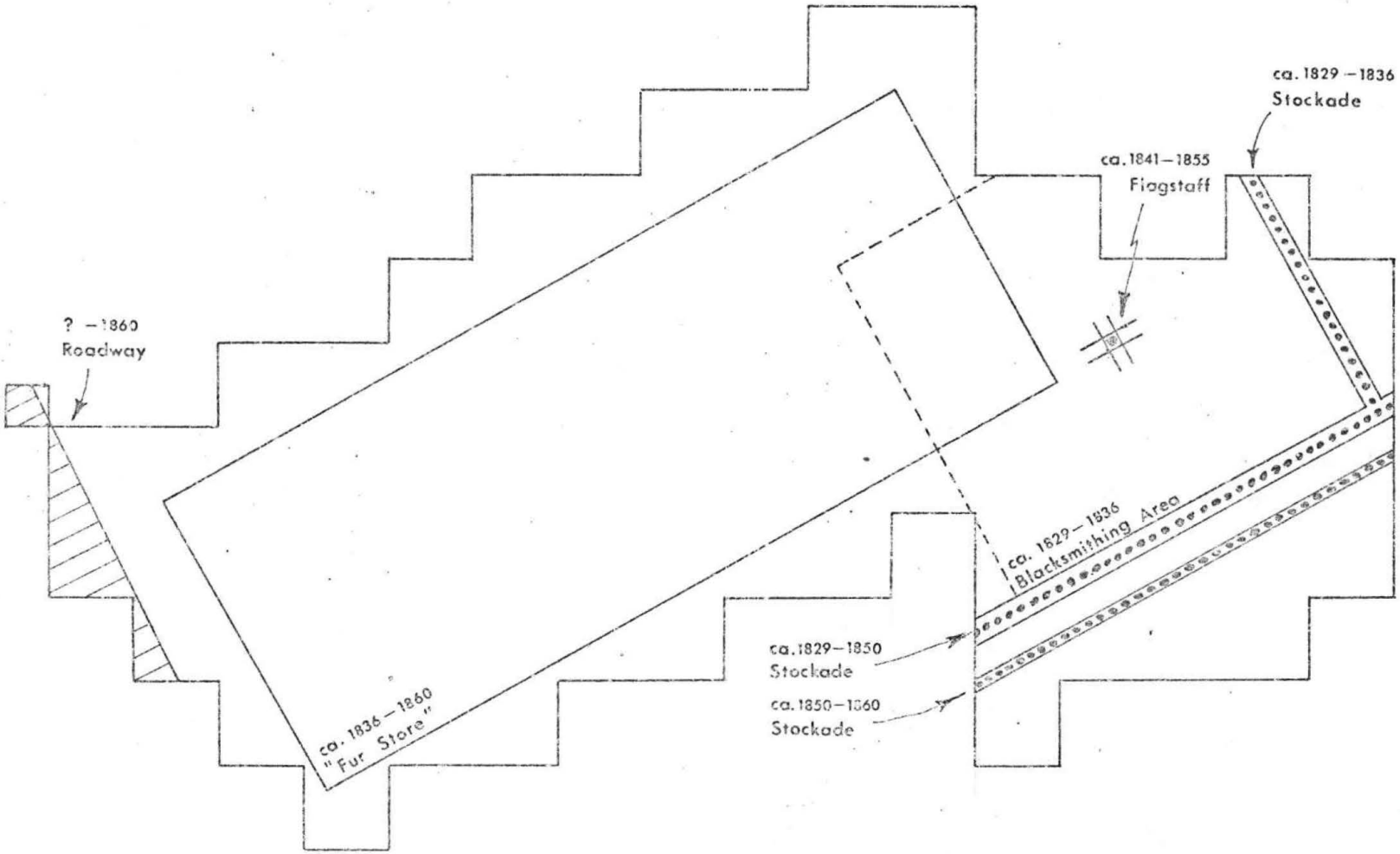


Fig. 89 - Spatial locations of historical archaeological structures and cultural activity areas within the Fur Store area.

Table 28 - Correlation of hypothesized structures with associated cultural activities.

Hypothesized Structure		Hypothesized Activities	
Structure	Date	Activity	Date
Blacksmith Shop	ca. 1829-1836	Blacksmithing Manufacturing Axes Traps Hardware Repairing Firearms Hardware	ca. 1829-1836
Fur Store East Room	ca. 1836-1860	Unknown Fur Storage U.S. Army Storage Unknown	ca. 1836-1845 ca. 1845-1852 ca. 1852-1858 1858-1860
Middle Room		Indian Trade Store Fur Storage U.S. Army Storage Unknown	ca. 1836-1845 ca. 1845-1849 ca. 1849-1858 1858-1860
West Room		Unknown Fur Storage U.S. Army Storage Unknown	ca. 1836-1845 ca. 1845-1849 ca. 1849-1858 1858-1860
Roadway	? -1860	Transportation	? -1860
Flagstaff	ca. 1841-1855	Flag Display	ca. 1841-1855

Ceramic Household and Container Fragments

Earthenware Household Wares

Clear glazed white body fragments were distributed throughout the excavated area. A slight concentration was associated with the roadway near the northwestern corner of the Store (Fig. 90). This may be related to trash disposal of items from inside the Store via the hypothesized door in the west wall.

Stoneware Wares and Containers

Greenish gray body fragments of Chinese derivations were concentrated in the blacksmithing area and the roadway (Fig. 91). Both reflect trash disposal, and the latter concentration again suggests a door in the west wall of the Store.

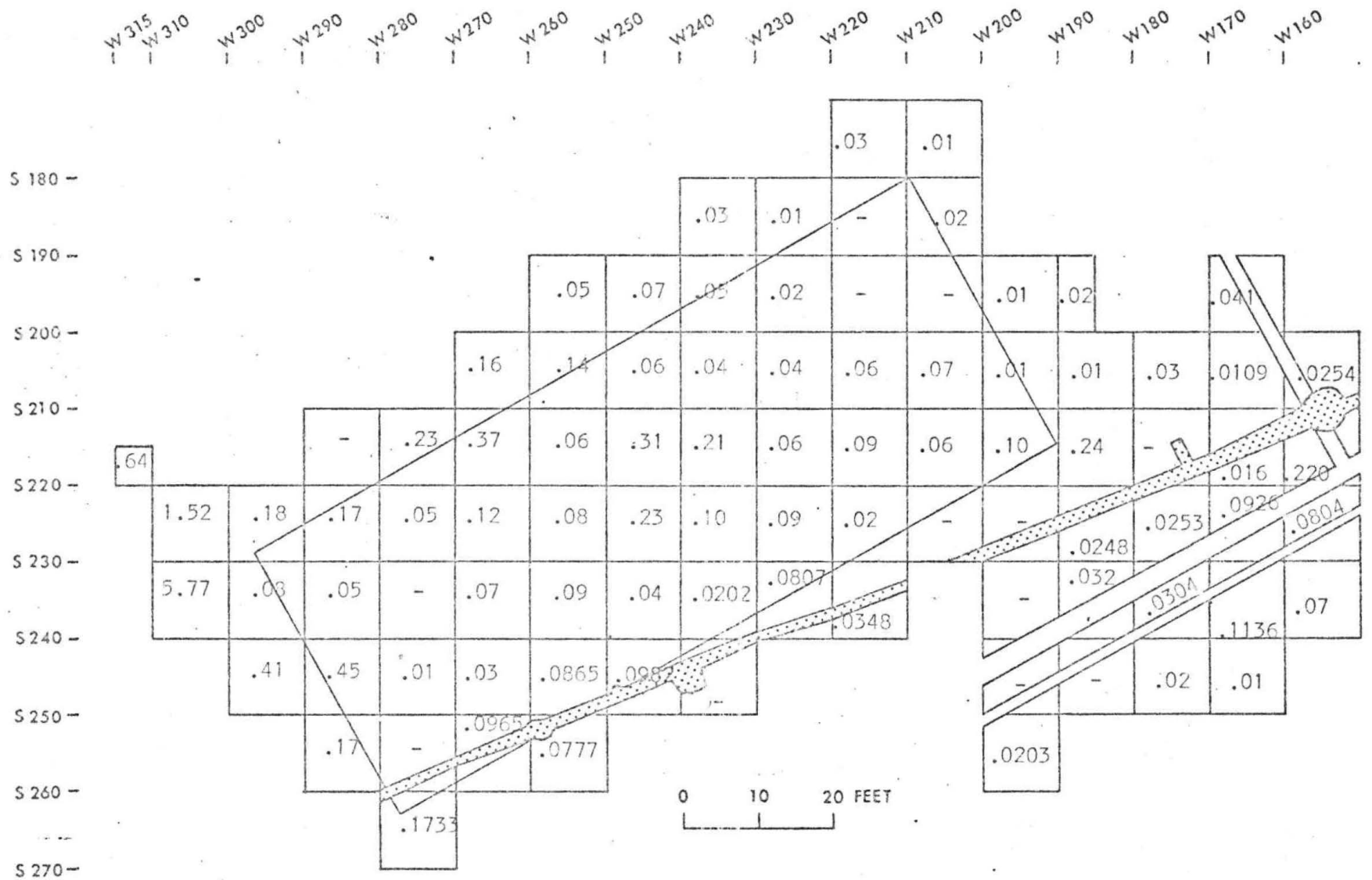


Fig. 90 - Distribution of clear glazed white body earthenware fragments in the Fur Store area (f/ft^2).

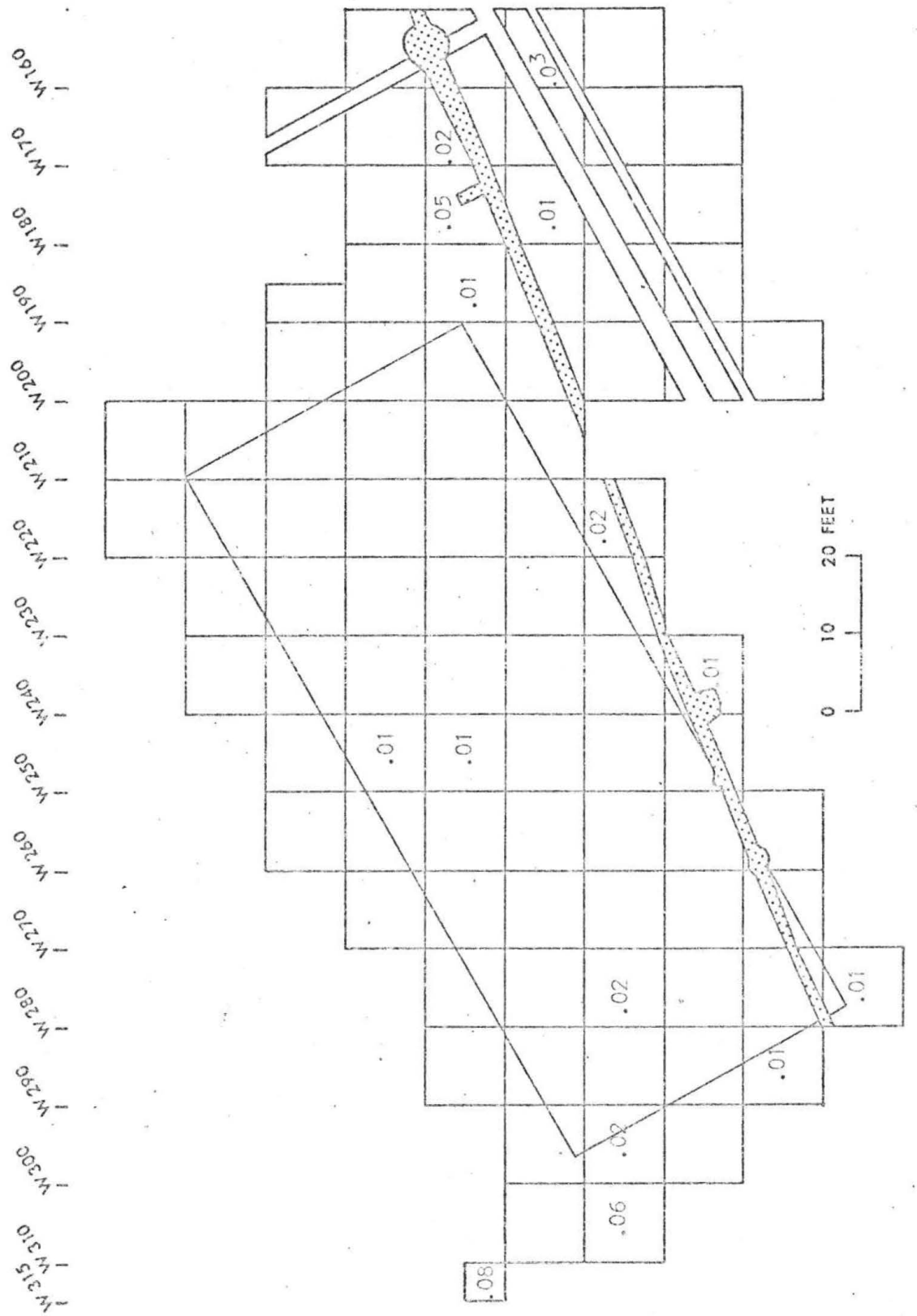


Fig. 91 - Distribution of greenish gray body (Chinese) stoneware in the Fur Store area (f/ft^2).

Unidentified saltglazed, brownish gray body container fragments showed 3 concentrations (Fig. 92). One at the northwest corner of the Fur Store appears to reflect the trash disposal discussed for the above earthenwares. Another in the blacksmithing area outside the southeastern corner of the Store is probably related to trash disposal. The third concentration at the central area of the Fur Store is another matter. Reconstructed stoneware vessels SC 1 and SC 3 were found in this area along with the probable snuff bottle SC 4. SC 2, another container, was found along the south wall. Since all sherds of this style in the central area appear to derive from containers, we believe that they associate with the central area's use as the Indian Trade Store. Quite likely, the vessels served as containers for bulk merchandise that was difficult to handle such as powders, liquids and small objects. As discussed in our report of the Fort Vancouver Sales Shop, the presence of artifacts and other cultural materials inside the Stores is most likely due to the "loosely laid" plank flooring of warehouses (Hussey 1972:205) which allowed certain materials to fall through cracks in the floor (Hoffman and Ross 1974:63).

Ceramic Personal Items

Kaolin Pipe Fragments

A relatively uniform distribution was found throughout the excavations (Fig. 93). Slight concentrations were noted outside the Store's southeastern corner in the blacksmithing area. While these coincide with probable areas of trash disposal, pipe concentrations here may also indicate smoking areas such as we have previously discussed (Hoffman and Ross 1973b:162; 1974:74). A heavier concentration was defined at the center of the Store. Again, this reflects use of the central area as the Indian Trade Store; pipes found here are probably remains of merchandise dropped to the floor and swept through cracks.

Glass Items

Bottle Fragments

Three concentrations were identified outside the northwestern corner of the Store, at the central area of the Store and in the blacksmithing area immediately outside the southeast corner of the Store (Fig. 94). Trash disposal seems likely at the roadway and the blacksmith shop. Anomalous frequencies are present near the southwestern corner of the Store and in the small area between the stockade trenches. The southwest anomaly may be due to mixing with extensive USA sheet trash in the area, while the stockade frequency may be a spurious product of previous excavation (q.v. Caywood 1955:sheet 2 of map 2). The concentration at the center of the Store aids in identification of this sector as the Indian Trade Store. Fragments of apothecary bottles found here suggest either trade merchandise or use of the

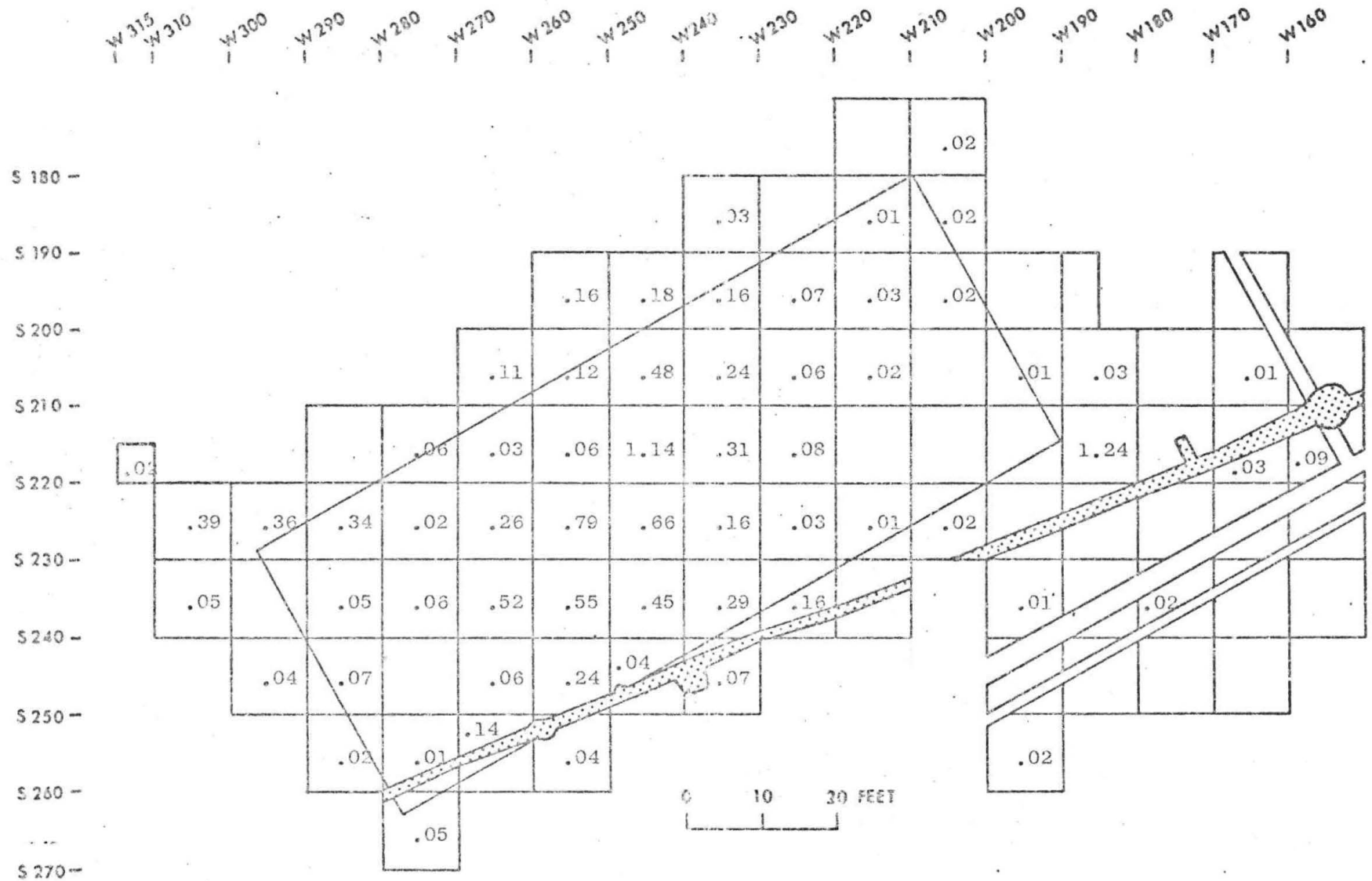


Fig. 92 - Distribution of brownish-gray body stoneware container fragments in the Fur Store area (f/ft^2).

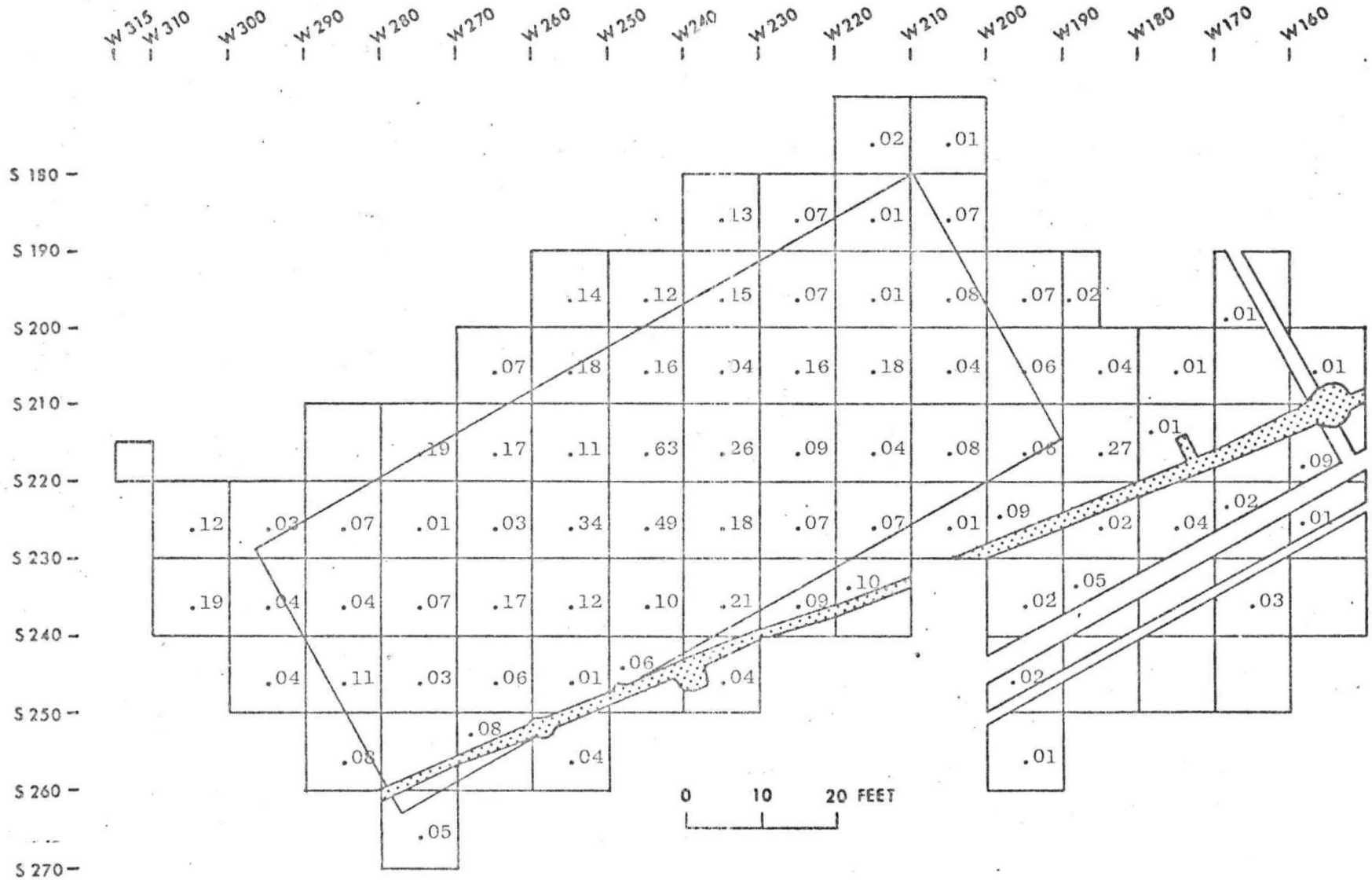


Fig. 93 - Distribution of kaolin tobacco pipe fragments in the Fur Store area (f/ft^2).

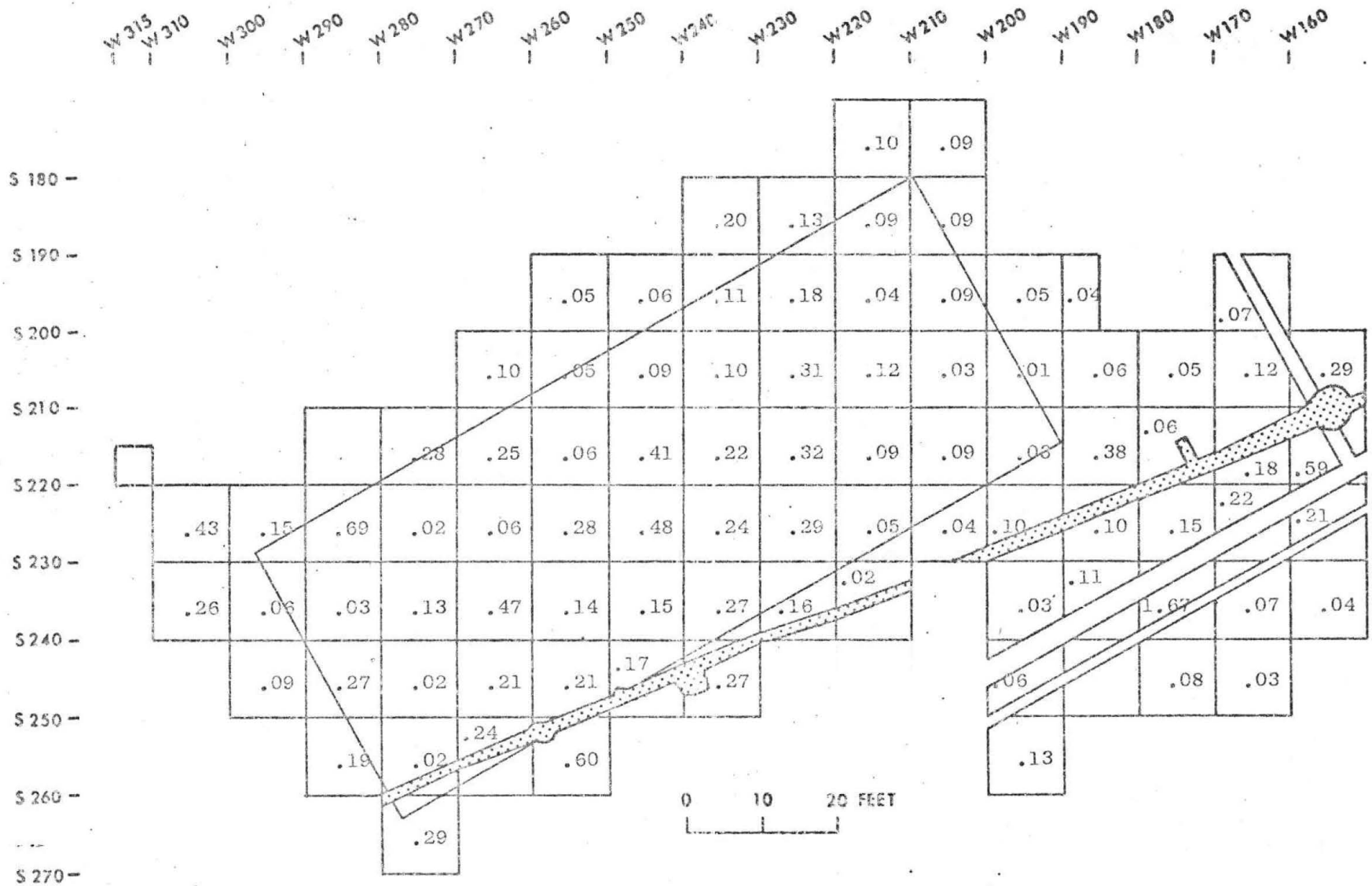


Fig. 94 - Distribution of bottle fragments in the Fur Store area (f/ft^2).

sector as the "Hospital Dispensary, etc." known from historic sources (Hussey 1957:Pl. II). Fragments from a bottle of "J. T. Daly, Clubhouse" medicinal cordial gin were associated with the eastern portion of the Store. As discussed in Chapter III, this bottle can be attributed to either HBC or USA use of the building.

Window Glass

Density of window glass found in excavation is rather tightly restricted to the central area of the Fur Store with a high concentration at the southern wall (Fig. 95). Low frequencies of window glass around the Store perimeter make it difficult to infer the presence of glass panes in the windows. The thin scattering of glass in the blacksmithing area seems to be "normal" for the general area. By contrast, the high density at the center of the Store suggests storage of window panes somewhere close to the south wall. Almost all of this glass forms a single statistical population (Fig. 16) that is virtually identical in metric distribution to the single population of glass found in the Sales Shop (Hoffman and Foss 1974:Fig. 9). In context of historically known use of the Sales Shop, it is evident that the window glass of the Store was stored HBC merchandise that was used in the Indian Trade Store.

Glass Beads

These were the most common artifacts found in excavation (Table 7) and their large numbers are indicative of the Indian Trade Store activity. Beads were heavily concentrated at the center of the Store; frequencies tapered rapidly from the center and were very sparse outside of the Store (Fig. 96). The calculations of Fig. 96 are incomplete since they are based only on the beads sorted to date. Several hundred bags of bead-bearing dirt were cataloged from the excavations but have yet to be processed (Table 7, Miscellaneous Items). However, this potential source of greater bead numbers was recovered from the same excavation units that already show outstandingly high frequencies (Fig. 96). Further sorting will only reinforce our interpretations of the central area as the Indian Trade Store.

Ring and Jewelry Settings

While few in number (Table 7), these functionally important items were restricted to the central area of the Fur Store (Fig. 97). In Chapter III, the ring settings were identified as parts of brass trade rings. These items support the functional identification of the central area as the Indian Trade Store.

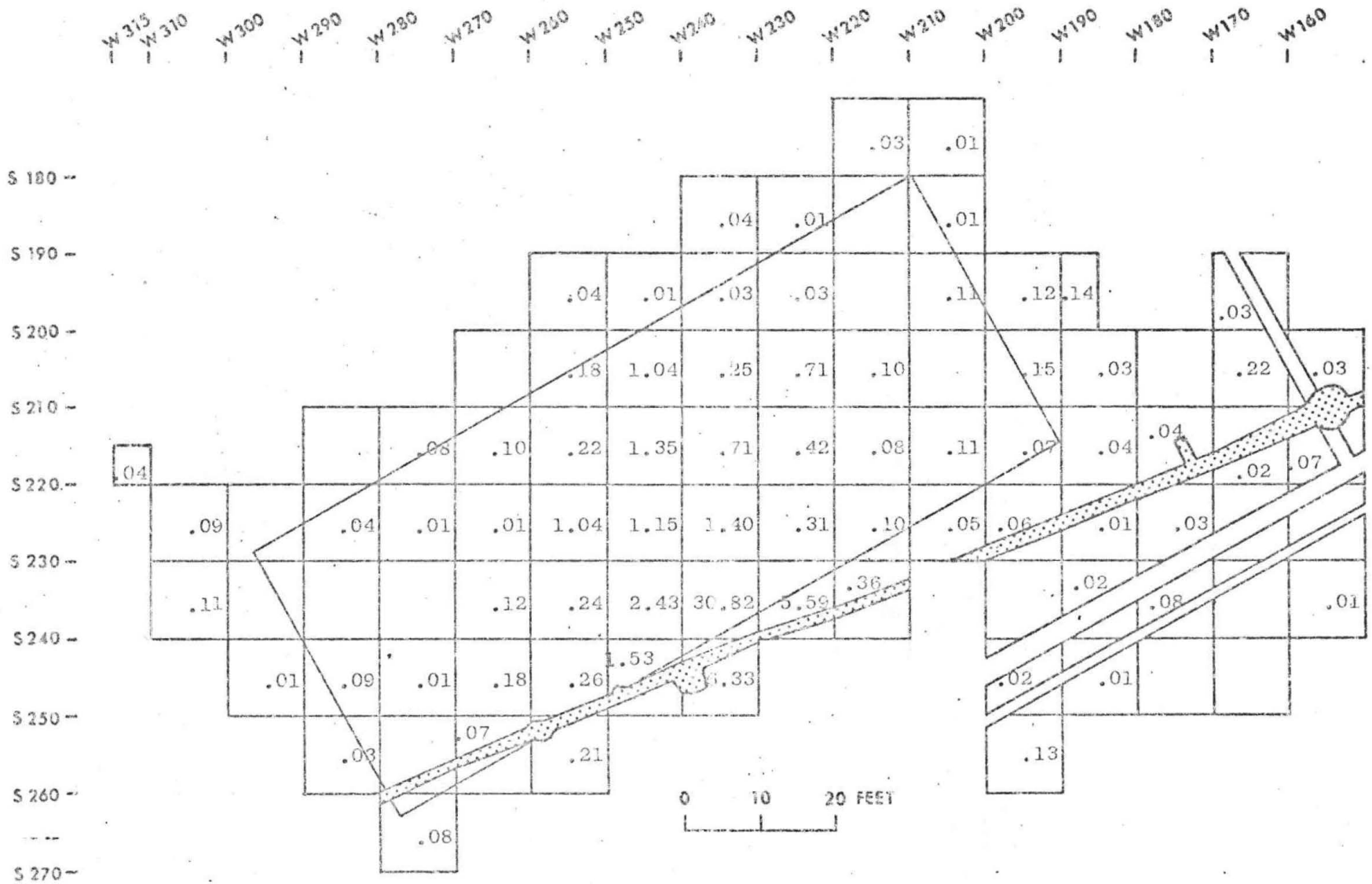


Fig. 95 - Distribution of window glass in the Fur Store area (f/ft^2).

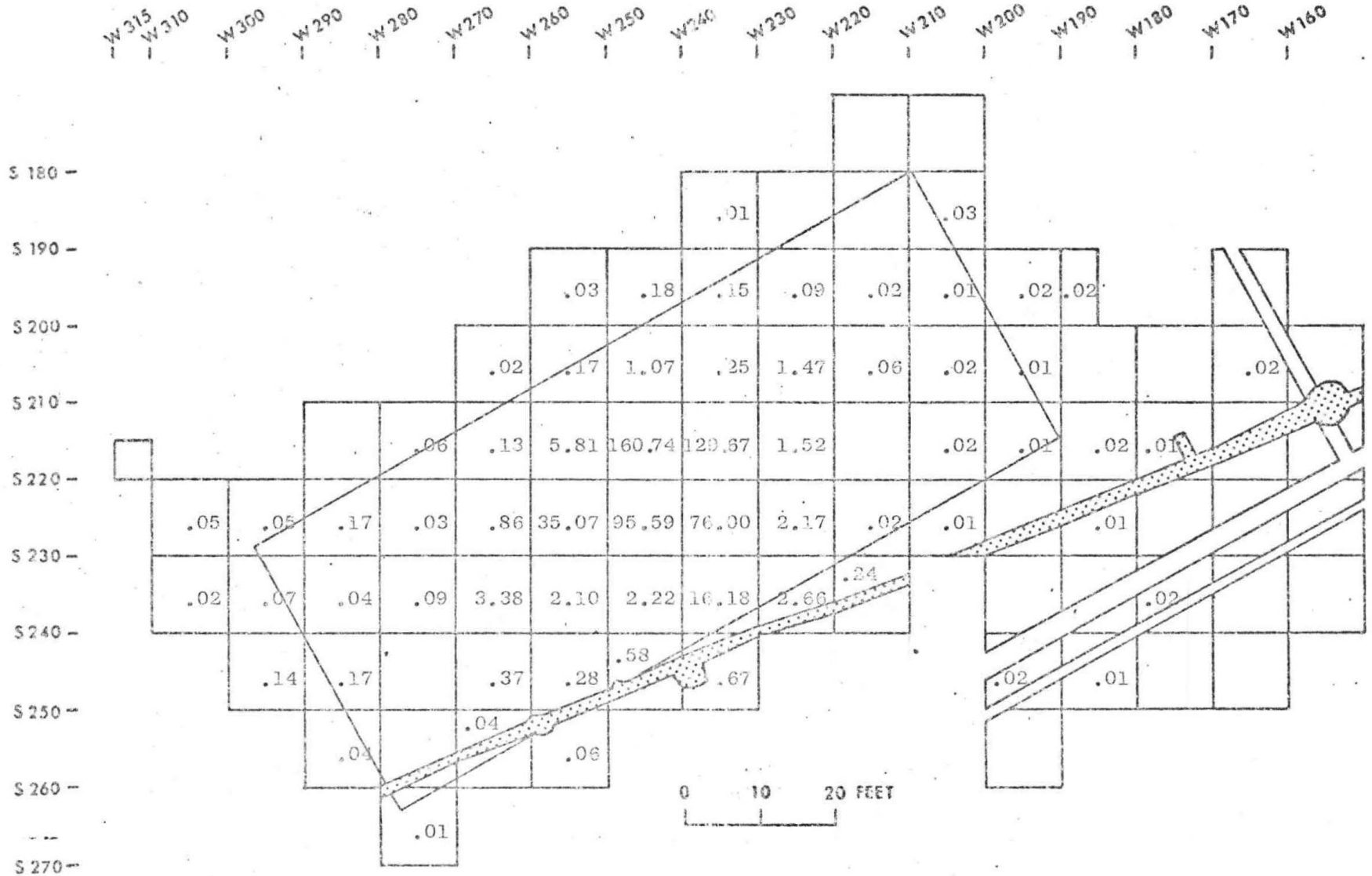


Fig. 96 - Distribution of beads in the Fur Store area (f/ft^2).

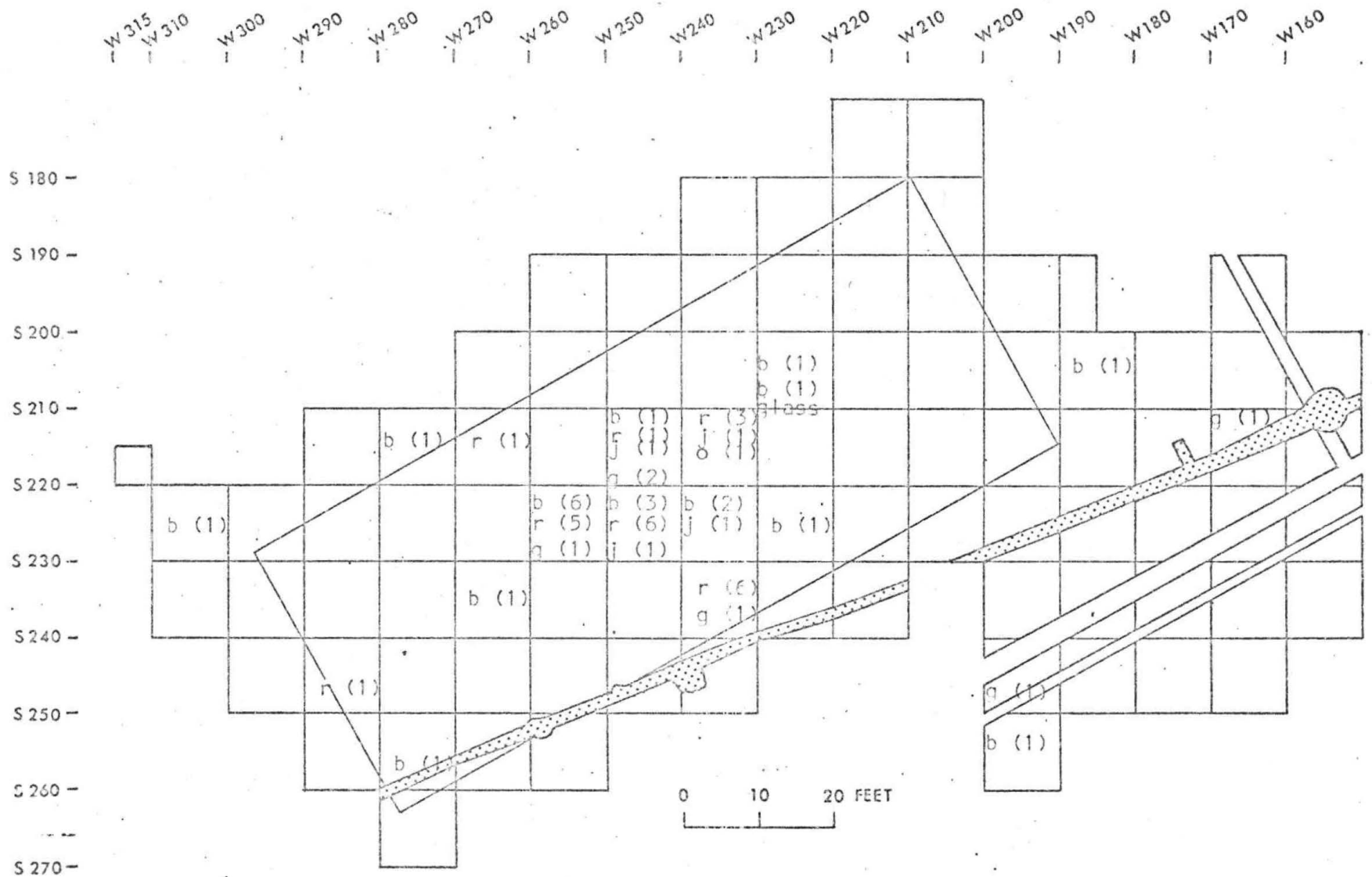


Fig. 97 - Distribution of selected trade goods from the Fur Store area (absolute frequency of buttons (b), finger rings and fragments (f), glass jewelry settings (j), gunflints (g), "half-dime" ornament (o)).

Metal Items

Hardware Items

Wrought rod nails were present in virtually all parts of the excavations. Concentrations were noted in the blacksmithing area, the roadway and the western two-thirds of the Fur Store (Fig. 98).

Variety #1002 "shingling" nails were concentrated in the blacksmith shop and the western portion of the Store (Fig. 99). This was a frequent nail style at Fort Vancouver. As discussed in Chapter III, the smaller sizes have been correlated with historic shingling events, although they may also have functioned as cooper's nails. Due to the uneven distribution in the Fur Store area, we believe the small sizes of Variety #1002 may have been used for cooperage in the western sector of the Store, while actual shingling may be represented in the blacksmith shop.

Variety #1007 "door" or "shutter" nails were concentrated along the south wall of the Store (Fig. 100). Since there is no historic documentation of a door in the south wall, these nails are probably derived from shutters. As will be discussed, the shutters were most likely in the second floor of the Store.

Variety #1009 "spike" nails were found in the roadway, smithing area and the Fur Store (Fig. 101). This large nail is frequently found at Fort Vancouver and was probably used for heavy joining.

Variety #1014 "T-spike" nails were associated with the stockade, central area of the Store and the roadway (Fig. 102). These were large nails (Table 21) that were probably used for heavy joining. We would speculate that this variety would also be useful for suspending strings of pelts during fur storage activities (g.v. Hussey 1974b:26).

Variety #1060 "sheathing" nails were irregularly distributed over the Fur Store area with concentrations in the blacksmithing area and the central sector of the Store (Fig. 103). A large number of these nails was found in the Store (Table 21), yet there is no historic evidence of exterior sheathing (Ibid.:42-43). The smaller sizes may have been used for partitions and the larger sizes for flooring.

Variety #1066 nails were found associated with the roadway (Fig. 104). As noted in Chapter III, this variety was probably used to fasten 2 to 3 inch planks to the rails of the roadway.

Variety #1081 nails were all found in situ with Store footings (Fig. 105). As previously discussed, many of these footings were cut from members of a precedent structure. Use of this large joining nail is not relevent to the Fur Store.

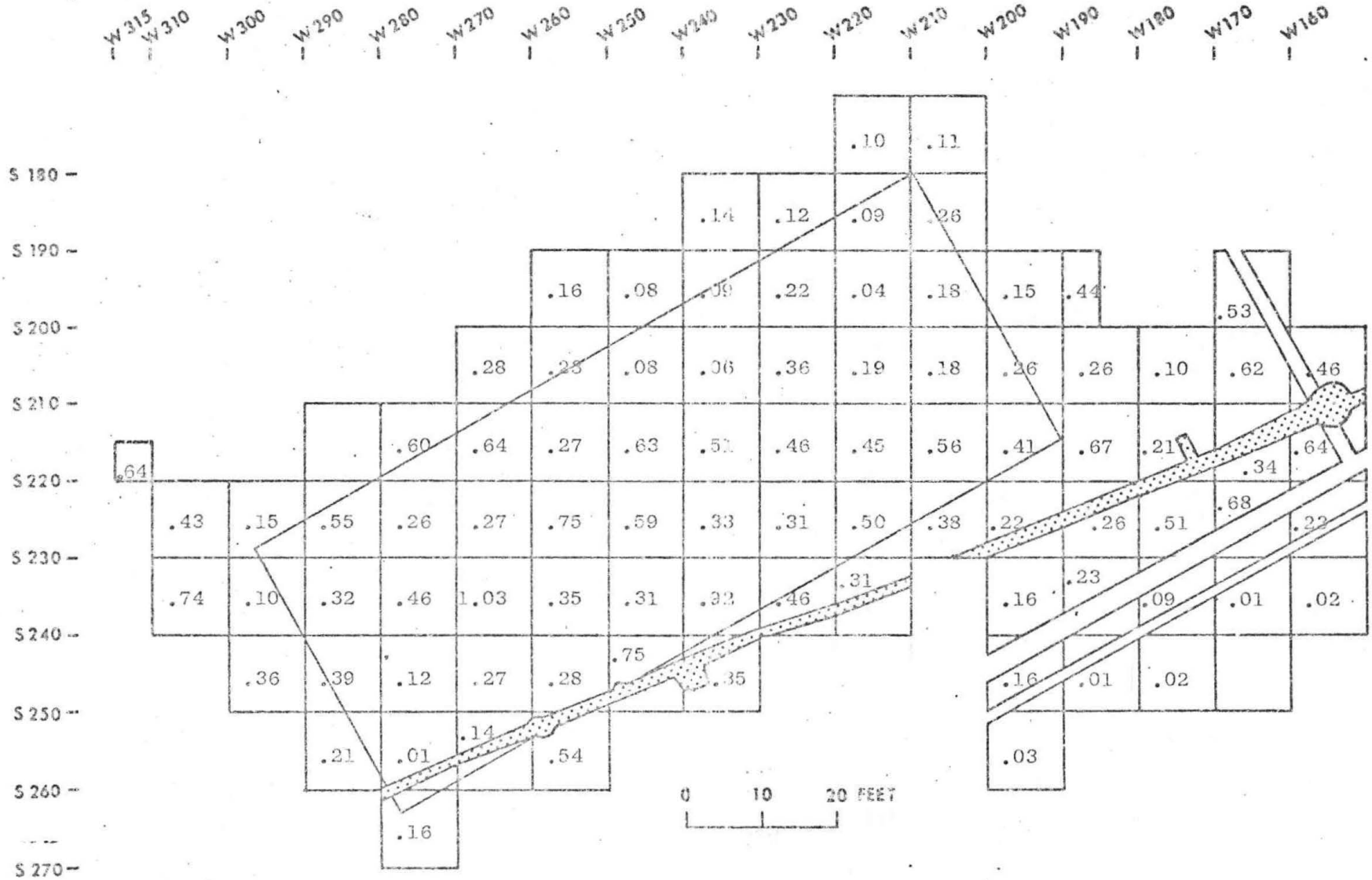


Fig. 98 - Distribution of wrought rod nails in the Fur Store area (f/ft^2).

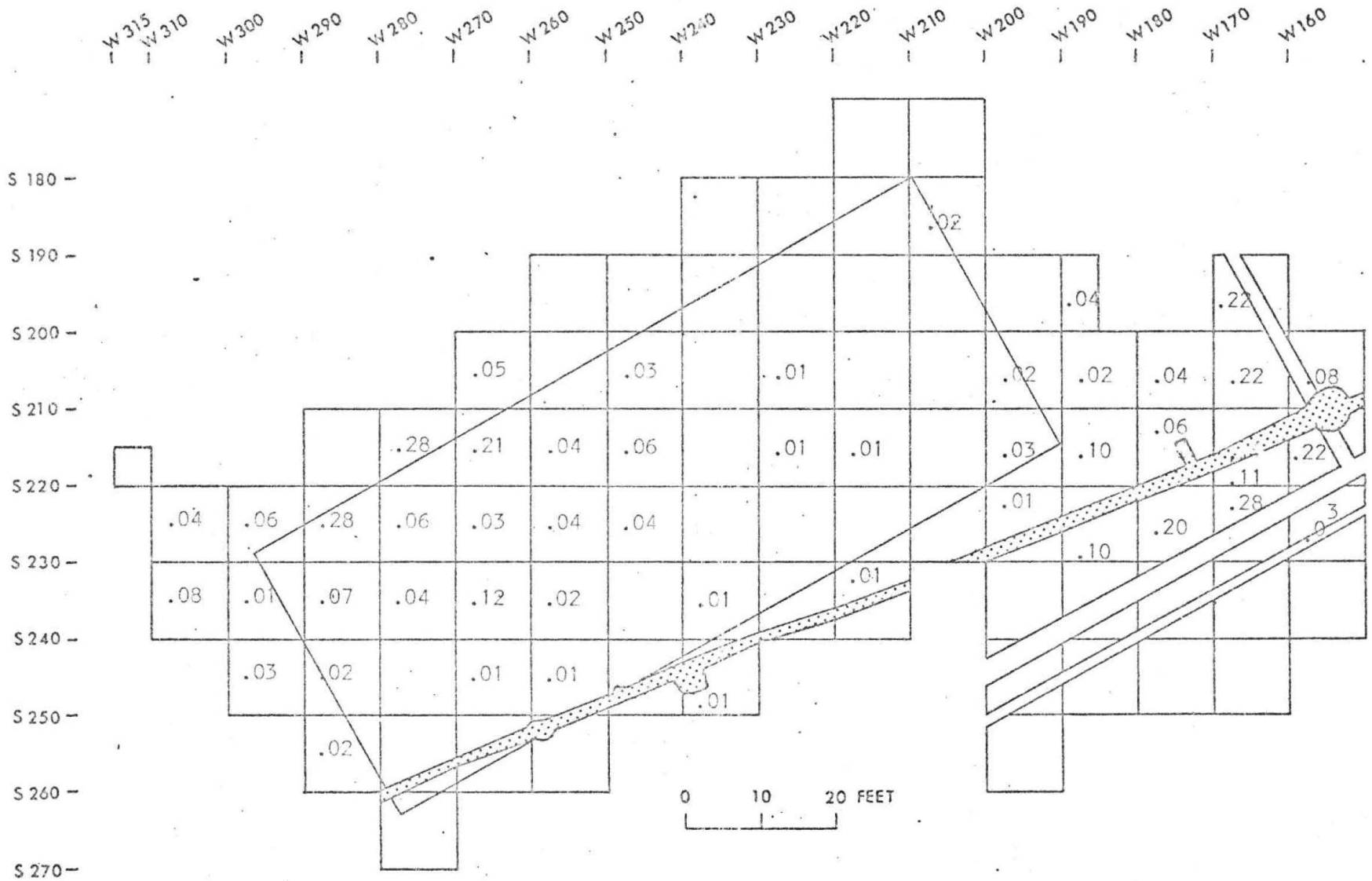


Fig. 99 - Distribution of nail Variety #1002 "shingling" nails in the Fur Store area (f/ft^2).

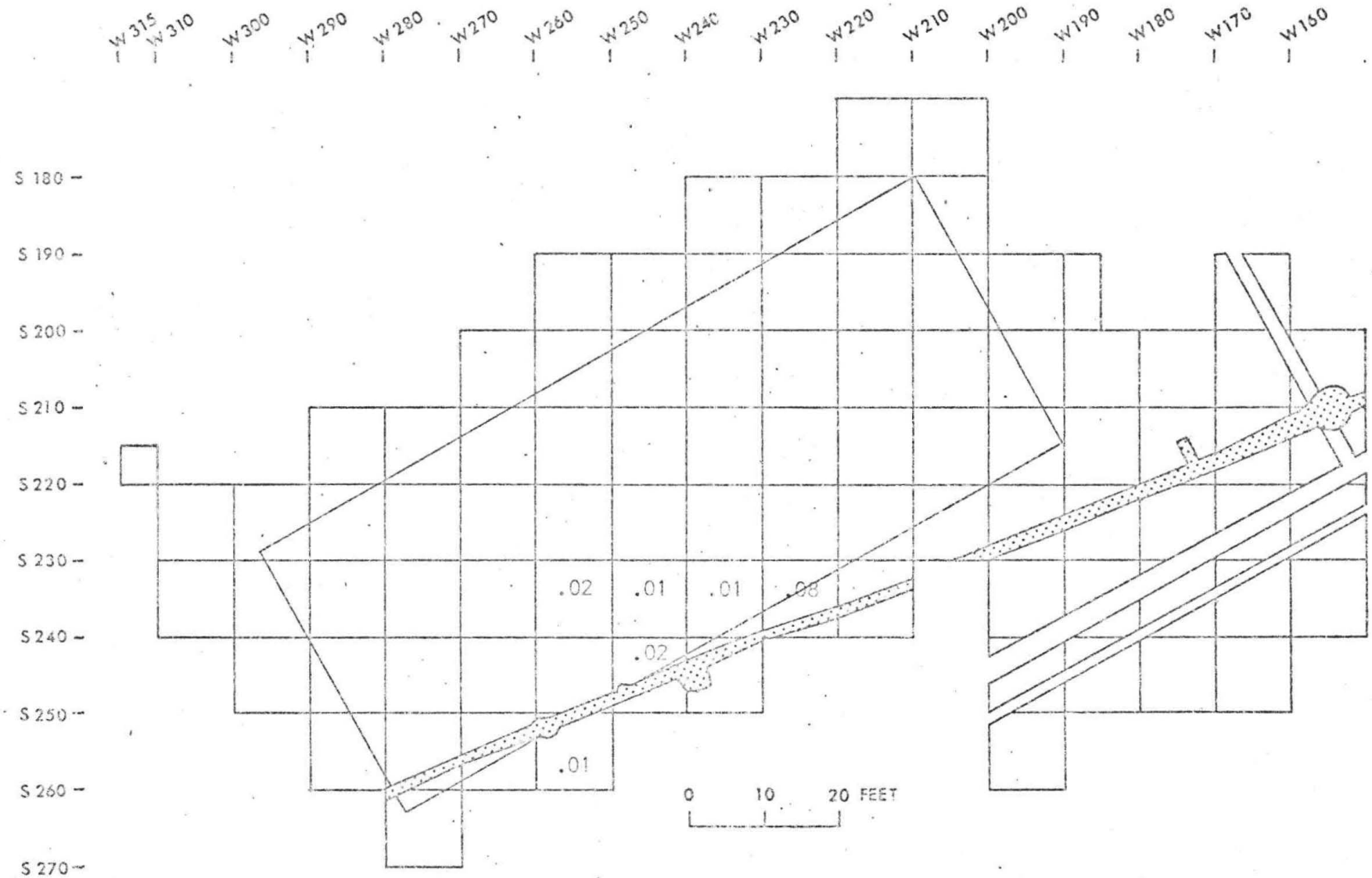


Fig. 100 - Distribution of nail Variety #1007 in the Fur Store area (f/ft^2).

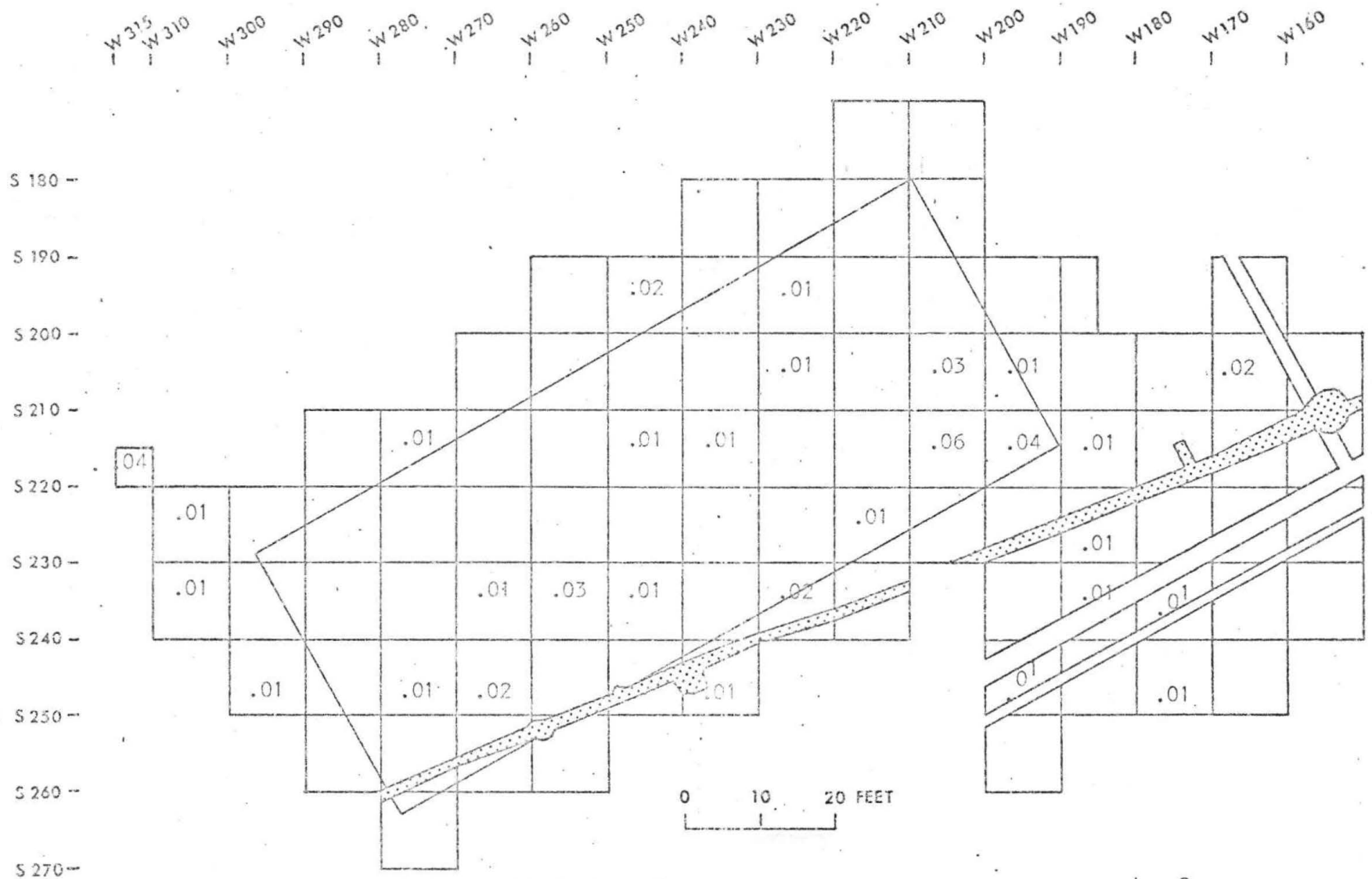


Fig. 101 - Distribution of nail Variety #1009 "spikes" in the Fur Store area (f/ft^2).

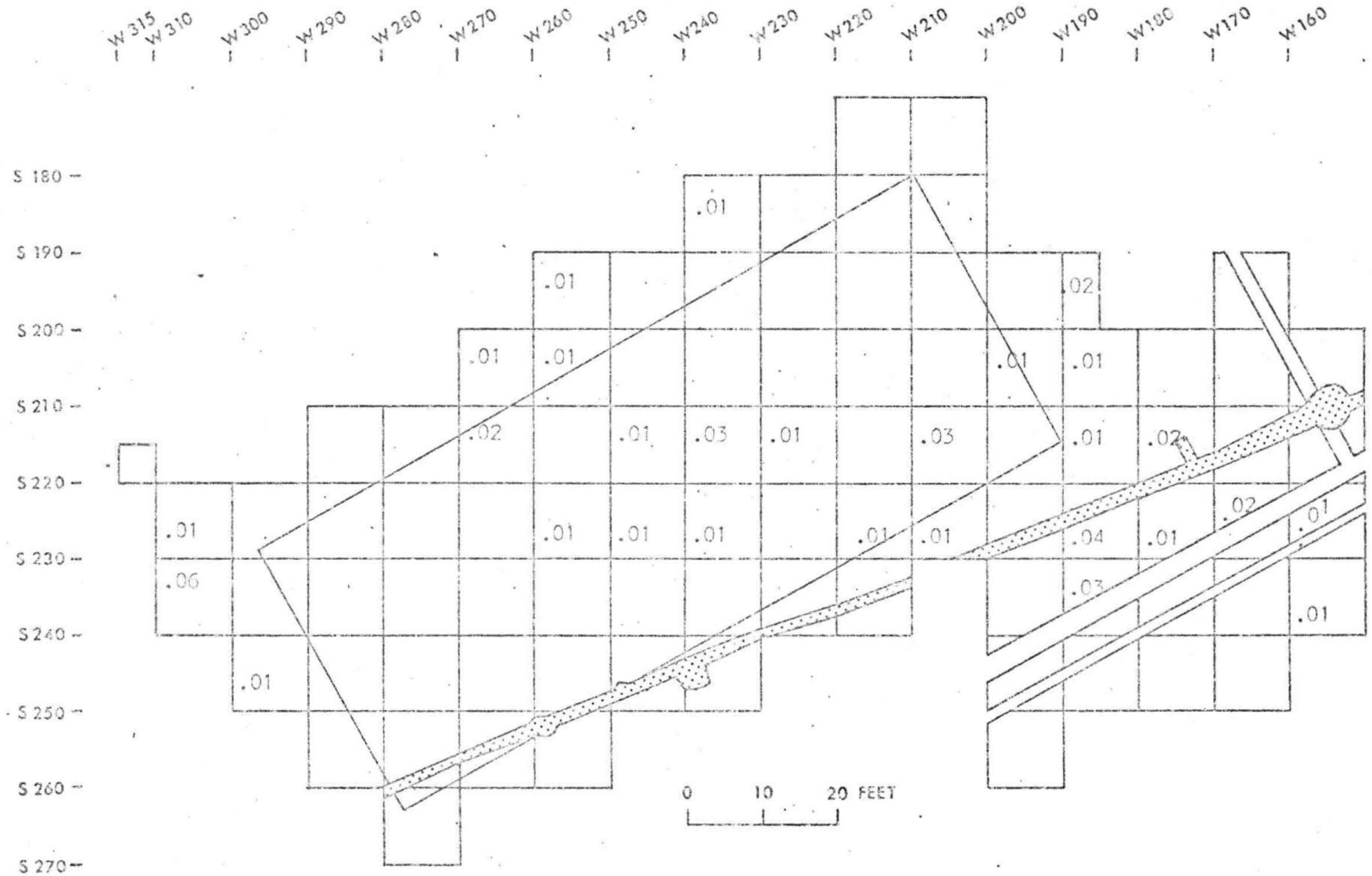


Fig. 102 - Distribution of nail Variety #1014 in the Fur Store area (f/ft^2).

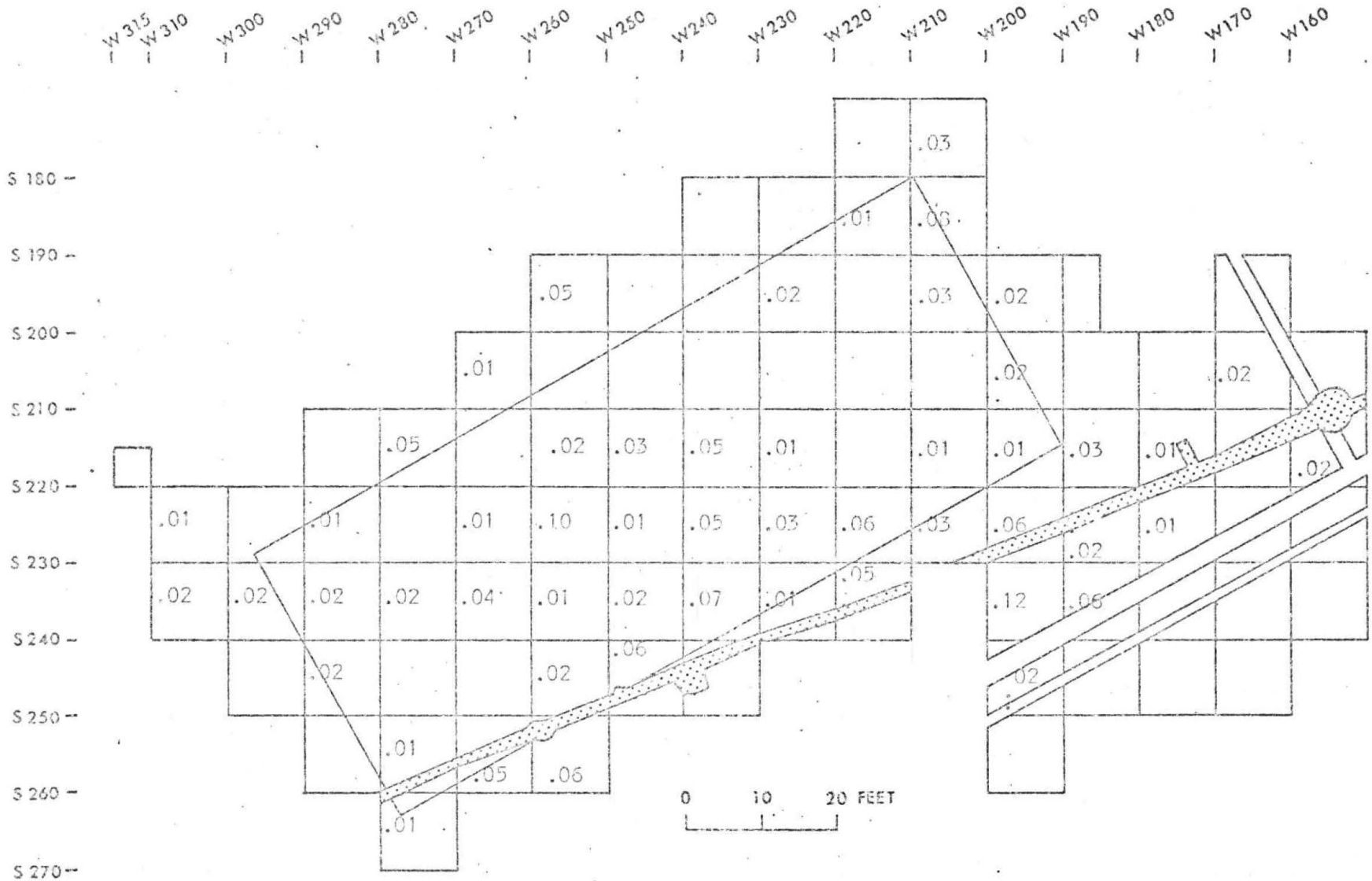


Fig. 103 - Distribution of nail Variety #1060 "sheathing" nails in the Fur Store area (f/ft^2).

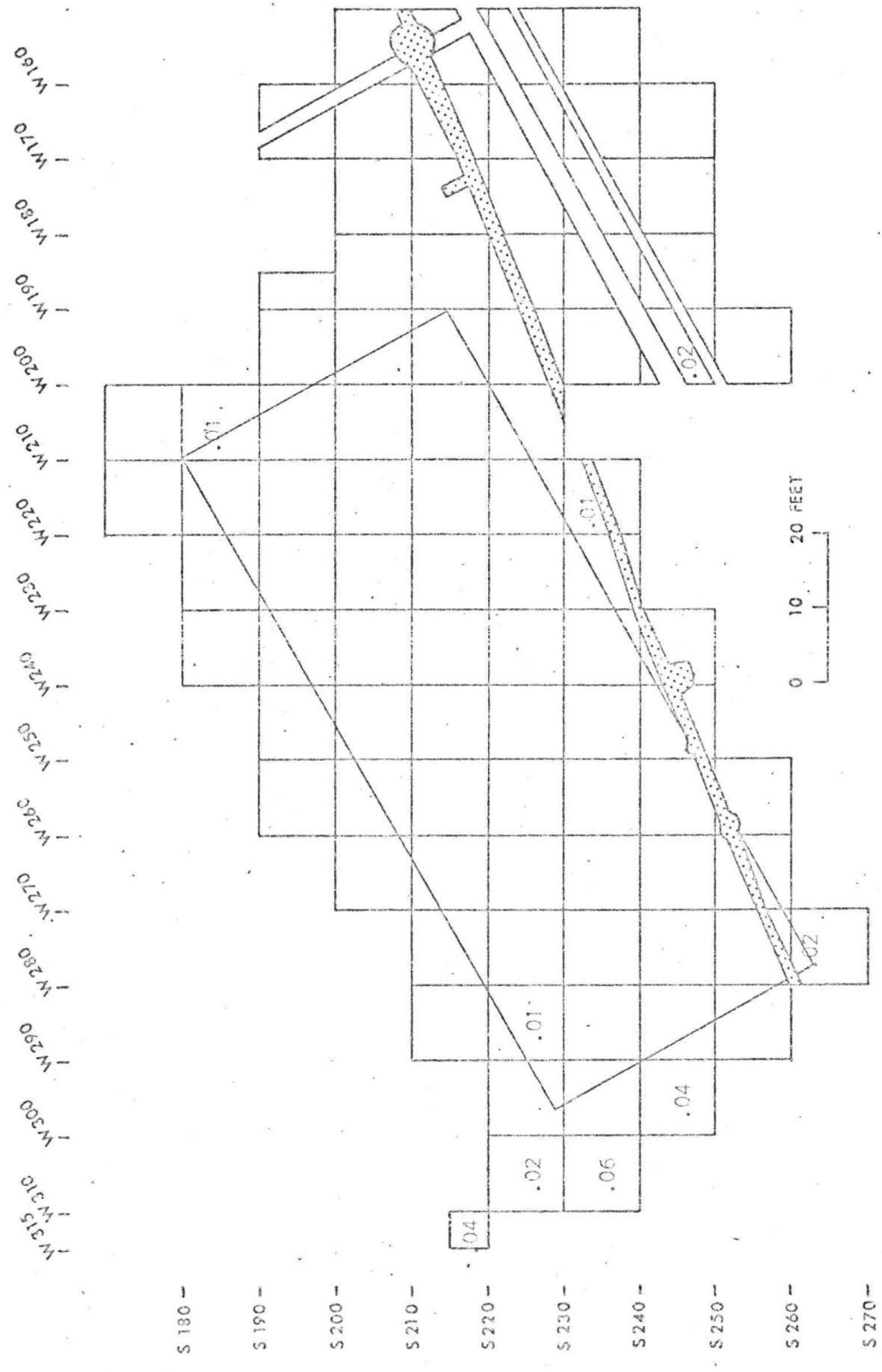


Fig. 104 - Distribution of nail Variety #1166 in the Fur Store area (f/ft^2).

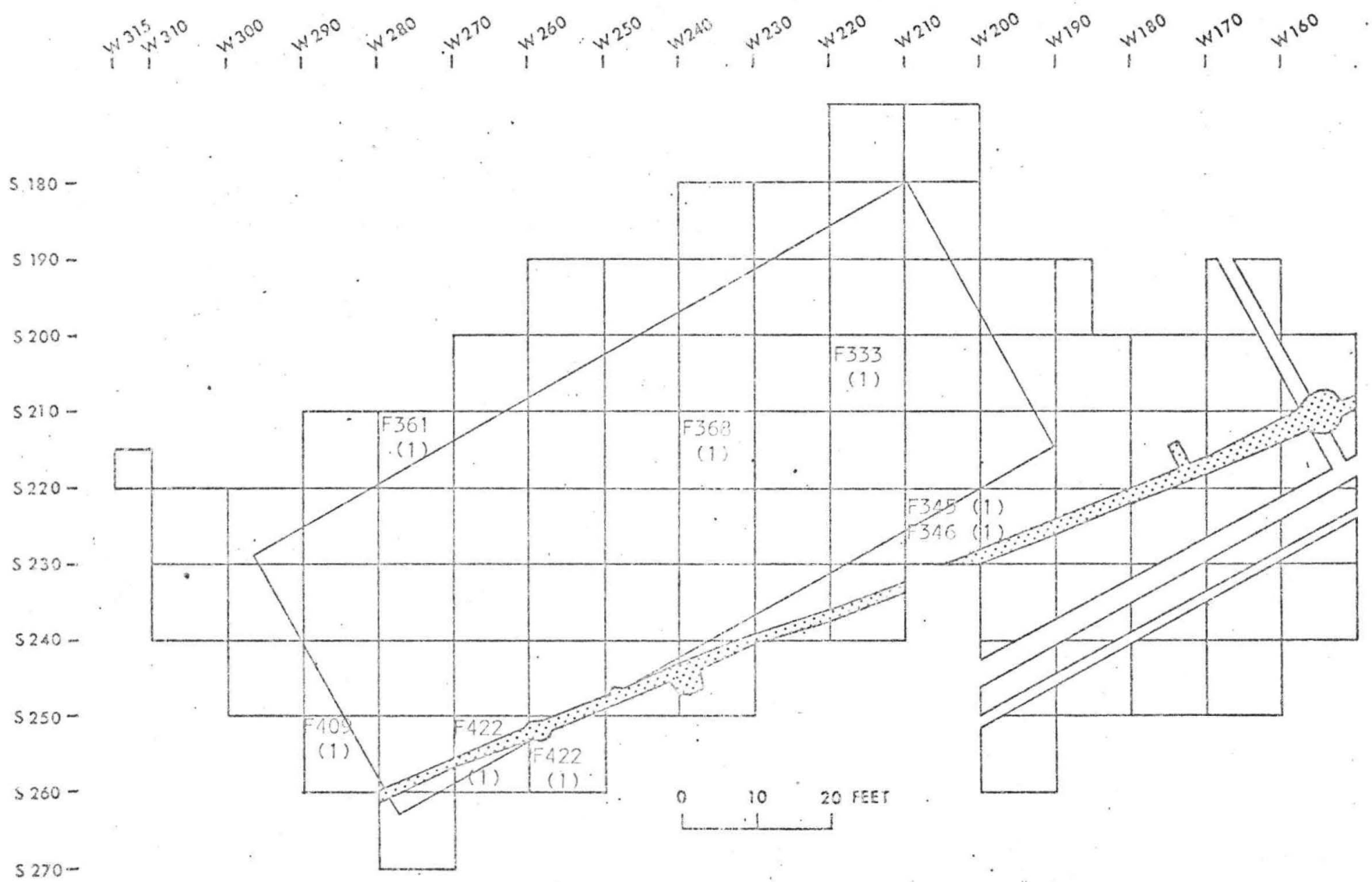


Fig. 105 - Distribution of nail Variety #1081 in the Fur Store area (numerical frequency -- specimens found only in footings).

Variety #1090 nails were associated with the southeastern sector of the Store (Fig. 106). As discussed in Chapter III, this is a round shanked, clenched nail used for attaching strap hinges or similar hardware to 1 1/2 inch wooden stock. Thusfar unique to the Fur Store, this nail was probably used for window shutters.

Variety #1104 "horseshoe" or "muleshoe" nails were concentrated in the central portion of the Store (Fig. 107). As discussed in Chapter III, this variety was probably used for muleshoes. As such, it is best attributable to USA occupation of the building.

Machine cut sheet nails were also present in virtually all parts of the excavation with a high concentration in the central portion of the Store (Fig. 108).

Variety #2001 "clasp" or "shingling" nails were concentrated in the central and eastern portions of the Store (Fig. 109). As discussed in Chapter III, over 80% of this variety is of 4d size and can be interpreted as true shingling nails. The balance, of larger sizes, probably was used for flooring. The large numbers recovered (Table 22) plus our previous observations on this variety (Hoffman and Ross 1974: 37) indicate that the central and eastern portions of the Store were shingled ca. 1845-46.

Variety #2002 "common" nails were present throughout the area but concentrated in the central portion of the Store (Fig. 110). The large numbers of this American nail (Table 22) in a small area indicate deposition by the USA. While Store renovating by the Army may account for the presence of this variety, the nails are most frequent in the modern size intervals of 6, 8 and 10d (Figs. 73-74). Numerical and size frequencies suggest that at least some of these nails formed part of the USA quartermaster stores.

Variety #2004 "crimped flathead" nails are of American manufacture and are still marketed in a number of sizes. As discussed in Chapter III, this style may have filtered into Fort Vancouver from its earliest days. However, the large number recovered from the Fur Store (Table 22) indicates a USA provenience. Concentrated in the central portion (Fig. 111), the larger sizes suggest interior renovation while the smaller sizes may suggest shingling of the Store roof post-1849.

Hand forged staples were concentrated in the blacksmithing area (Fig. 112). Probably manufactured in the area, their low number (Table 7) may indicate actual use in the blacksmith shop.

Screws were concentrated in the central portion of the Store (Fig. 113) and were probably either trade goods or quartermaster stores. Screws in the smithing area may have been manufactures.

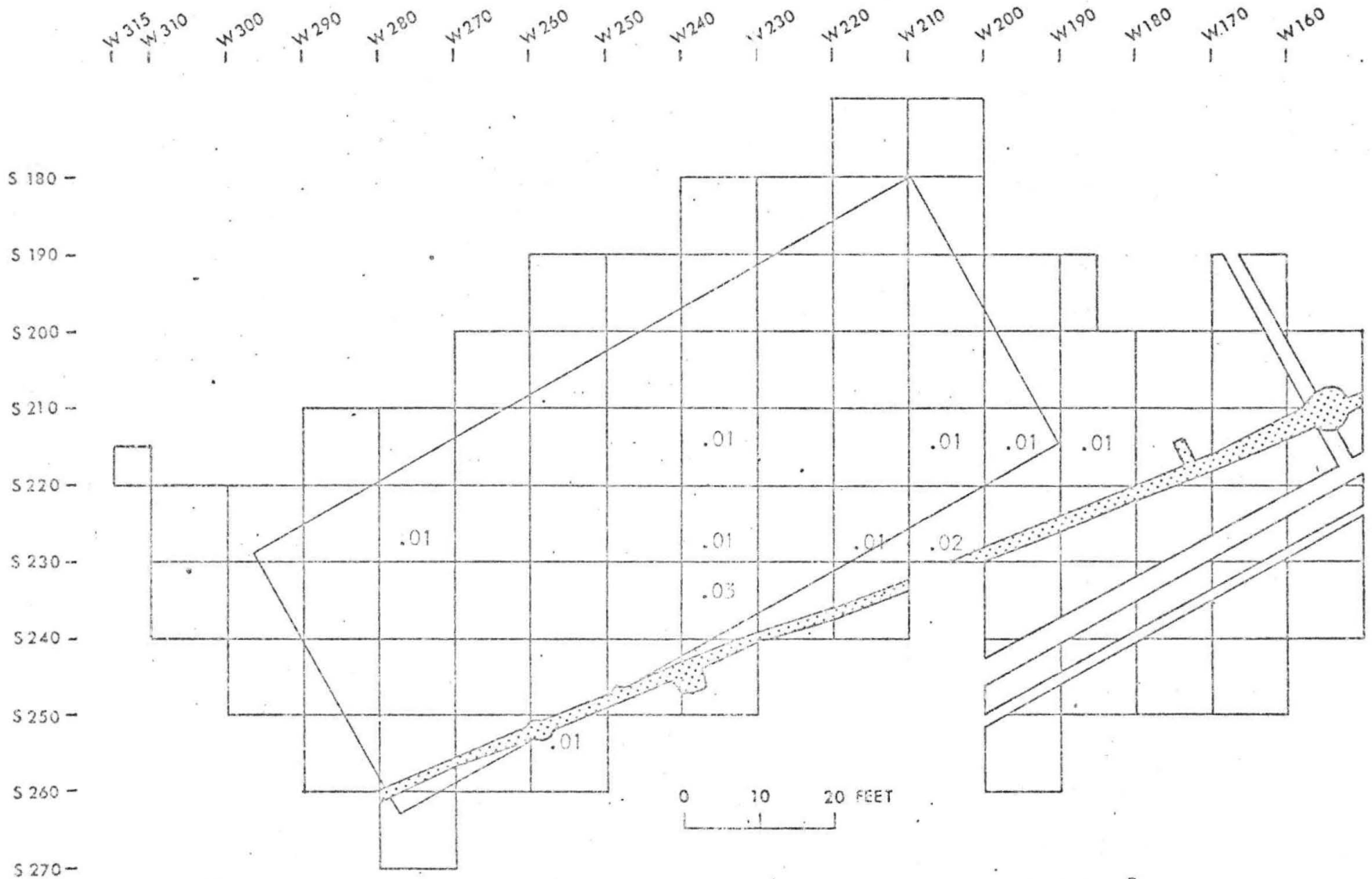


Fig. 106 - Distribution of nail Variety #1090 in the Fur Store area (f/ft^2).

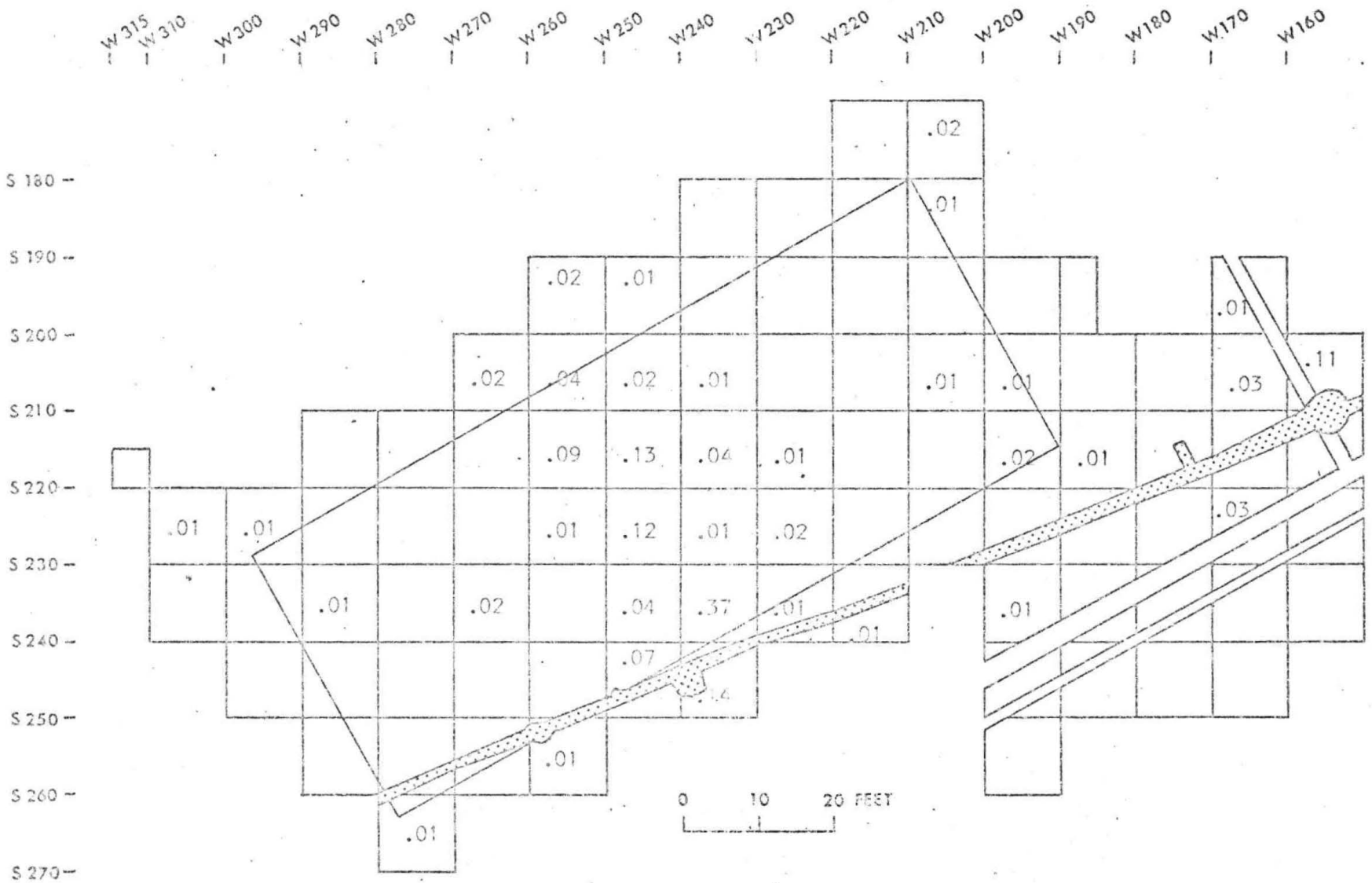


Fig. 107 - Distribution of nail Variety #1104 "horseshoe" nails in the Fur Store area (f/ft^2).

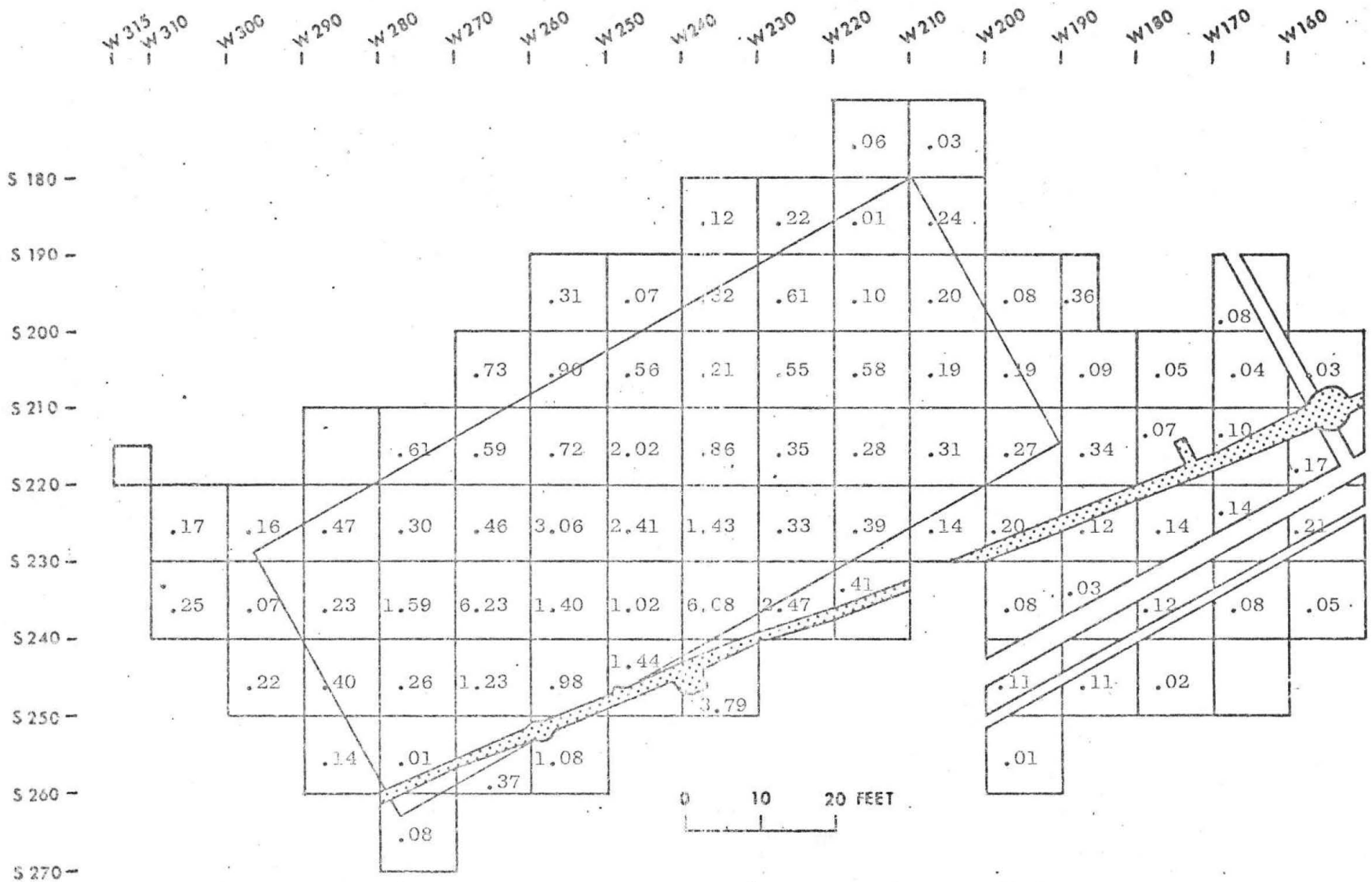


Fig. 108 - Distribution of machine cut sheet nails in the Fur Store area (f/ft^2).

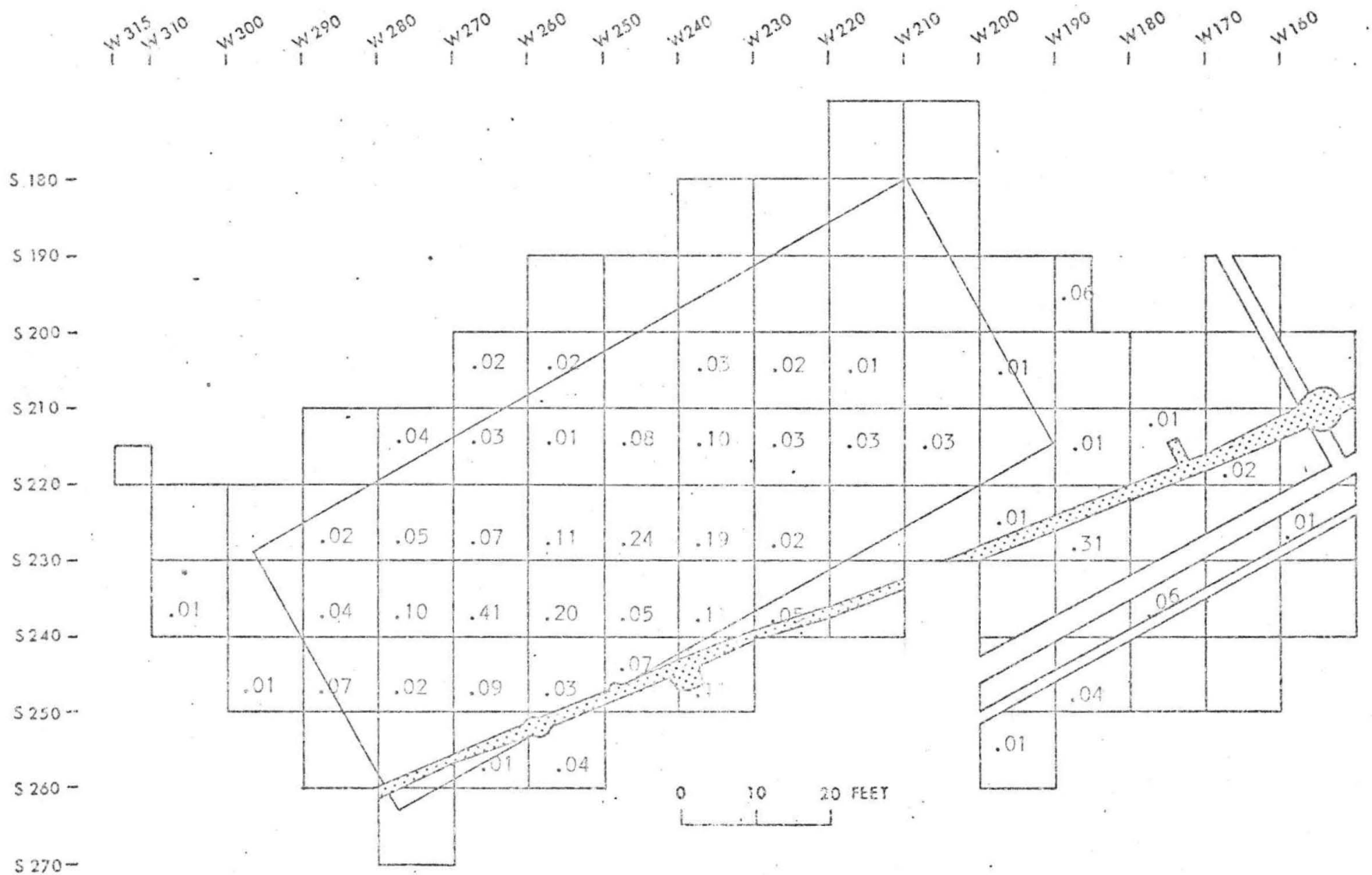


Fig. 109 - Distribution of nail Variety #2001 "shingling" nails in the Fur Store area (f/ft^2).

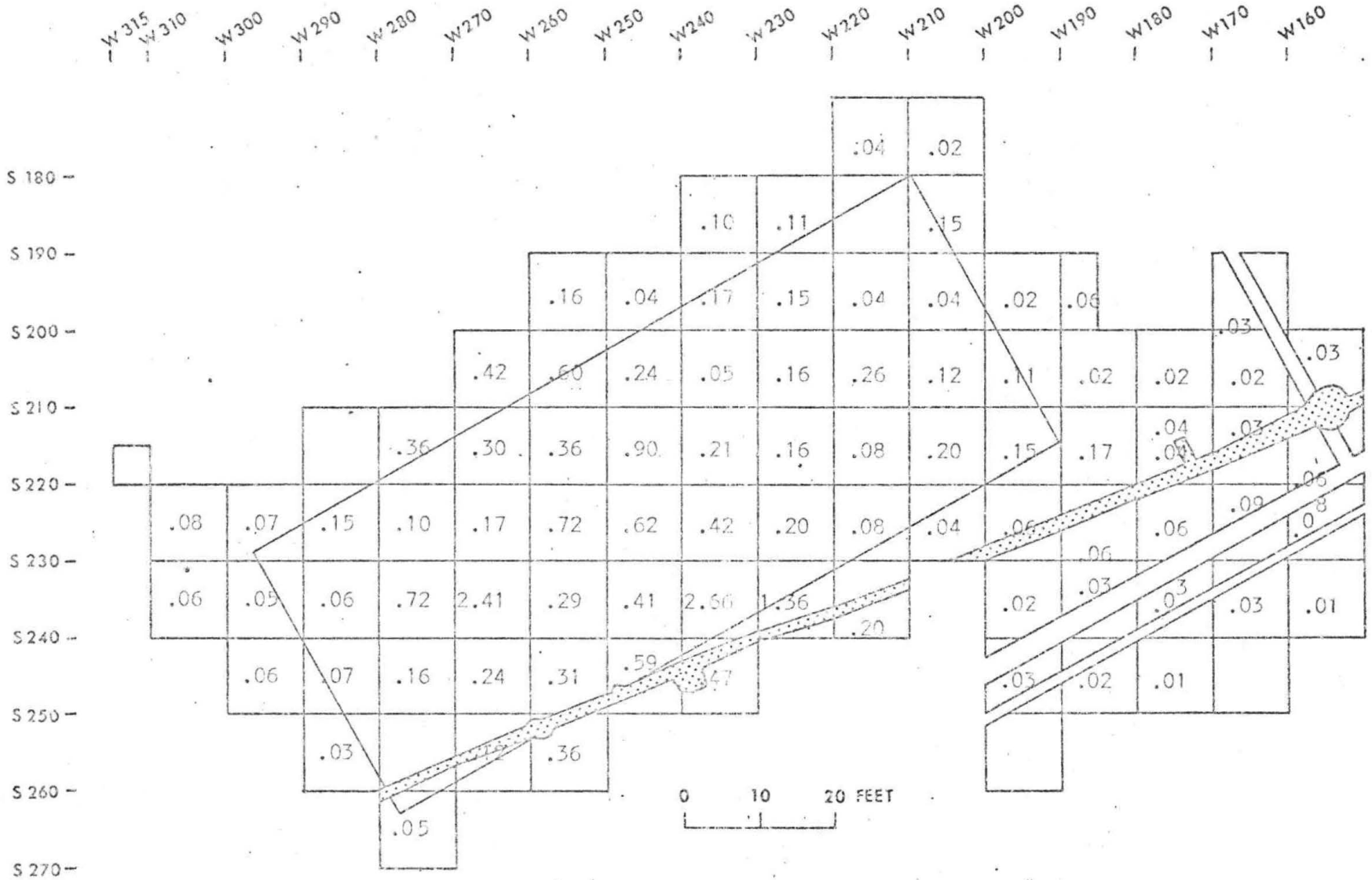


Fig. 110 - Distribution of nail Variety #2002 in the Fur Store area (f/ft^2).

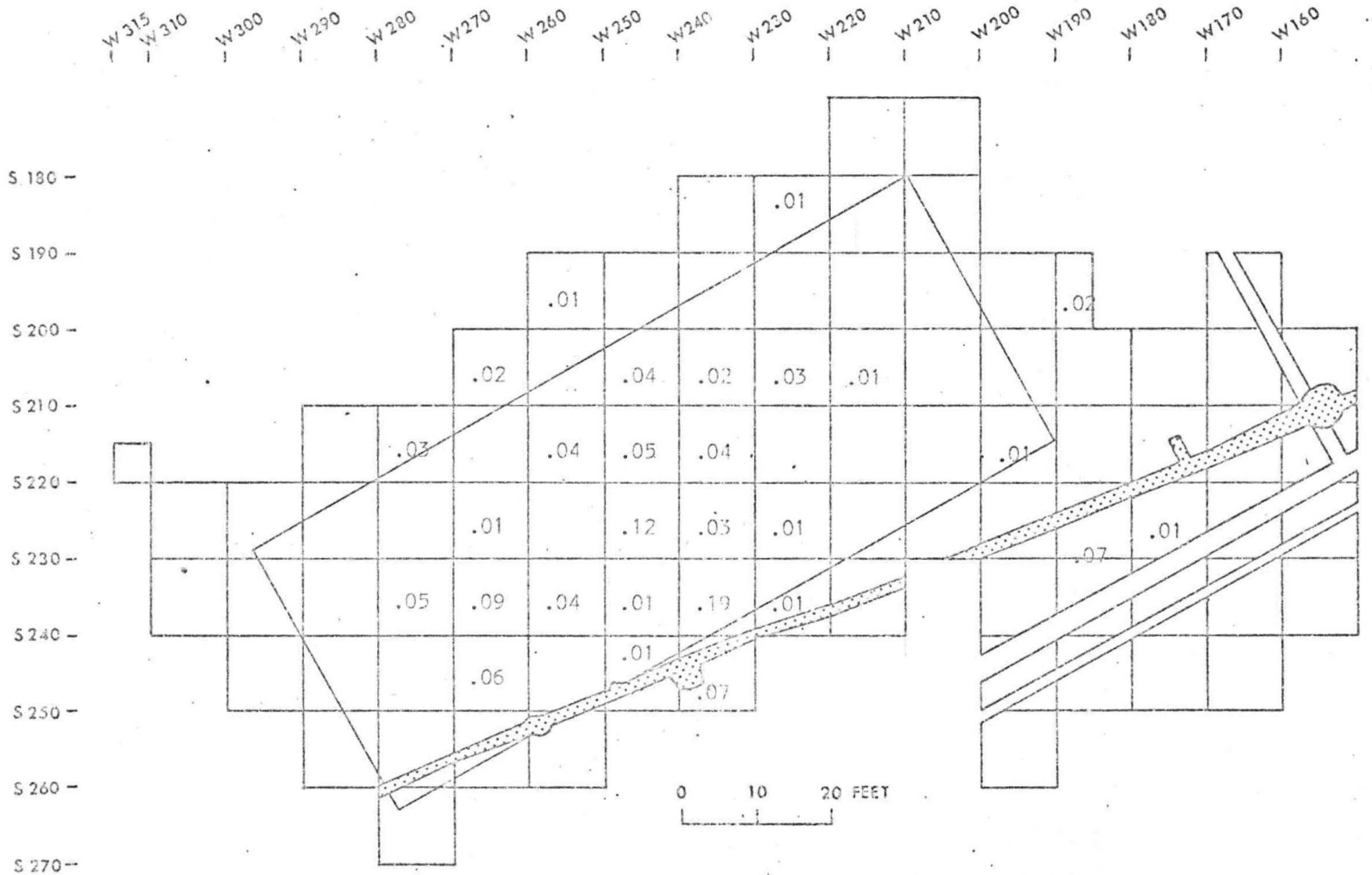


Fig. 111 - Distribution of nail Variety #2004 "shingling" nails in the Fur Store area (f/ft^2).

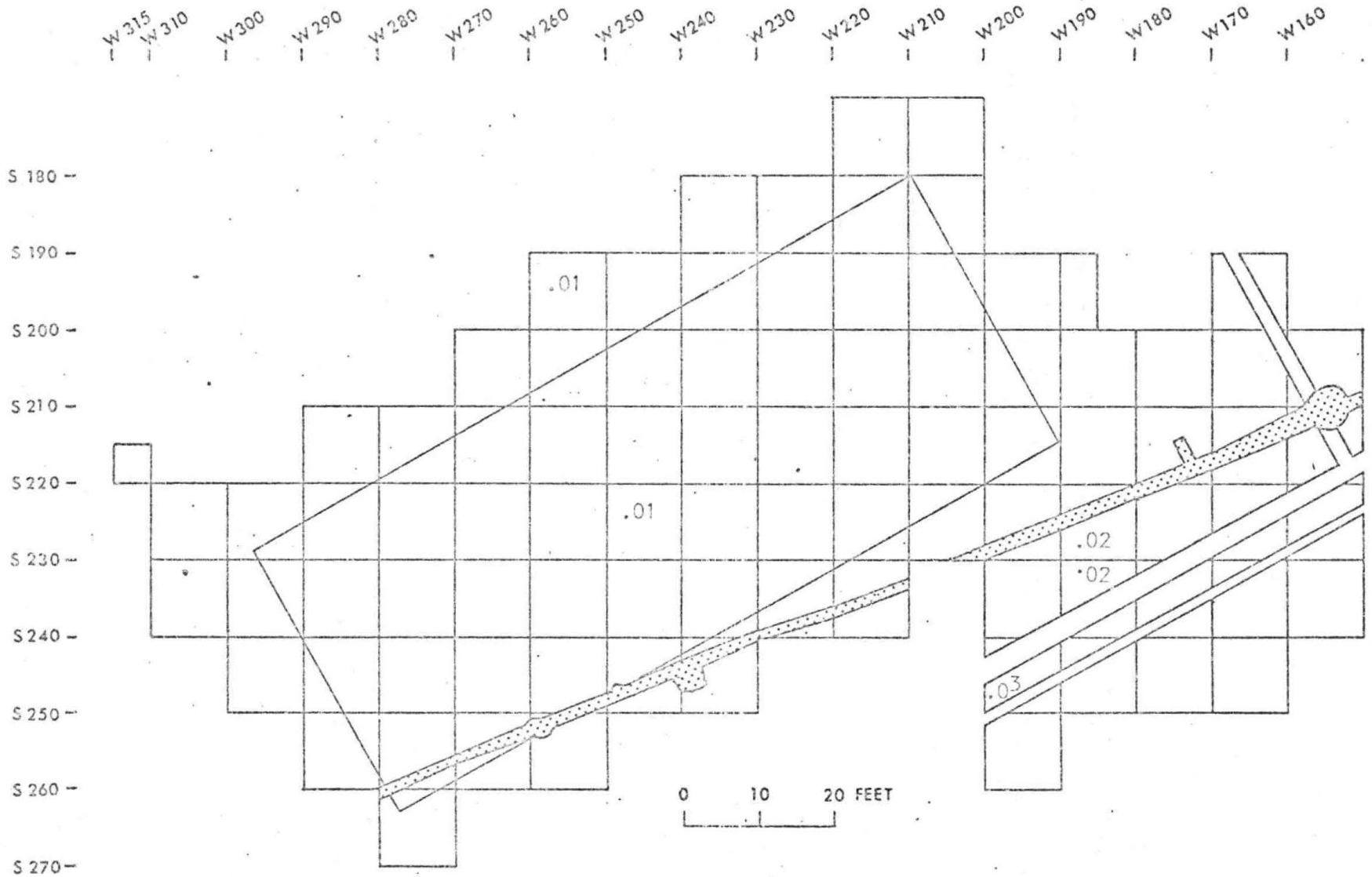


Fig. 112 - Distribution of wrought staples in the Fur Store area (f/ft^2).

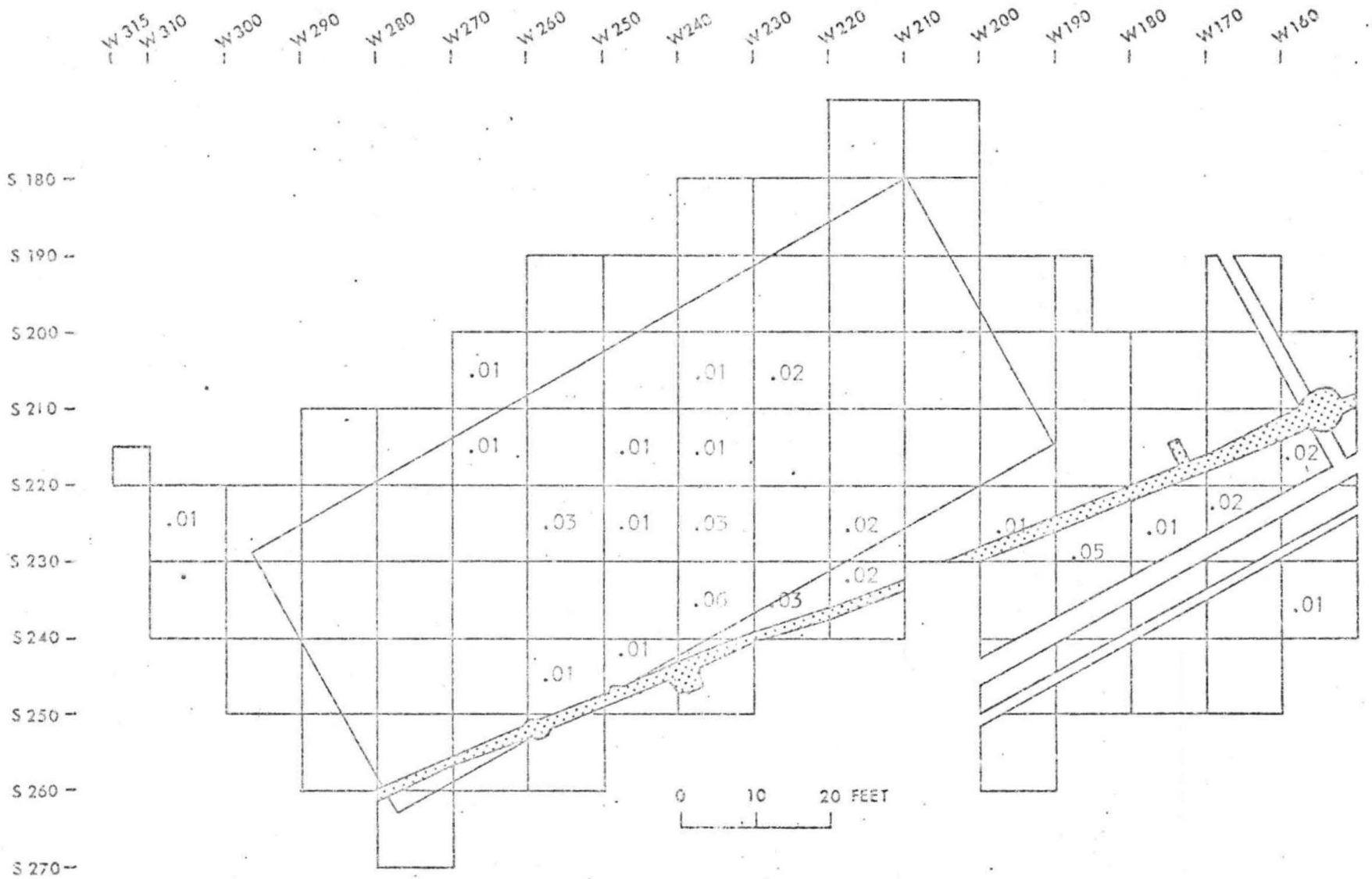


Fig. 113 - Distribution of screws in the Fur Store area (f/ft^2).

Bolts, nuts and washers were concentrated in the blacksmithing area (Fig. 114). Their numbers (Table 7) suggest that they were products of the shop.

Barrel rivets were present only in the western portion of the Store (Fig. 115). These are attributable to the same HBC coopering activities as the small sizes of nail Variety #1002.

More specialized pieces of building hardware were found along the southern wall of the Store and in the blacksmithing area (Fig. 116). Those in the Store were probably in use while items in the shop were manufactures or repairs.

Swivel preforms were concentrated in the blacksmithing area (Fig. 117). These were local manufactures designed for use with trap chains.

Trap and axe parts were also concentrated in the blacksmithing area (Fig. 118-119). Their frequency (Table 7) indicates repairs and local manufactures.

Blacksmithing tools were understandably concentrated in the blacksmithing area (Fig. 120), while wood working tools were scattered throughout the excavated area.

A large amount of bundling strap was concentrated in the blacksmithing area and the Fur Store (Fig. 121). Most strap from the shop appears to have been ties used for bundling iron stock while strap from the central sector of the Store may represent other packaging activities.

Riveted strap was concentrated in the blacksmith shop and the western portion of the Store (Fig. 122). These items were identified as barrel hoops.

Copper sheeting was concentrated in the blacksmithing area (Fig. 123). The large amount of this material (Table 7) indicates another facet of shop activities.

Lead castings were present only in the western portion of the Store and were probably associated with graphite crucible fragments (Fig. 124). These items may represent the casting of bale seals for the Fur Store or the manufacture of musket balls for the Indian Trade Store.

Household and Personal Items

Buttons were concentrated in the central portion of the Store (Fig. 97). Most were probably trade items, while some were obviously USA quartermaster stores (Table 24).

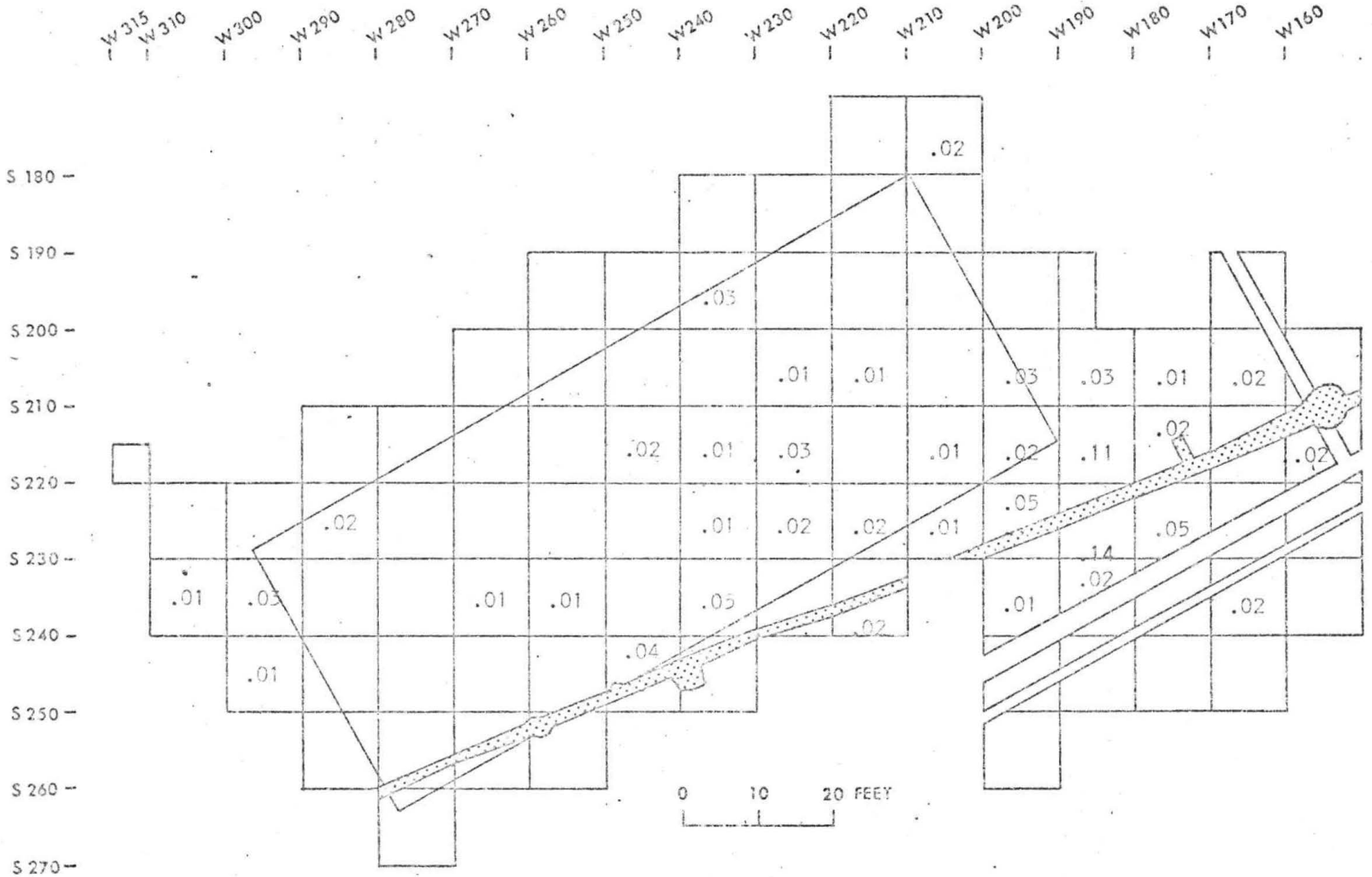


Fig. 114 - Distribution of bolts, nuts and washers in the Fur Store area (f/ft^2).

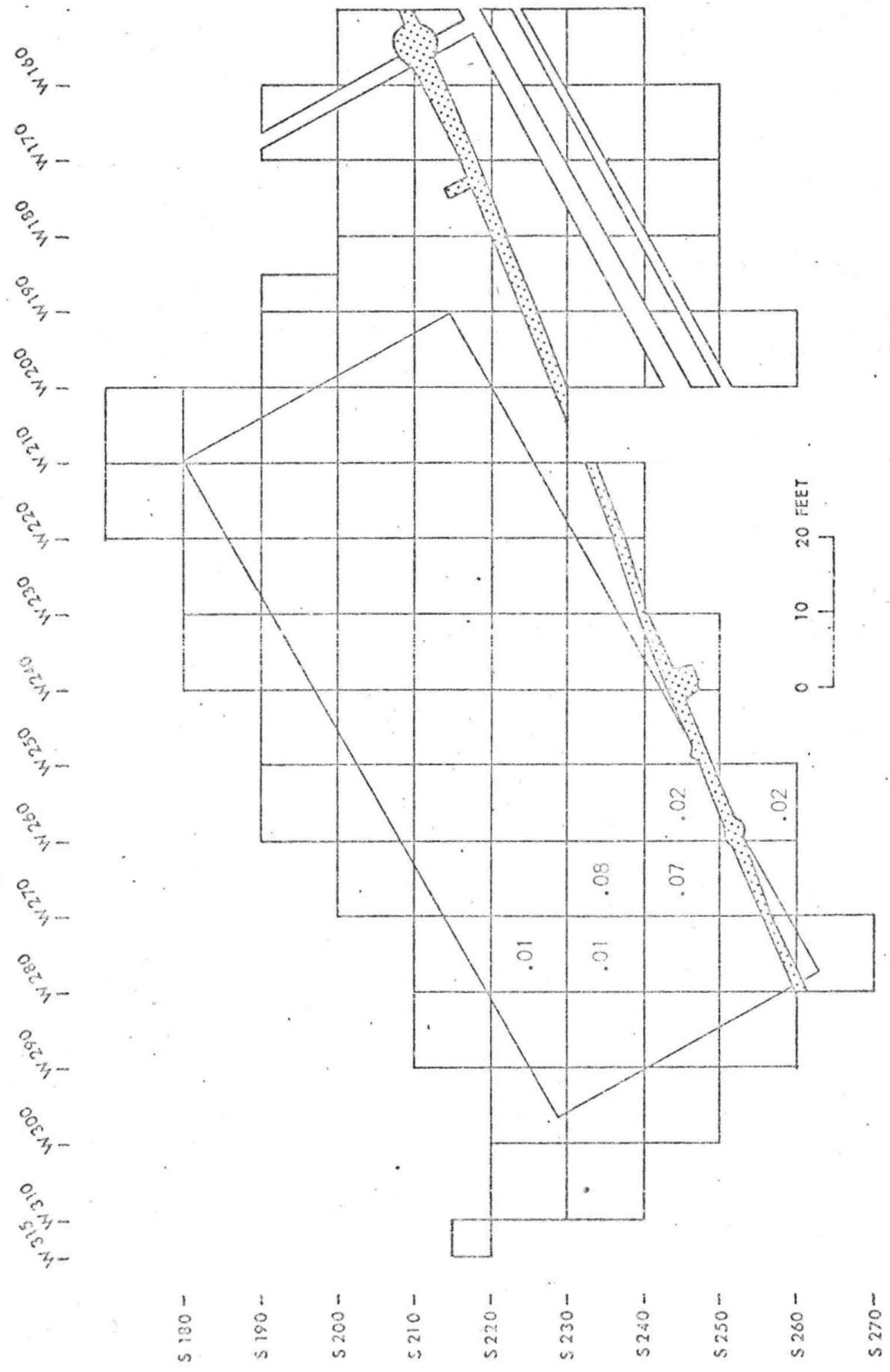


Fig. 115 - Distribution of barrel rivets in the Fur Store area ($\#/ft^2$).

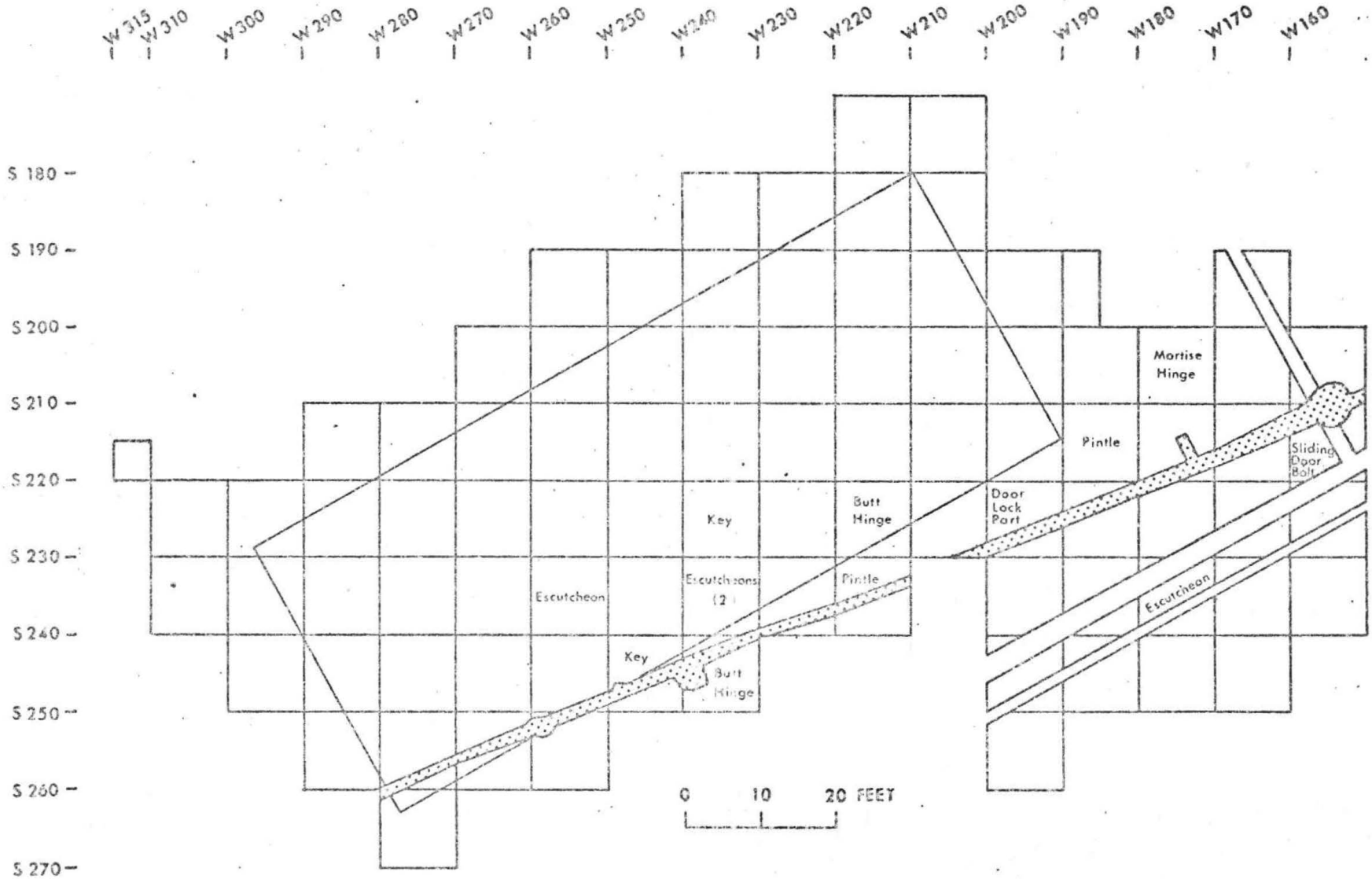


Fig. 116 - Distribution of building hardware in the Fur Store area.

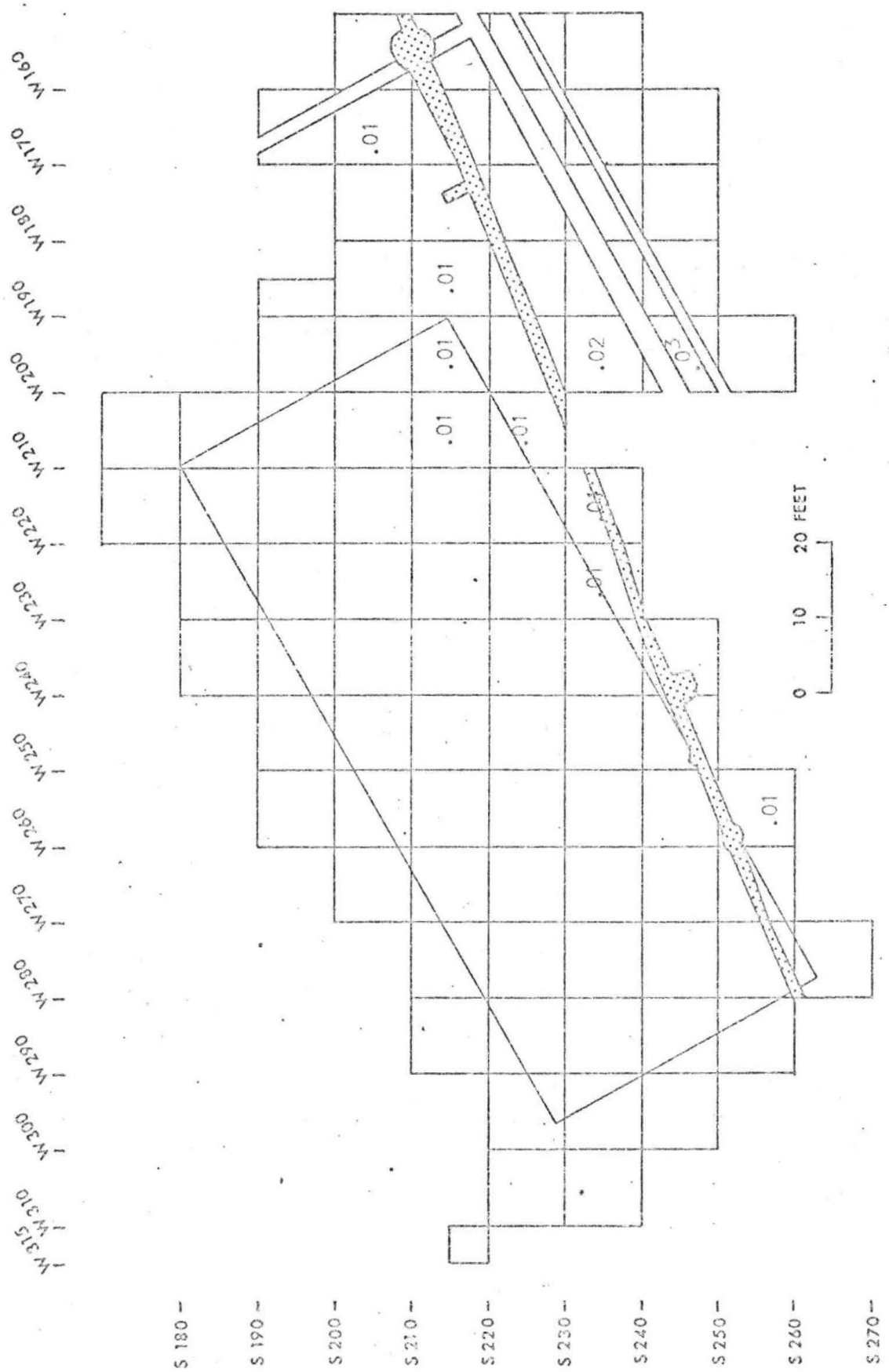


Fig. 117 - Distribution of swivel casting preforms in the Fur Store area (f/ft^2).

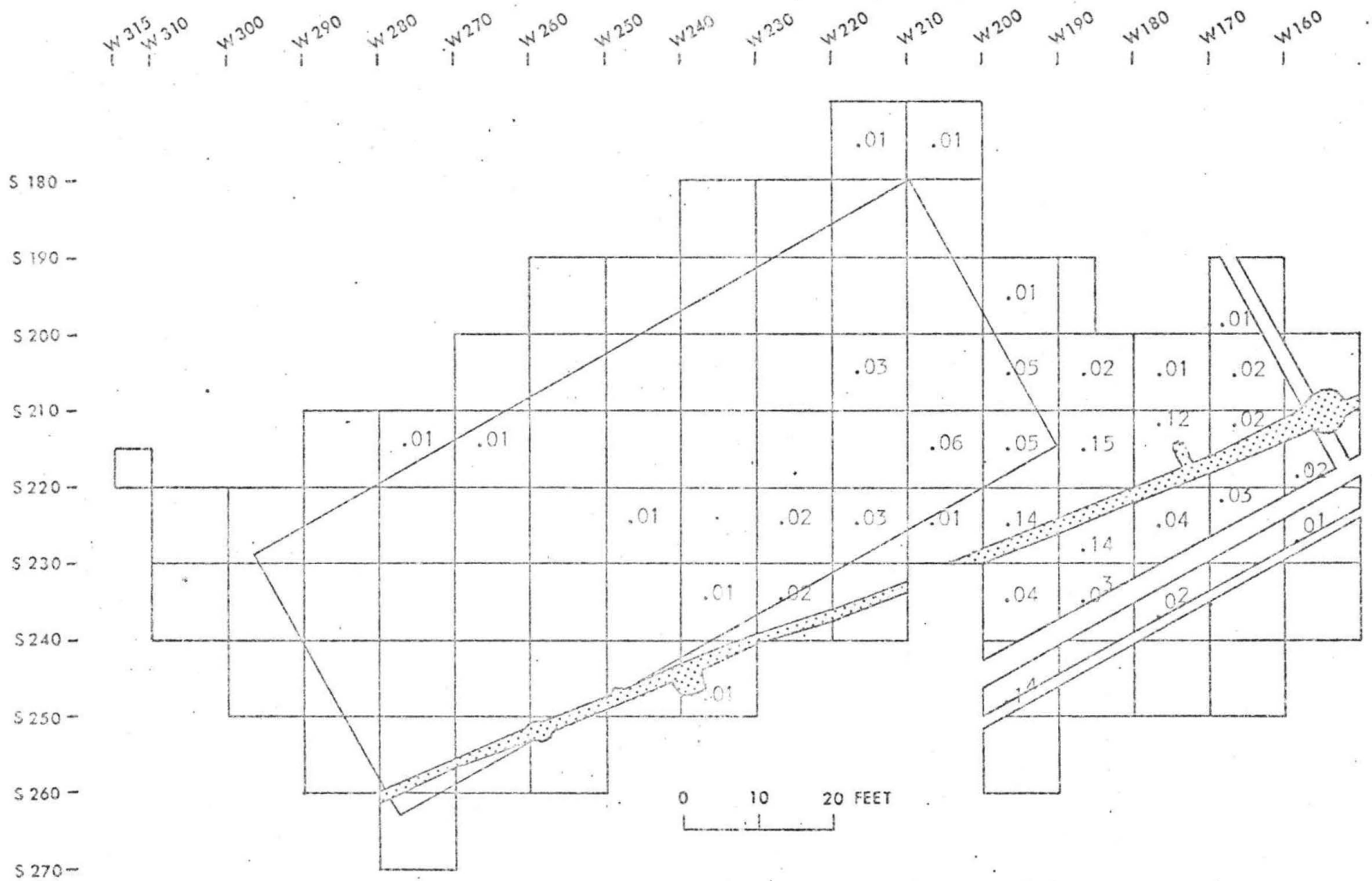


Fig. 118 - Distribution of trap parts in the Fur Store area (f/ft^2).

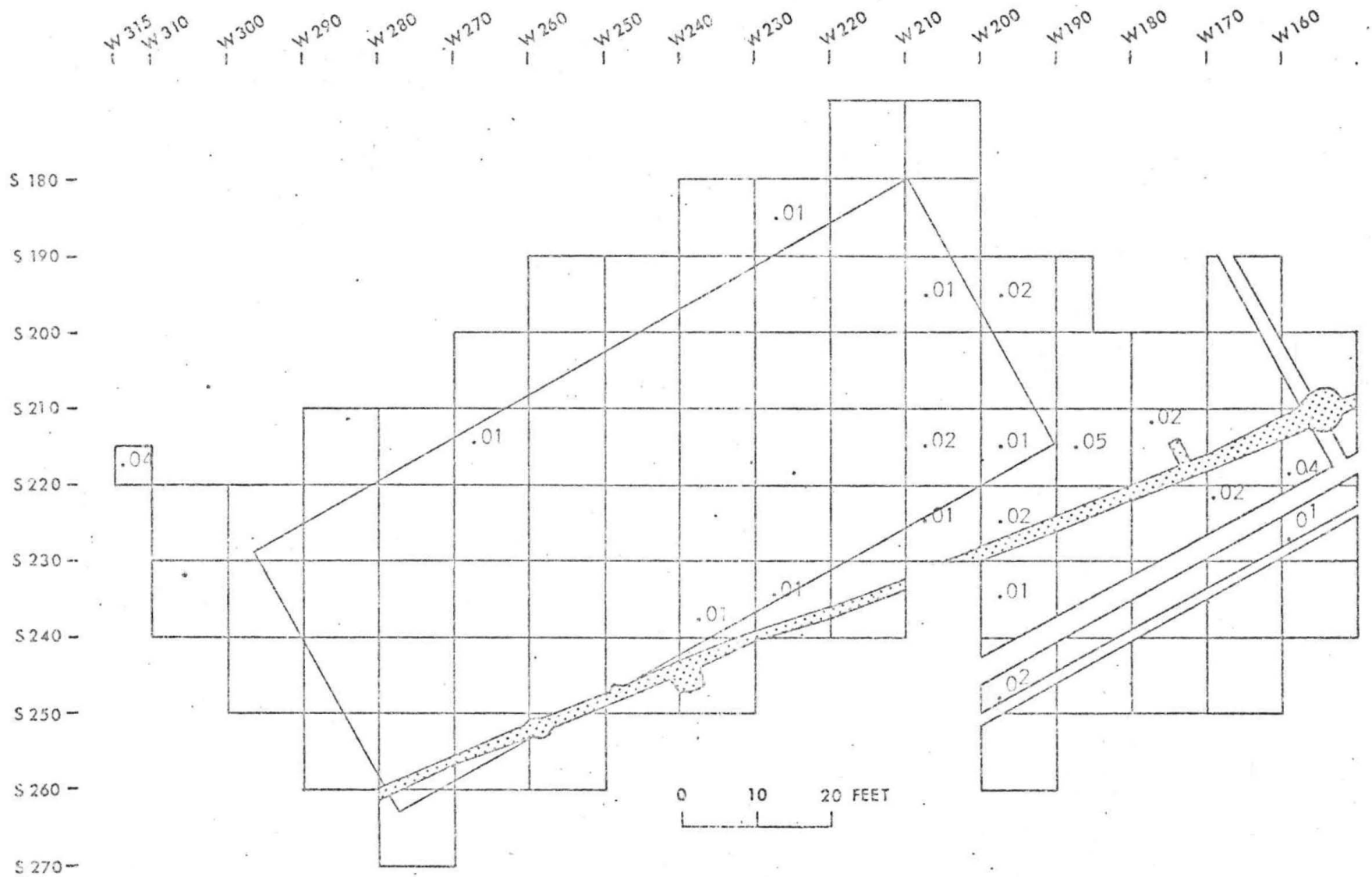


Fig. 119 - Distribution of axe parts in the Fur Store area (f/ft^2).

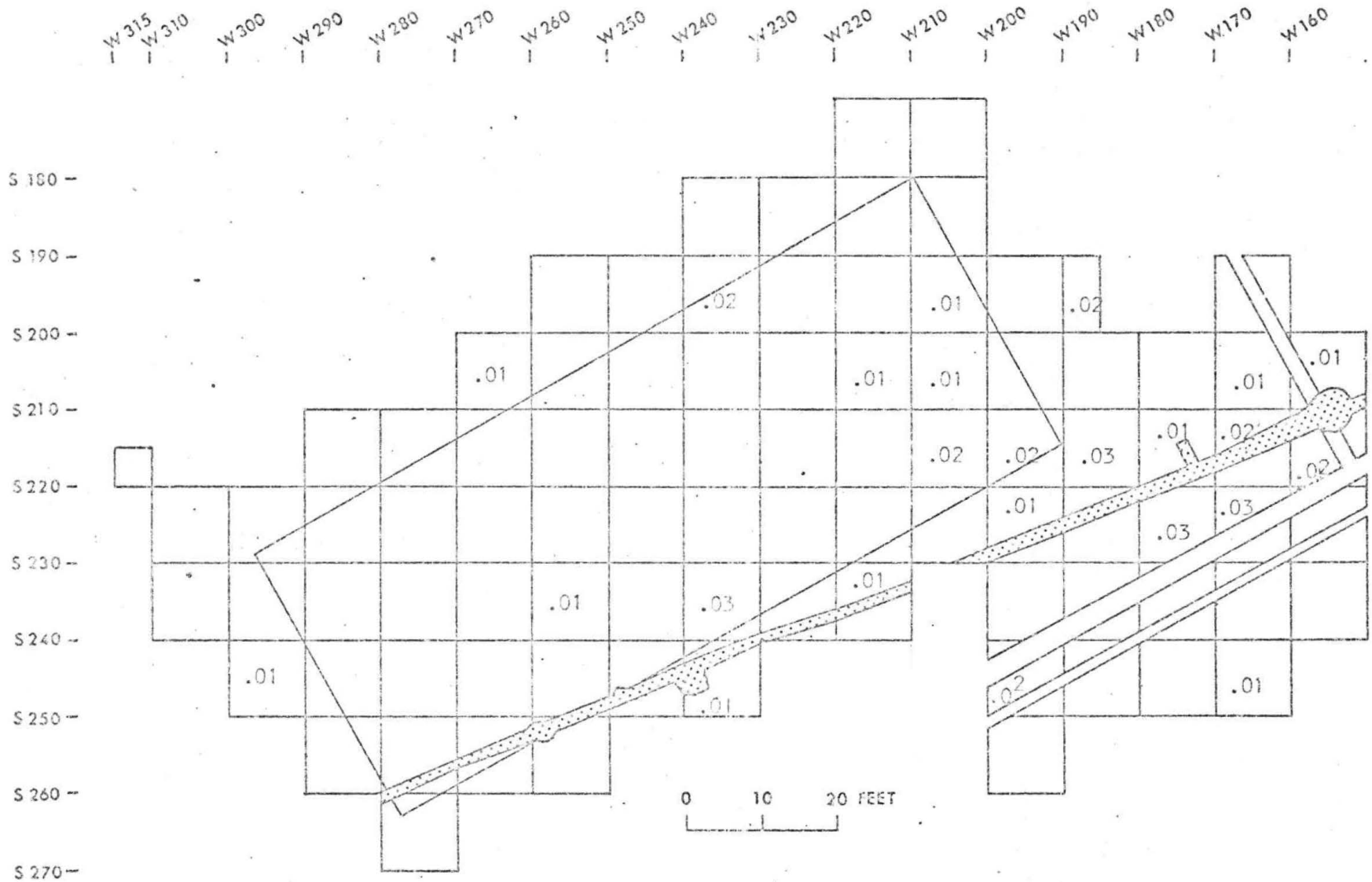


Fig. 120 - Distribution of blacksmithing tools and files in the Fur Store area (f/ft^2).

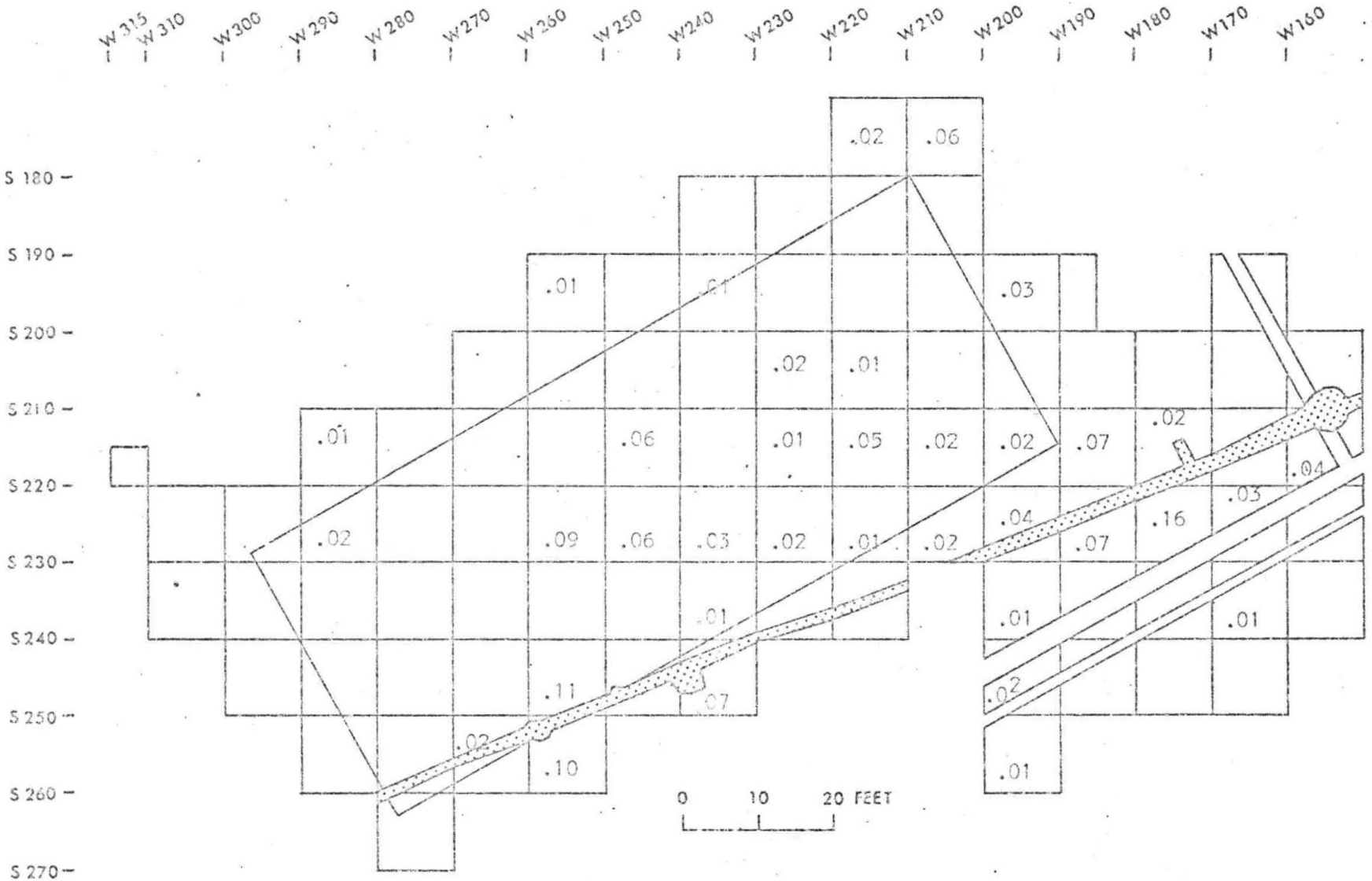


Fig. 121 - Distribution of metal bundling strap in the Fur Store area (f/ft^2).

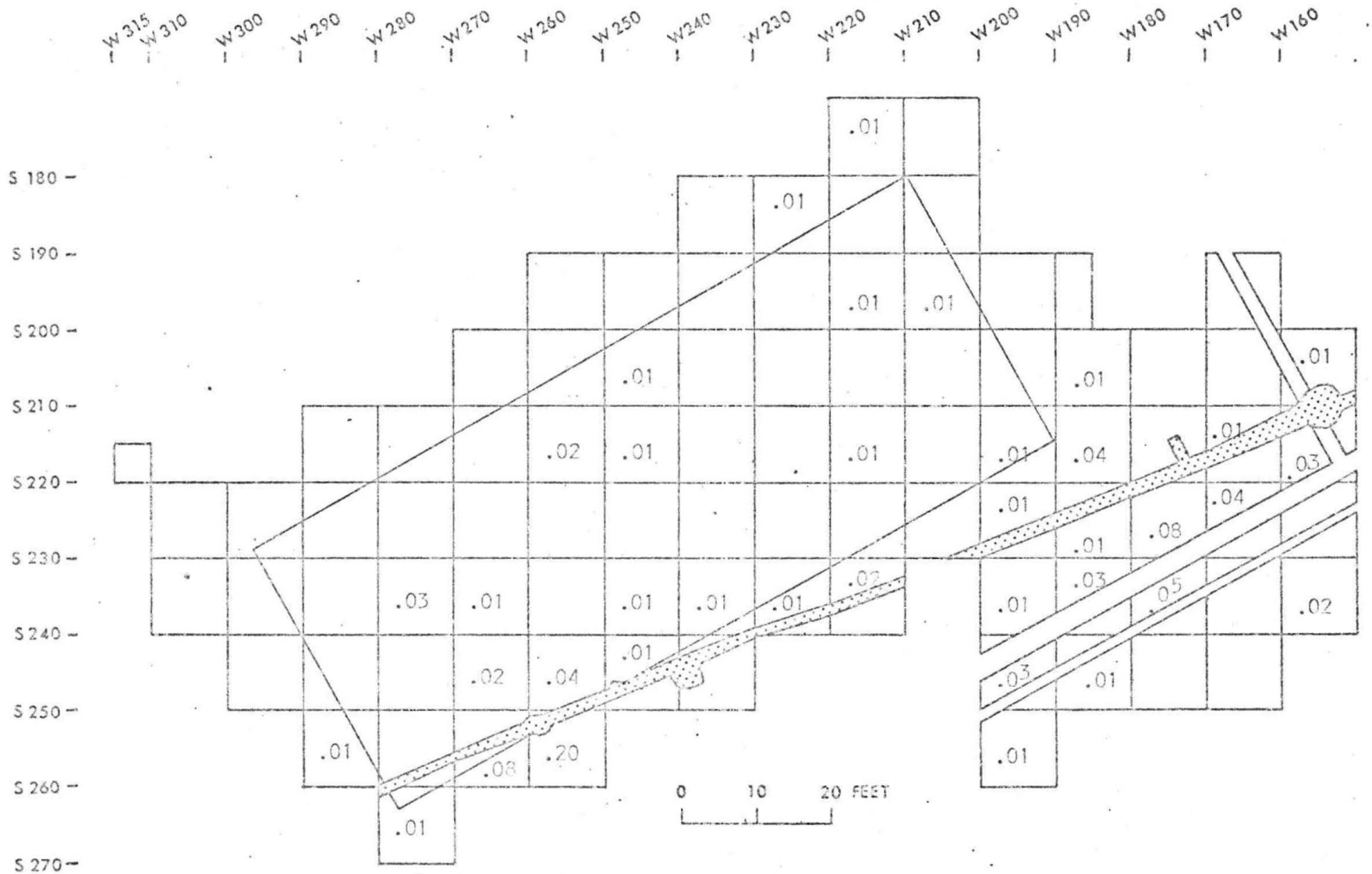


Fig. 122 - Distribution of riveted strap fragments ("barrel hoop" fragments) in the Fur Store area (f/ft^2).

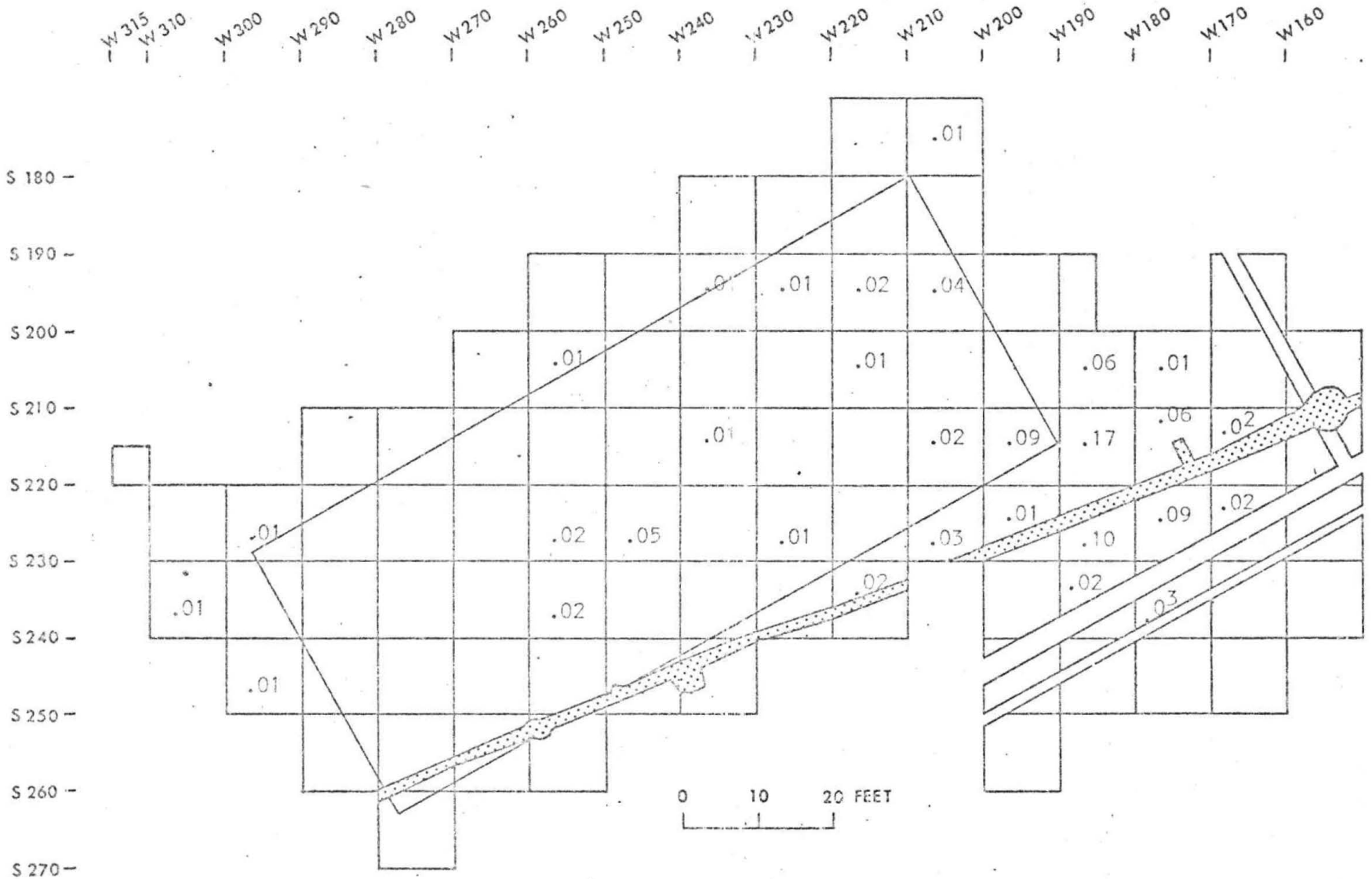


Fig. 123 - Distribution of copper sheeting in the Fur Store area (f/ft^2).

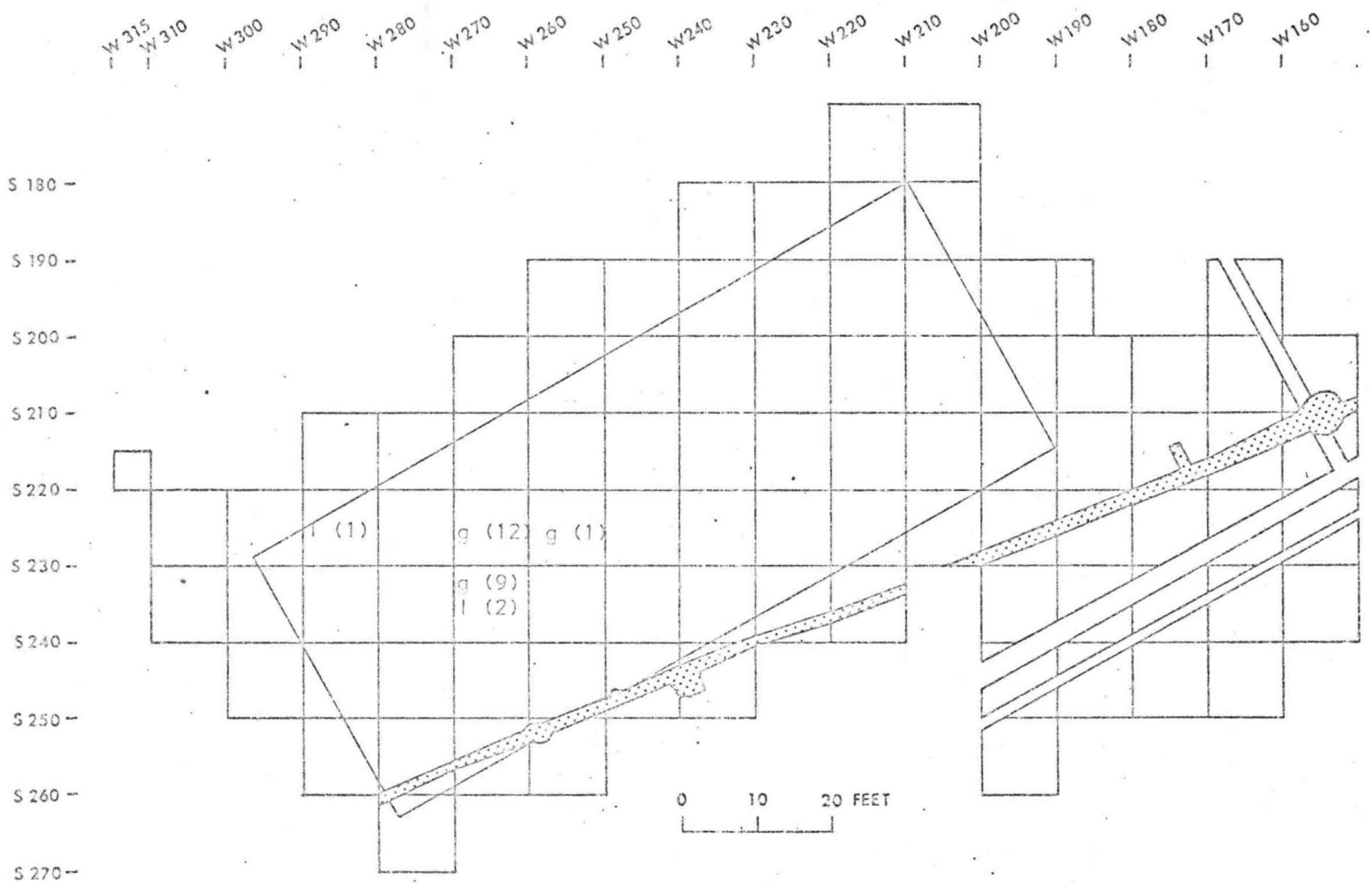


Fig. 124 - Distribution of graphite crucible fragments (g) and lead castings (l) in the Fur Store area (numerical frequency).

Finger rings, like glass ring settings, were concentrated in the central portion of the Store (Fig. 97). These are trade items that aid our identification of the central portion as the Indian Trade Store.

The half-dime ornament found at the central portion (Fig. 97) may have been lost by a customer of the Indian Trade Store. The brass cock parts found in the same sector suggest that liquids were dispensed in the Indian Trade Store.

Weaponry Items

Lead balls, buckshot and large amounts of recovered shot were concentrated in the central portion of the Store (Fig. 125). These were primarily trade items, and their presence validates our identification of the central sector as the Indian Trade Store. The most common ball sizes (Table 25) indicate ammunition for Northwest trade guns.

Small arms parts were concentrated in the blacksmithing area (Fig. 126) and represented repairs of muskets, rifles and pistols.

Construction Material

Most of the brick recovered in excavation was imported Variety #1001, a British firebrick (Table 27). It was found concentrated in the blacksmithing area and at the northern wall of the Store's western sector (Fig. 127). No pattern of dispersal could be readily identified in the shop and recovered fragments probably represented what was not salvaged by the HBC for reuse elsewhere (q.v. Hoffman and Poss 1973a: 49). Presumably, this brick was originally used in a forge. Brick concentrated inside the northwestern corner of the Store may associate with a heat source used for the lead casting in this sector. The same heat source may have been used for melting the asphalt noted in the area. As will be discussed, the asphalt likely reflects coopering activities in the western sector of the Store. A smaller, less readily identifiable concentration was present at the center of the Store's southern wall (Fig. 127). Associated with rock and metal stovepipe (Fig. 3.3), this concentration suggests an alternative or additional heat source for the Store.

Stone Items

Slate tablets and pencils were concentrated in the central and eastern portions of the Store (Fig. 128). These items probably were used for various recording activities during uses of the building as an Indian Trade Store and a Fur Store.

The few gunflints recovered (Table 7) were largely confined to the central sector of the Store (Fig. 97) and represented merchandise of the Indian Trade Store.

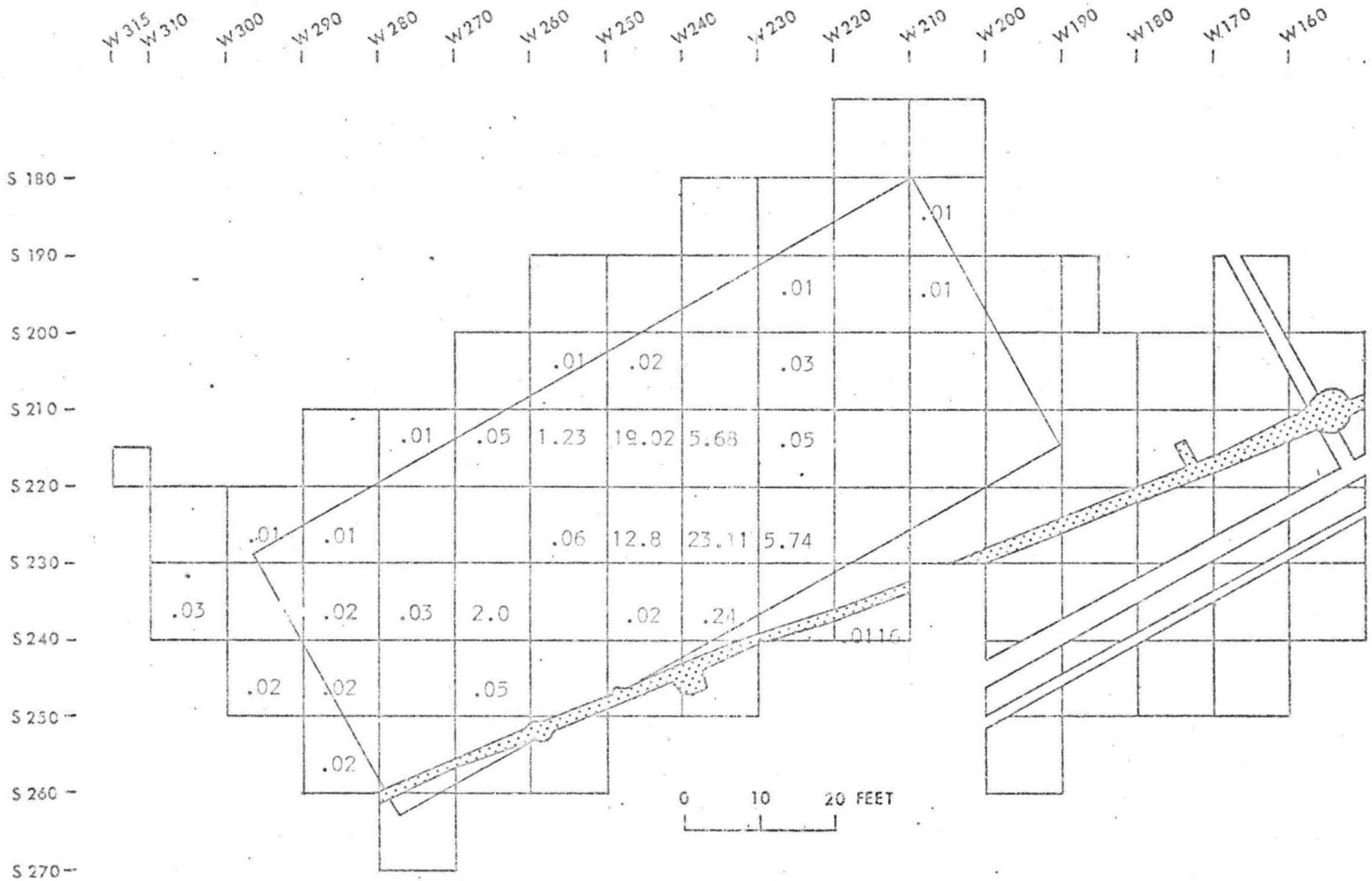


Fig. 125 - Distribution of lead ball and shot in the Fur Store area (f/ft^2).

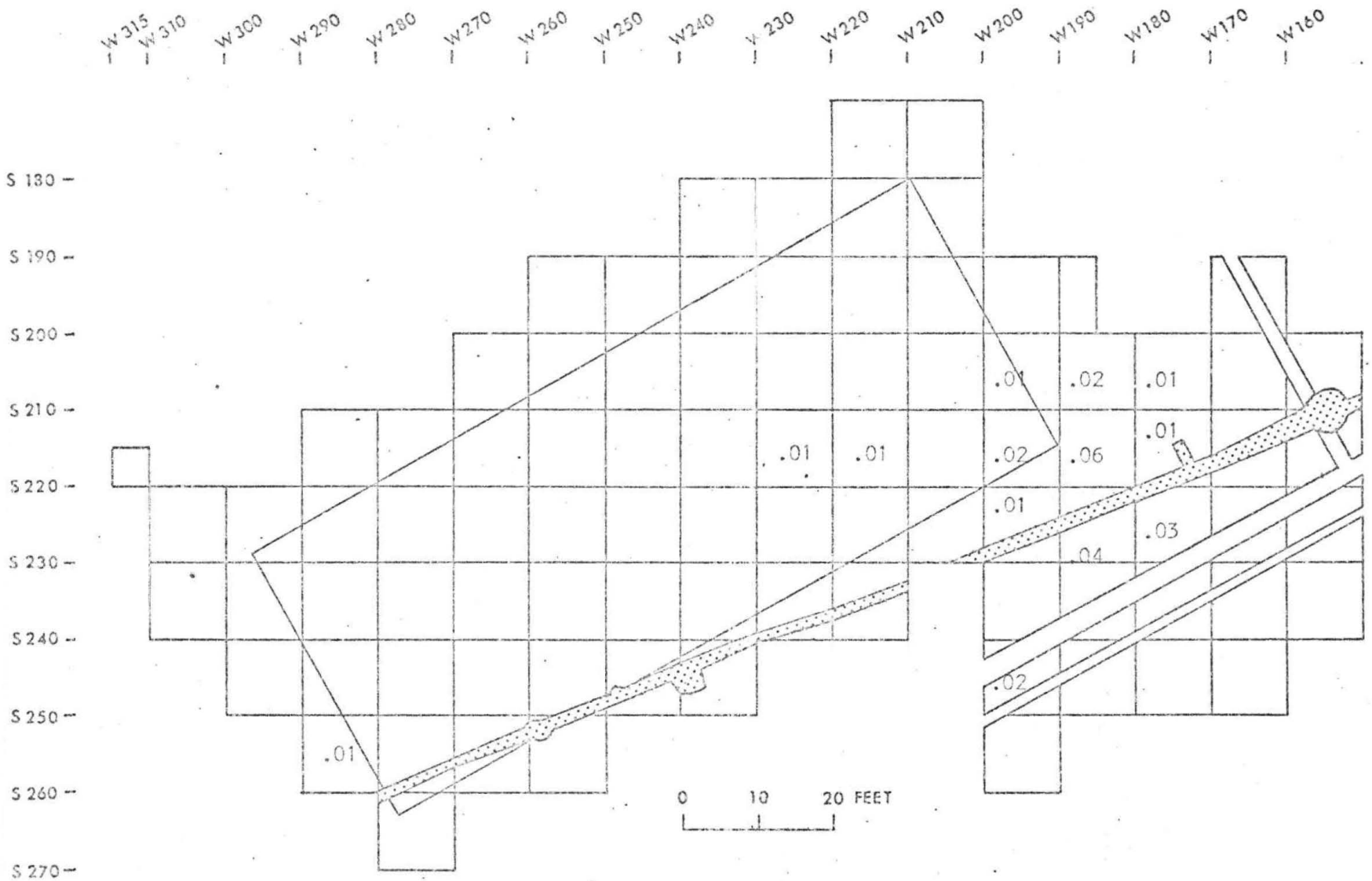


Fig. 126 - Distribution of gun parts in the Fur Store area (f/ft^2).

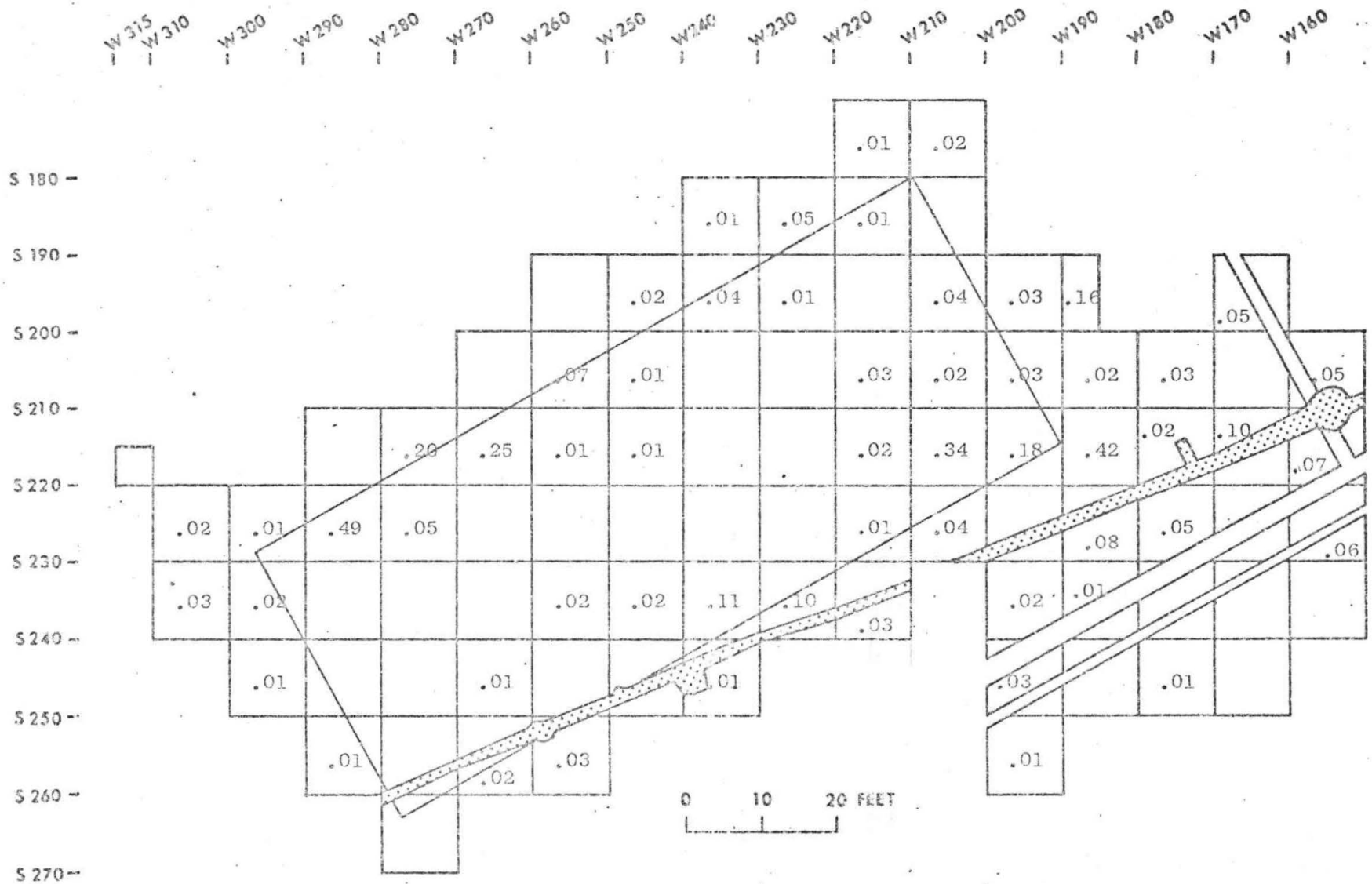


Fig. 127 -Distribution of imported brick fragments in the Fur Store area (f/ft^2).

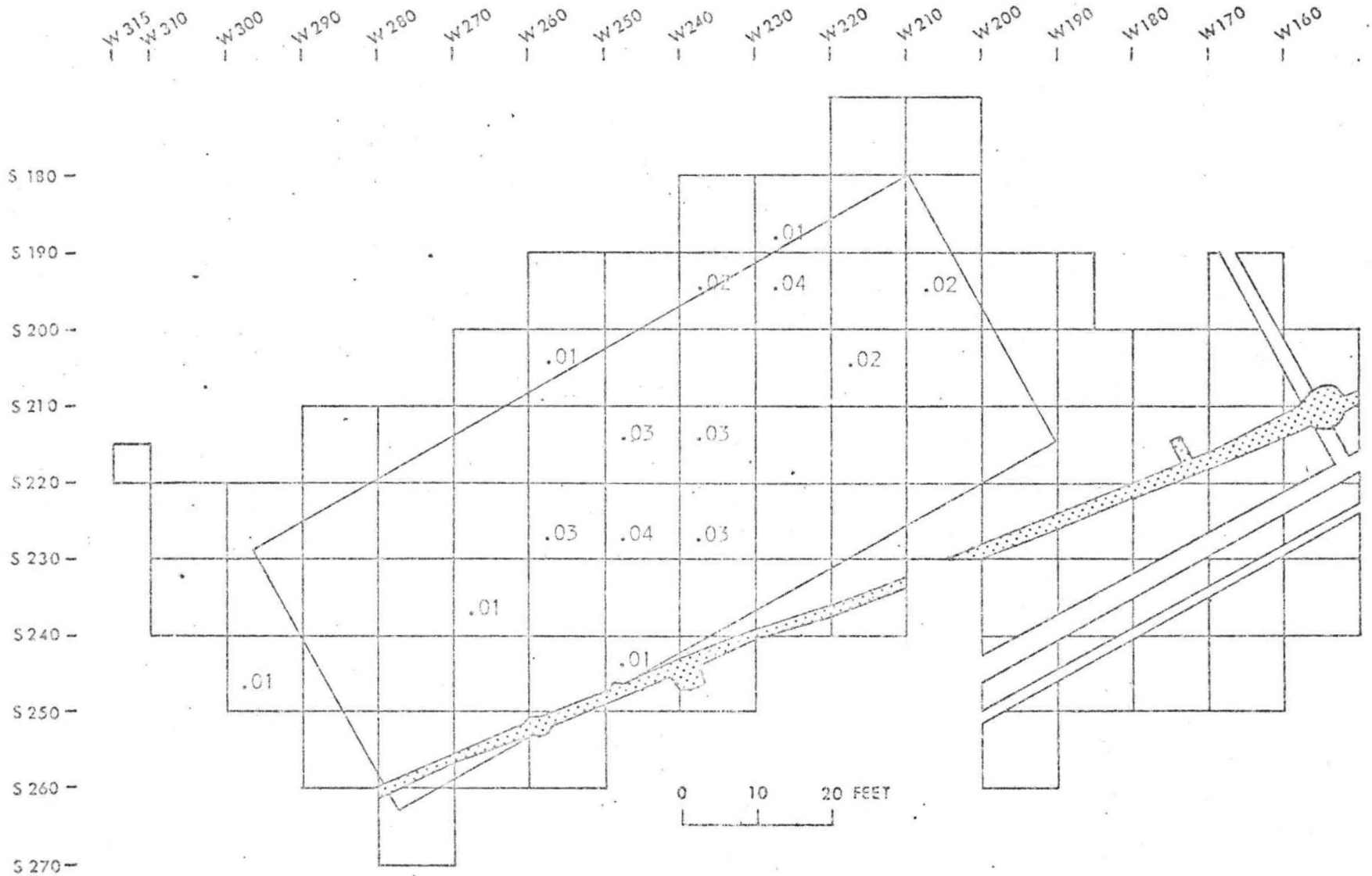


Fig. 128 - Distribution of slate tablets and pencils in the Fur Store area (f/ft^2).

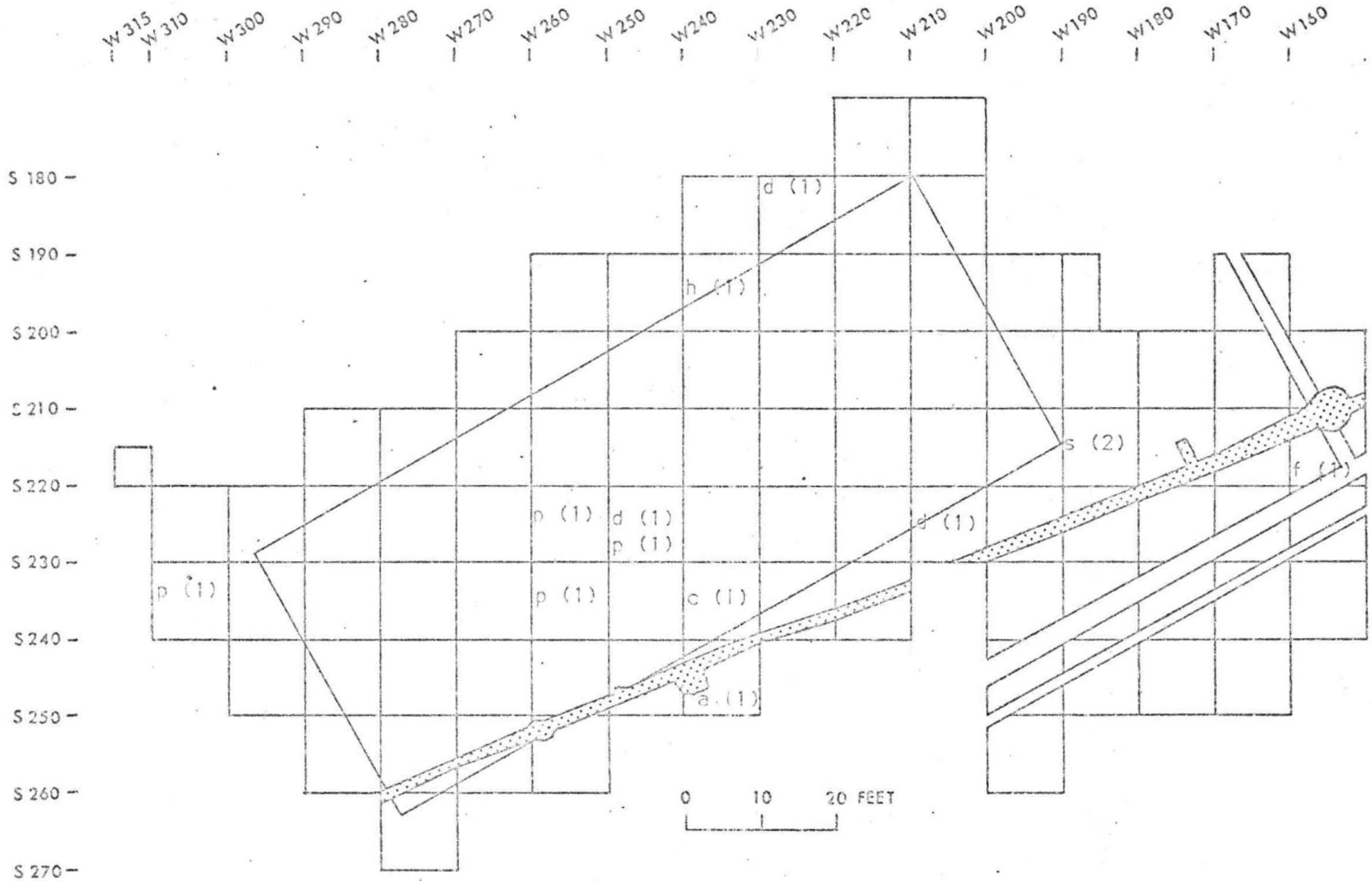


Fig. 129 - Distribution of Native American lithic artifacts (projectile point=p; carved stone=c; abraded stone=a; flaked stone=f; steatite=s; detritus=d; hammerstone=h) from the Fur Store area (numerical frequency).

Several fragments of a graphite crucible (Table 7) were found in the western portion of the Store (Fig. 124). As previously mentioned, the crucible associates with lead castings also found in the area.

Projectile point fragments were found in the central portion of the Store. These were few in number (Table 7); possibly they were dropped by customers of the Indian Trade Store. As with other Native made objects (Fig. 129), they may pertain to pre-HBC occupation of the area.

Other Materials

Bone fragments were scattered throughout the excavation with a concentration at the east wall of the old Stockade (Fig. 130). While not analyzed, the bones are presumably culinary remains and their presence suggests simple trash disposal. The low number of bones recovered (Table 8) does not indicate an immediate functional source of culinary remains.

Coral was concentrated in the blacksmithing area and along the north and south walls of the Store in its western sector (Fig. 131). Coral was a basic ingredient of locally produced mortar at Fort Vancouver (q.v. Hoffman and Ross 1973b:148), and its presence usually indicates masonry. Its distribution in the blacksmithing area and in the Store is very similar to that of imported brick. Again, forge remains are indicated for the blacksmithing area, while a masonry base and/or chimney are suggested for the putative heat source in the western sector of the Store.

Clinkers were found concentrated on the site of the blacksmith shop (Fig. 132). They formed one of the bases for identifying this position.

Collected fragments of tarred wood were concentrated in the western sector of the Store. As discussed in Chapter II, portions of the floor were asphalted in the western area of the Store. A large number of asphalt fragments was also collected (Table 8). While tarring of the floor may have been purposeful, the asphalt-encased footing found in the western sector suggests otherwise. It seems more likely that asphalted wood in this area represents an accidental flow of stock designed for other purposes. Presently, we believe these purposes to include the asphalting of barrels used in Fur Store activities. The cooperage archeologically inferred for the western sector of the Store is well in keeping with the historically documented function of packing delicate and more valuable furs in barrels at Fort Vancouver to provide maximum protection against insects and dampness (Hussey 1974b:32). Asphalted staves would certainly aid the anti-vermin function of packing furs in barrels. Asphalt coating would also insure tight cooperage of low solvent oils such as castoreum and whale oil

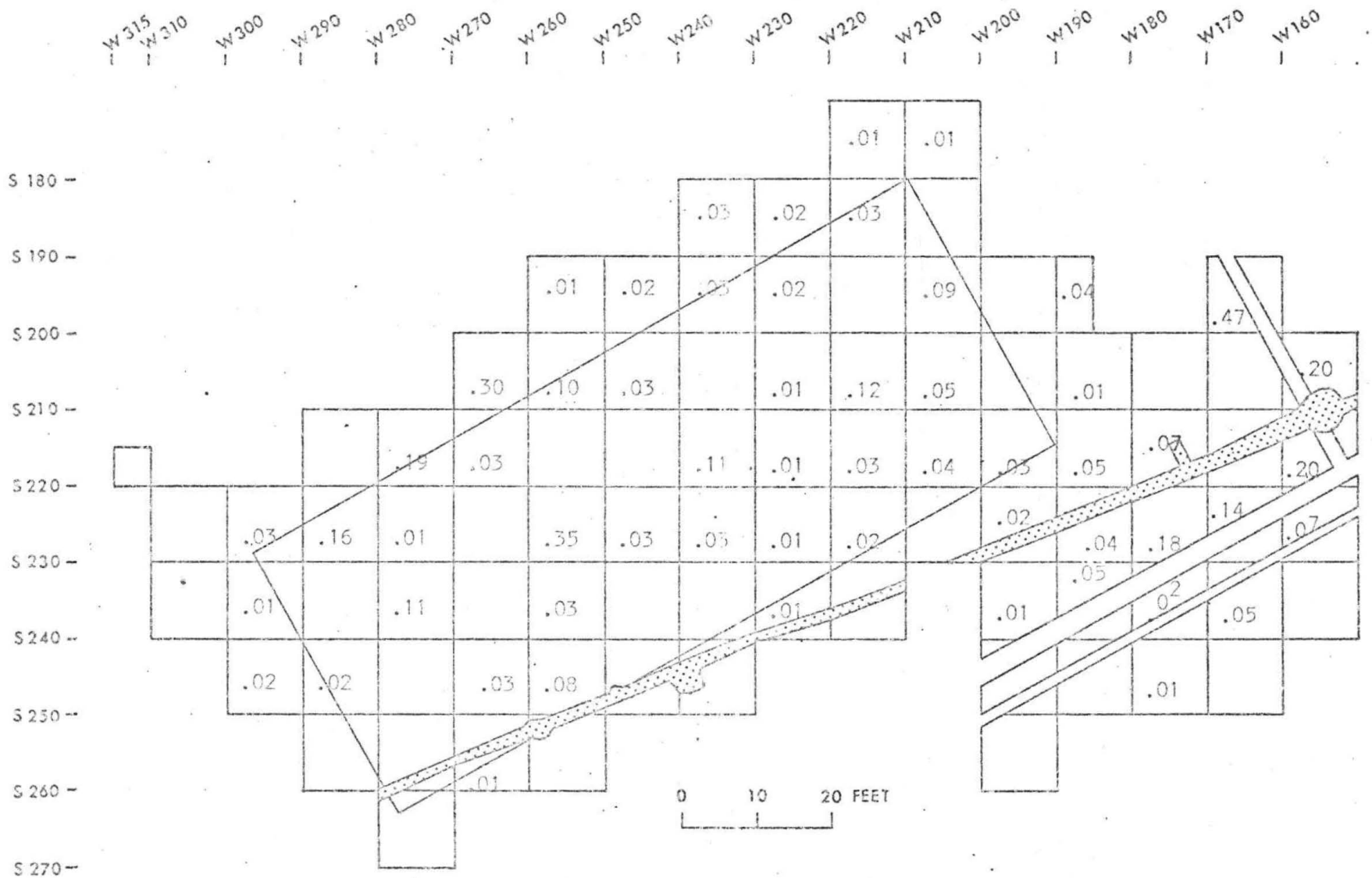


Fig. 130 - Distribution of bore in the Fur Store area (f/ft^2).

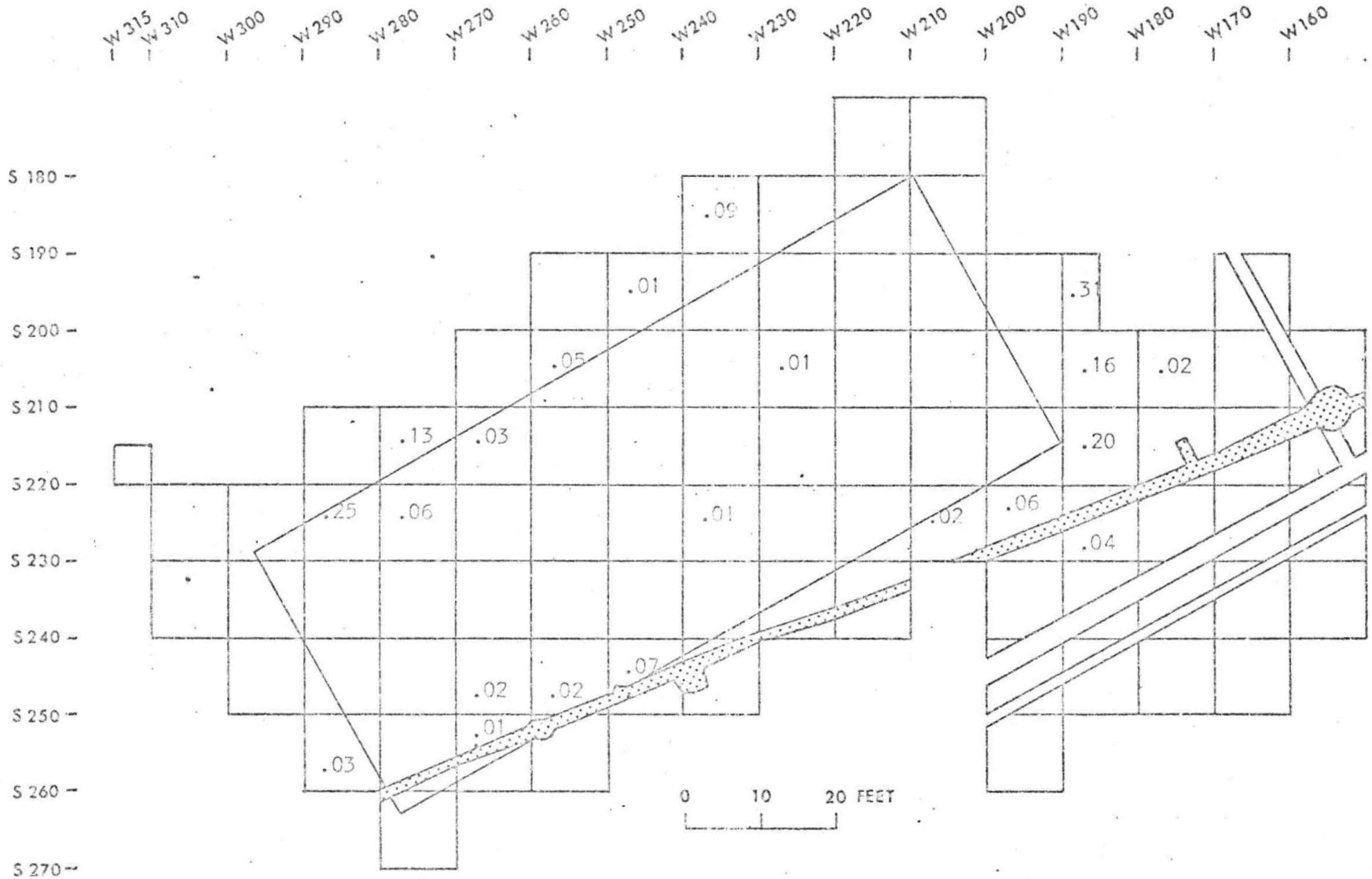


Fig. 131 - Distribution of coral in the Fur Store area (f/ft^2).

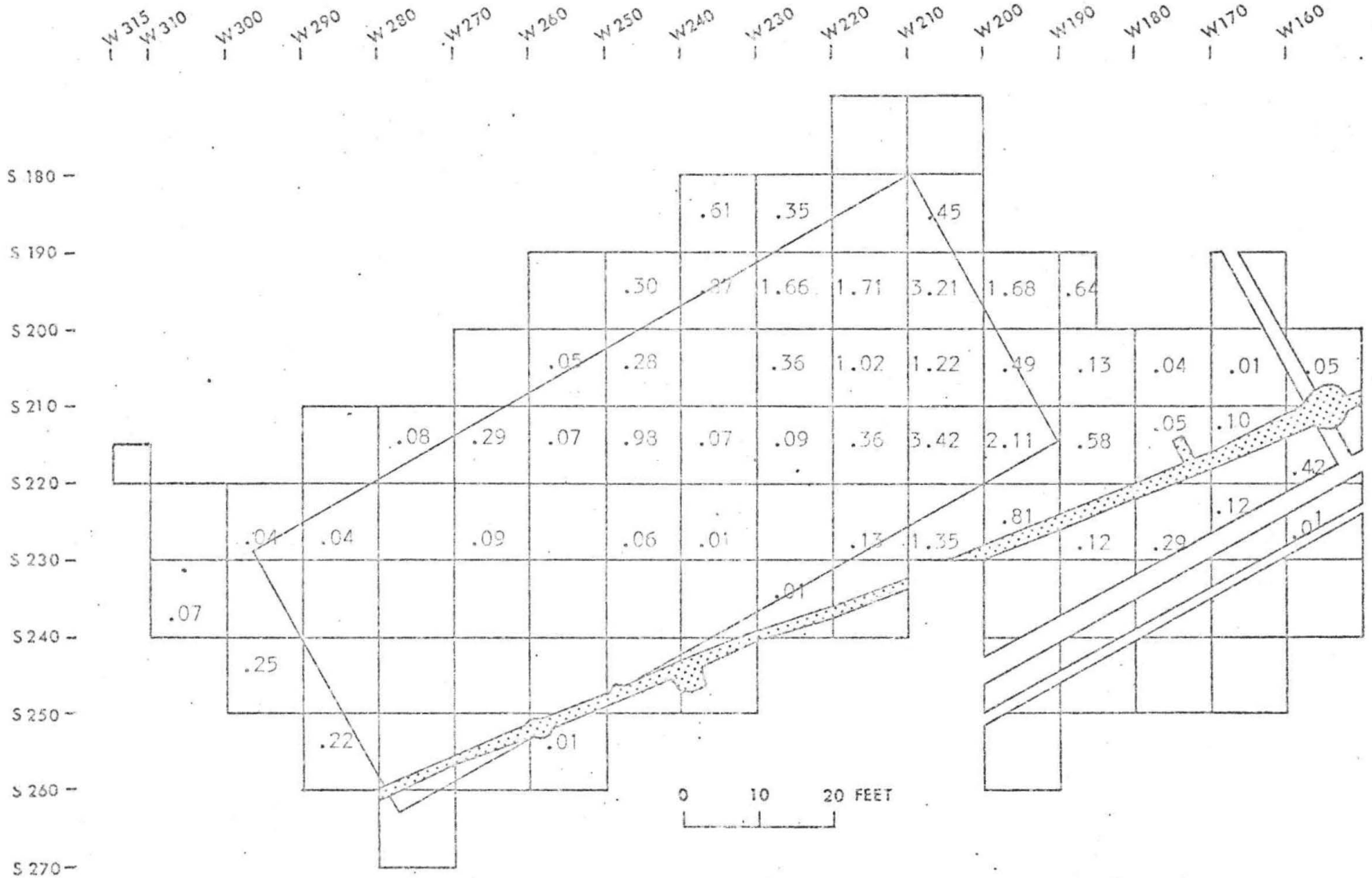


Fig. 132 - Distribution of clinkers in the Fur Store area (f/ft^2).

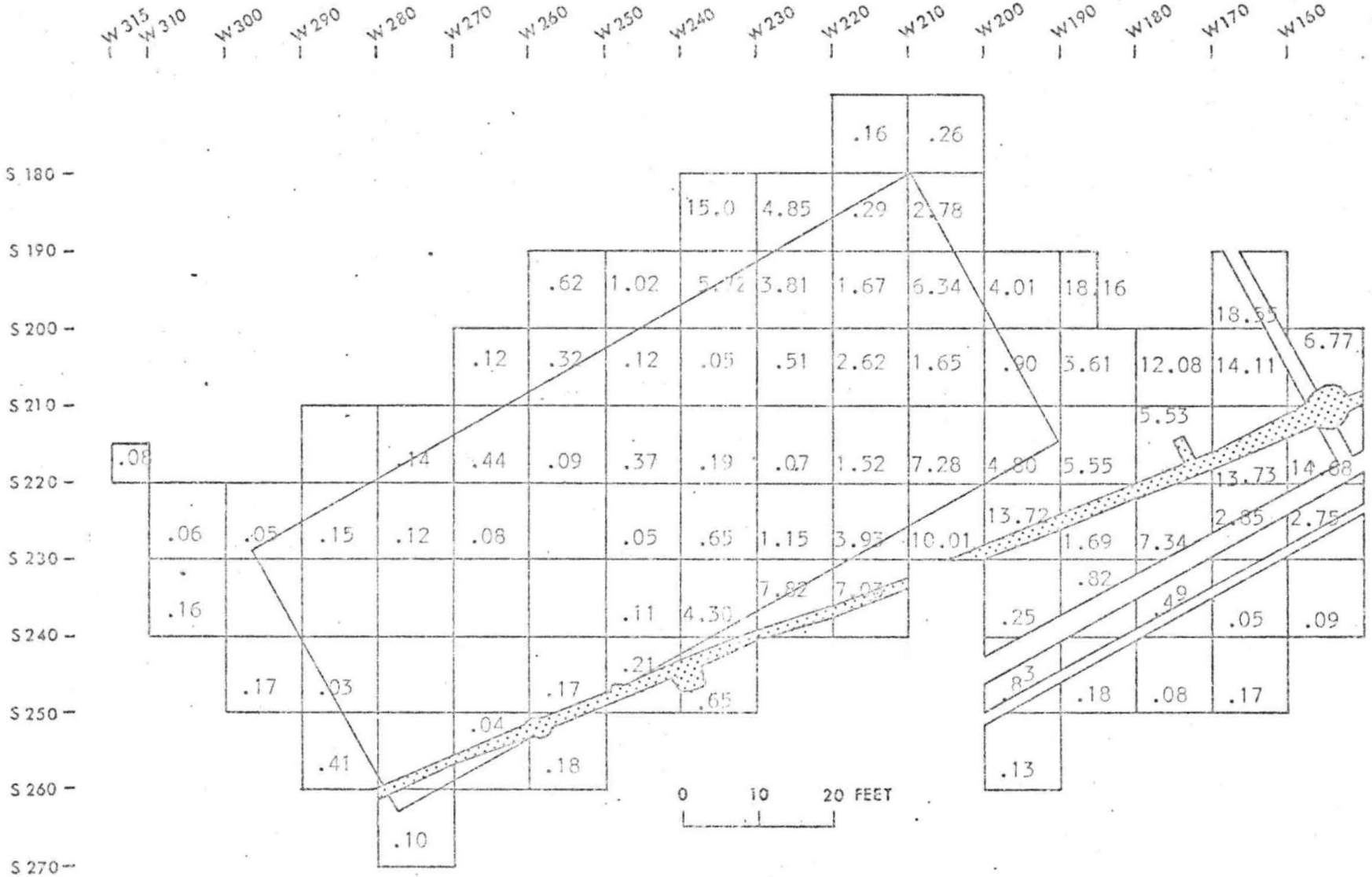


Fig. 133 - Distribution of coal in the Fur Store area (f/ft^2).

which were occasionally shipped with furs (Ibid.:34). Placed in the cool, outboard holds of a ship, asphalted barrels would probably retain their coatings throughout a transoceanic trip.

Coal was found concentrated in the blacksmithing area (Fig. 133). The large number of recovered fragments (Table 8) agrees with the artifactual evidence in hypothesizing the shop as one of the main activity areas previous to construction of the Store.

Cultural Assemblages

At the beginning of our discussion on distributional evidence, we noted that 6 historic activity areas are hypothesized from the archeological evidence. The activity areas are formulated from both structural and nonstructural remains and are outlined in Table 28. In this section we reinforce our hypotheses by defining cultural assemblages of portable materials that are functionally related to the activity areas. The assemblages are based on the distributional evidence of this report, and where possible, divided into HBC and USA uses of the activity areas previous to 1860. In the areas of the roadway and flagstaff, nonstructural evidence is minimal or absent.

Tables 29-33 are summaries of the presented distributional evidence arranged by activity areas. We repeat that the assemblages do not reflect the total artifact styles found in excavation but only those items that were sufficiently numerous or distinctive as to warrant distributional analysis. As previously discussed, non-blacksmithing materials found inside the Store area are inferred to derive from Store activities. That is, these archeological materials were deposited by falling through cracks of the "loosely laid" plank floor of the Store.

Table 29 clearly shows the functions of the blacksmith shop in metal tools, manufactures, repairs and stock. Construction materials and other materials indicate a forge as well as forge fuel and residue. The ceramics are difficult to fit into the functions of the Shop. Smoking pipes are understandable in terms of daily activities since a forging area would have been a "safe" smoking area (q.v. Hoffman and Ross 1974:74). But inventories of a later blacksmith shop at Fort Vancouver fail to shed light on the use of stoneware vessels (Hussey 1974b:324-327). Neither do these inventories list the oils, fluxes and solders presumably needed for welding, sheeting and fine tempering. We would speculate that such items were present in the pre-1836 blacksmith shop and that at least some of them were kept in stoneware vessels.

Table 29 - Cultural assemblage of materials functionally related to the blacksmithing activity area.

- Hudson's Bay Company Blacksmith Shop
  - Ceramic Items
    - "Chinese Porcelain" Stoneware
    - Saltglazed Stoneware Containers
    - Kaolin Tobacco Pipes
  - Glass Items
    - Bottles
  - Metal Items
    - Hardware
      - Wrought Rod Nails
        - Variety #1002 "Shingling"
        - Variety #1014 "T-spike"
      - Hand Forged Staples
      - Bolts, Nuts and Washers
      - Swivel Preforms
      - Traps
      - Axes
      - Blacksmithing Tools
      - Bundling Strap
      - Riveted Strap
    - Copper Sheeting
    - Weaponry
      - Small Arms Parts
  - Construction Material
    - Brick
      - Variety #1001, British Firebrick
  - Other Materials
    - Coral
    - Clinkers
    - Coal

In Table 30, we list the archeological materials related to the western area of the Store. This area may well have been the "cooperage" noted to have been within the stockade as of 1845-46 (Ibid.:300). The list clearly points up the coopering activity that was an integral part of Fur Store operations. The smaller sizes of nail Variety #1002, for instance, were probably used much like barrel rivets. The firebrick and tarred wood previously discussed suggest the lining or sealing of shipping barrels. With the possible exception of the crucible and lead castings, there is no concentrated evidence of western sector activity previous to Fur Store use; neither is there any concentrated evidence of USA activity.

Table 30 - Cultural assemblage of materials functionally related to activity areas in the western sector of the Fur Store.

Hudson's Bay Company Cooperage
Metal Items
Hardware
Wrought Rod Nails
Variety #1002 "Shingling"
Barrel Rivets
Riveted Strap
Lead Castings
Construction Material
Brick
Variety #1001, British Firebrick
Stone Items
Graphite Crucible
Other Materials
Coral
Tarred Wood
U.S. Army Quartermaster Stores
No concentrated evidence

Cultural assemblages from the central sector of the Store suggest 3 different activities: Indian Trade Store; Fur Store; and USA Quartermaster Stores (Table 31). Trading functions are evident from many items of the list such as pipes, beads, buttons, etc. We note that the Fort Vancouver Indian Trade Store was also the administrative and logistical point for an extensive fur business on the Lower Columbia that was separate from the main Fur Store operations (Ibid.:68). Thus, the presence of slate tablets and pencils for temporary recording purposes is understandable.

Other items of Table 31 are less understandable in terms of purely trading activity. For instance, apothecary bottles, the brass cock and firebrick are more understandable as dispensary activity. We are reminded that dispensary activities and Indian trading were joint responsibilities at Fort Vancouver and "Clearly by 1841 the apothecary shop and the Indian trade store were in the same structure." (Ibid.: 105.) The brass cock and saltglazed vessels are likely similar to the "Water Cask wh brass cock" and the narrow and wide mouthed jars inventoried for the dispensary of 1844 (Ibid.:145-155). This inventory applies to a later dispensary, but it reflects items used for the pertinent activity. The same inventory lists "1 portable furnace" that was possibly used for cauterizations, and by inference, explains the presence of brick and stovepipe near the south wall of the central sector. We also note the practice of resident physicians at Fort Vancouver making their living quarters in the apothecary shop wherever it was located at various times (Ibid.:104). This practice would

Table 31 - Cultural assemblages of materials functionally related to activity areas in the central sector of the Fur Store.

- Hudson's Bay Company Indian Trade Store
  - Ceramic Items
    - Saltglazed Stoneware Containers
    - Kaolin Tobacco Pipes
  - Glass Items
    - Bottles
      - Apothecary and Other
    - Window Panes
    - Beads
    - Ring and Jewelry Settings
  - Metal Items
    - Hardware
      - Wrought Rod Nails
        - Variety #1014 "T-spike" (?)
      - Machine Cut Sheet Nails
        - Variety #2001 "Shingling"
      - Screws (?)
    - Household and Personal Items
      - Buttons
      - Finger Rings
      - Half-dime Ornament
      - Brass Cock
    - Weaponry
      - Lead Shot, Buckshot and Ball
  - Construction Material
    - Brick
      - Variety #1001, British Firebrick
  - Stone Items
    - Slate Tablets and Pencils
    - Gunflints
    - Projectile Points (?)
- Hudson's Bay Company Fur Store
  - Metal Items
    - Hardware
      - Variety #1014 "T-spike" (?)
- U.S. Army Quartermaster Store ("commissary's store-house")
  - Metal Items
    - Wrought Rod Nails
      - Variety #1104 "Muleshoe"
    - Machine Cut Sheet Nails
      - Variety #2002 "Common"
      - Variety #2004 "Crimped Flathead"
    - Screws (?)
  - Household and Personal Items
    - Buttons

probably require some sort of heating facility during the winters. While our modern thinking distinguishes between the functional categories of a dispensary and a trading store, historic research indicates that these activities were concomitant in Fort Vancouver lifeways. The cultural assemblage of the Indian Trade Store reflects this; the 2 activities cannot be meaningfully distinguished.

One puzzling item of the Indian Trade Store is the large amount of window pane fragments found in the central sector. The tariffs and inventories of a later trade store at Fort Vancouver do not list glass panes for the Indian trade (Ibid.:86-89, 143-151). But as previously noted, the glass was virtually identical to that recovered from HBC deposits in the Sales Shop. We can only infer that window panes were indeed traded out of the Indian Trade Store.

There is nothing in the cultural assemblages of the central sector to reflect Fur Store activity other than our speculative inclusion of nail Variety #1014 "T=spike." As noted, this nail style would be useful for suspending strings of pelts. However, it could also have been used for displaying merchandise in the trade store (Table 31).

USA Quartermaster activity is reflected in the central sector of the Store by muleshoes, common and crimped flathead nails as well as buttons and possibly screws (Table 31). We are unable to recognize concentrated evidence of a USA departmental headquarters in this assemblage or any assemblage from the Store (cf. Clark 1974).

Only a single assemblage is defined for the eastern sector of the Store. Hardware fasteners, probably shutter nails, and shingling nails are actually structural items that probably associated with the period of Fur Store activity, although shutter nails may precede such activity. Since the eastern sector was also the press room, the presence of slate tablets and pencils for temporary recording of fur sorting and pressing seems reasonable (Table 32). No concentrated evidence of activities before and after use as a press room could be identified.

The cultural assemblage defined for the roadway consists primarily of large nails used for joining the various parts of the wooden road (Table 33). Ceramics concentrated in the area indicate activity other than access to the Fort, namely trash disposal. Pipes may also reflect trash disposal, or an actual smoking area outside of the Store. Presumably, the stoneware container fragments were cleaned out of the adjacent Store.

No cultural assemblage could be identified for the flagstaff area that did not reflect the widespread blacksmithing activity.

Table 32 - Cultural assemblage of materials functionally related to activity areas in the eastern sector of the Fur Store.

Hudson's Bay Company Fur Store
- Metal Items
  - Hardware
    - Wrought Rod Nails
      - Variety #1090 hardware fasteners (also precedent activities?)
    - Machine Cut Sheet Nails
      - Variety #2001 "Shingling"
  - Stone Items
    - Slate Tablets and Pencils

U.S. Army Quartermaster Stores
- No concentrated evidence

Table 33 - Cultural assemblages of materials functionally related to roadway activity area.

Hudson's Bay Company Occupation
- Ceramic Items
  - "Chinese Porcelain" Stoneware
  - Saltglazed Stoneware Containers
  - Kaolin Tobacco Pipes
- Glass Items
  - Bottles
- Metal Items
  - Hardware
    - Wrought Rod Nails
      - Variety #1009 "Spike"
      - Variety #1014 "T-spike"
      - Variety #1066 "Sheathing"

Appearance of the 1845 Fur Store

The general appearance and furnishings of the Fur Store ca. 1845 have been well outlined by historic research (Hussey 1974b:38-64). In this section, we add to or refine certain details of historic research by means of archeological evidence and our own observations.

Exterior

Location of the 1845 Fur Store is well established by archeological and historical evidence (Fig. 1). A credible illustration of the building was made during its use as a fur store (Williams 1970:52). There is excellent reason to believe that this illustration was made by a British naval officer between mid-1846 and early 1847 (Hussey 1972:22-23 n57, 105 n79). We have previously used this illustration, the "Coode Watercolor," for interpreting above ground dimensions of structural elements (Hoffman and Ross 1973c:25). At the time we used the illustration, we formulated a vertical scale applicable to structures positioned on or near a horizontal plane drawn between the Flagstaff and the Belfry. The scale was based on the height of the 2 structures; the Belfry, for instance, is known to have been 45 ft. high (Hussey 1972.72). We assigned a height of 100 ft. to the Flagstaff although we knew the actual height to have been 98.5 ft. (Hoffman and Ross 1973c:19). As a check on this scale, we found the stockade pickets behind the Fur Store to have been 20 ft. high in the illustration. This figure agrees with some of the historic documentation of the period (Hussey 1972:15), although there is no reason to believe that all parts of the stockade had identical heights at any given time.

Since the Fur Store was immediately adjacent to the Flagstaff, we applied our vertical scale to the Coode watercolor and found the total height of the Store to have been about 35 ft. Of this total, about 23 ft. constituted the walls of the building and about 12 ft. was the roof height. These figures are quite similar to those of the Fort Vancouver Sales Shop where photographic evidence indicated the body to have been 22.5 ft. high with a roof height of about 14 ft. (Hoffman and Ross 1974:59-60). The same scale indicated that the large, ground floor doors of the Fur Store were about 7.5 ft. high and elevation of the second floor windows was 17.5 ft. at their sills. The second floor windows were about 3 ft. high and 2.5 ft. wide, or identical in size to the second floor windows of the Sales Shop (Ibid.:61).

The Coode watercolor depicts doors and windows only in the north wall of the Fur Store (Williams 1970:52). As previously discussed, there is archeological evidence of a small, ground level door in the west wall of the Store. Following Hussey's (1974b:47) reasoning, we assume the south wall of the Store to have had 3 windows in the second floor in the same elevations and positions as those of the north wall. Unlike Hussey, we have no reason to assume windows at the ground floor

level of the south wall. As shown in our analysis of window glass and hardware distribution, there is no conclusive evidence the windows of the Fur Store had glass panes, whereas shutter evidence was present. Ground floor windows closed only by shutters do not seem in keeping with the weatherproofing of a building devoted to storage of furs and trade goods. Thus, we assume the only windows of the Store to have been restricted to the second floor.

The Coode watercolor does not show the framing or infilling of the Store that we know to have been present. Neither does it show the roof shingling we have inferred for this period. Comparison with the Chief Factor's House shown in the watercolor indicates that the Store was not sheathed or painted the same white color as the House. Yet all stores of the Coode watercolor are depicted as having a light colored exterior finish that sharply contrasts with darker finishes of other buildings (Williams 1970:52). It has been strongly suggested that the light finish of the stores was due to recently cut wood that had yet to darken with age (Hussey 1974a). There is no archeological evidence that reflects the situation and the light exteriors of the stores as depicted by Coode remain enigmas to us.

Ground Floor

As previously discussed, the ground floor of the Store probably had an exceptionally strong joisting arrangement that was slightly weakened in the southeastern corner (Fig. 88). A strong floor would be necessary for weight of the "huge heaps" of furs piled about the floor (v. Hussey 1974b:26 n51).

Archeological and historical evidence indicates the presence of 4 ground level doors, one in the west wall and 3 in the north wall (Fig. 134). This west wall door was identified by a supernumary footing and trash concentrations outside of the wall. Because of the exacting position of the supernumary footing (Table 6), we believe the door was located immediately north of the west wall centerline. It was no wider than 4 ft. and probably closer to 2.5 ft. (Fig. 134).

As depicted by the Coode watercolor, the 3 doors of the north wall were large openings with arched tops that were probably double leafed (cf. Hussey 1974b:44). They appear to have been evenly spaced along the wall, and each door was higher than it was wide (Williams 1970:52). We suggest that the doors were about 5 ft. wide and positioned 25 ft. apart on centers and in relation to the building corners. This arrangement agrees with the watercolor and the principles of post-in-sill construction. The central door was set at the exact center of the north wall and the side doors were butted to framing posts at equal distances (Fig. 134). Assuming the door frames to have been 5 ft. wide, the distance between each frame was 20 ft., and the distance between frames and exterior corners was 22.5 ft. While our doorway arrangement

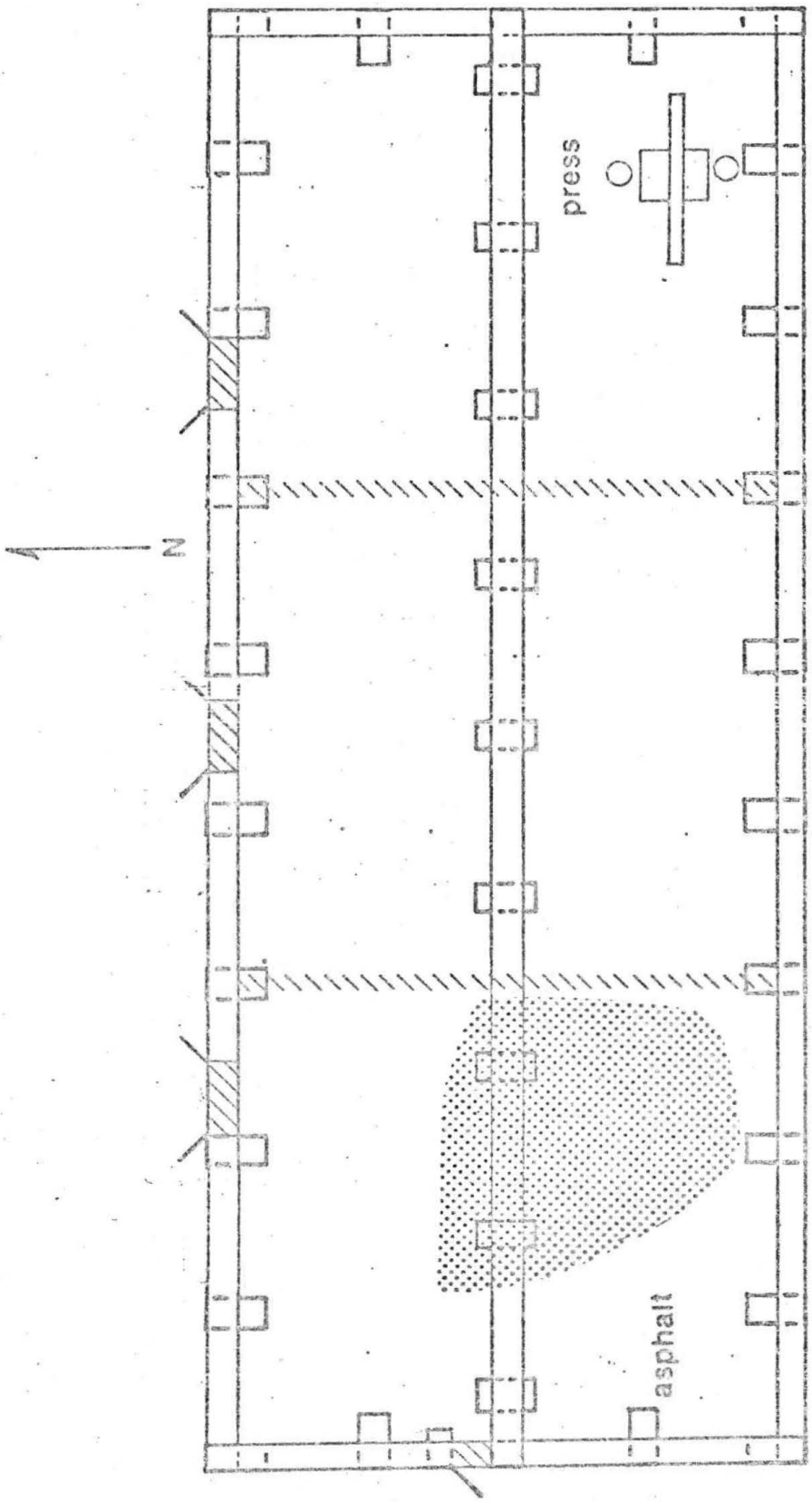


Fig. 134 - Doorway positions and hypothetical space divisions at ground floor of the Fu - Store.

at the north wall agrees with that of the watercolor, the watercolor is not a scaled architectural drawing. Other interpretations are possible. However, a very close analogy to our hypothetical arrangement can be seen in the positions of the ground floor windows of an HBC warehouse still standing at Fort St. James, British Columbia (Hussey 1972:Pls. LXXVIII-LXXIX).

The double doors of the Fort Vancouver Store appear to have been sufficiently wide for the passage of barrows or handtrucks containing bundled furs. Judging from the Coode watercolor, door sills were about ground level in elevation. Muddied areas adjacent to the sills suggest that wagons or carts were backed up to the doors.

Activity areas identified from the archeological evidence indicate that the ground floor of the Store was partitioned into 3 divisions. These divisions also explain the 3 large doors in the north wall. As shown by distributional analysis, the partitions dated from use of the building as a trade store and continued during use by the USA quartermaster. While the exact size of the partitioned areas cannot be stated, archeological evidence and our inferred doorway positions suggest that 3 equal sized rooms were present. Hypothetically, each room had interior dimensions of about 36 ft. north-south by about 32 ft. east-west (Fig. 134). This arrangement also has the economy of explaining the restricted distribution of asphalt in the coopering area. Whatever the partitions consisted of, they were most likely placed over floor joists for stability. Our hypothesized arrangement reflects this and also shows that the door of the central room was centered while doors of the side rooms were not. In terms of Fur Store activity, we infer the west room to have been the cooperage, the east room to have been the baling room, while the central room was probably a general accounting and shipping area.

It has been suggested that the medial footings, and thus sill, also may have had posts used for supporting ceiling beams (Hussey 1974b:51). If so, there is a suggestion of further subdivision of space at the ground floor. Conceivably, up to 6 rooms could have been present. Such an arrangement, or variation thereof, may have been possible during trading store activities. But small rooms do not seem in keeping with the space-consuming operations of the Fur Store (cf. Hussey 1974b:26-27).

In Chapter II, we described remains of a fur press whose foundations were set below the floor of the Store in the eastern room. Elevation of the footing for the basal mount indicated that the mount was roughly at the same level as the surrounding floor. Distance between positions of the press uprights indicated that the press was capable of handling bales up to 5 ft. wide. Judging from the limited space and the depressed condition of the basal mount footing, we suggested that the press was screw actuated. Independent historical research also indicates the use

of a screw type fur press at Fort Vancouver from about 1843 to about 1859 (Ibid.:28-29). The 5-ft. wide bales we inferred from the press remains seem in keeping with the 270-275 lb. fur bales known to have been shipped out during 1844 (Ibid.:30).

One item for which we have no evidence is a stairway. Since the Store was a 2-story structure, some arrangement was necessary to gain access to the second floor from the first. Nothing in the structural remains or the concentrated artifact distribution provided evidence of a stairway.

As shown in previous discussion, other interior items such as putative heating devices and possible storage areas can be suggested for the ground floor. Most of these items were confined to trading-dispensary activities and were not relevant to use of the building as a fur store. However, some sort of heating device was necessary at the ground floor of the west room in order to melt asphalt for the cooperage. It is possible that lead casting was also done in this area at the same time. There is no conclusive evidence as to how this device was vented, if indeed it was vented. However, we noted the presence of stovepipe with another putative heating device of the trading store period.

Second Floor

As previously stated, we assume the only windows of the Fur Store to have been confined to the second floor. Moreover, there is no conclusive evidence that the windows had glass panes. The lack of window glass may have been related to the special ventilating needs of the Store (v. Hussey 1974b:26). We also scaled the second floor windows to have been about 3 ft. high and 2.5 ft. wide. In line with Hussey's (Ibid.:47) reasoning, we assume the north and south walls of the Fur Store to have had 3 windows each.

Again referring to the Coode watercolor, Hussey (Ibid:46) notes that the second floor windows were seemingly centered over the 3 doors of the ground level. He also notes that the windows of Fort Vancouver warehouses seemed to have been centered between wall uprights (Ibid.: 48); in other words, they were set at the centers of infill bays formed by uprights set over footing positions. This observation seems valid for the central window of the north wall. However, centering the east and west windows over the doorways we have deduced would not place the windows in the center of the bays; rather, it would produce awkward horizontal dimensions. Our observations of the Coode watercolor suggest that east and west windows of the north wall were not exactly centered over corresponding doorways. We believe that the east edge of the west window and the west edge of the east window were set at the center of bays. These edges were plumb with corresponding doorway edges below the windows. Under this arrangement,

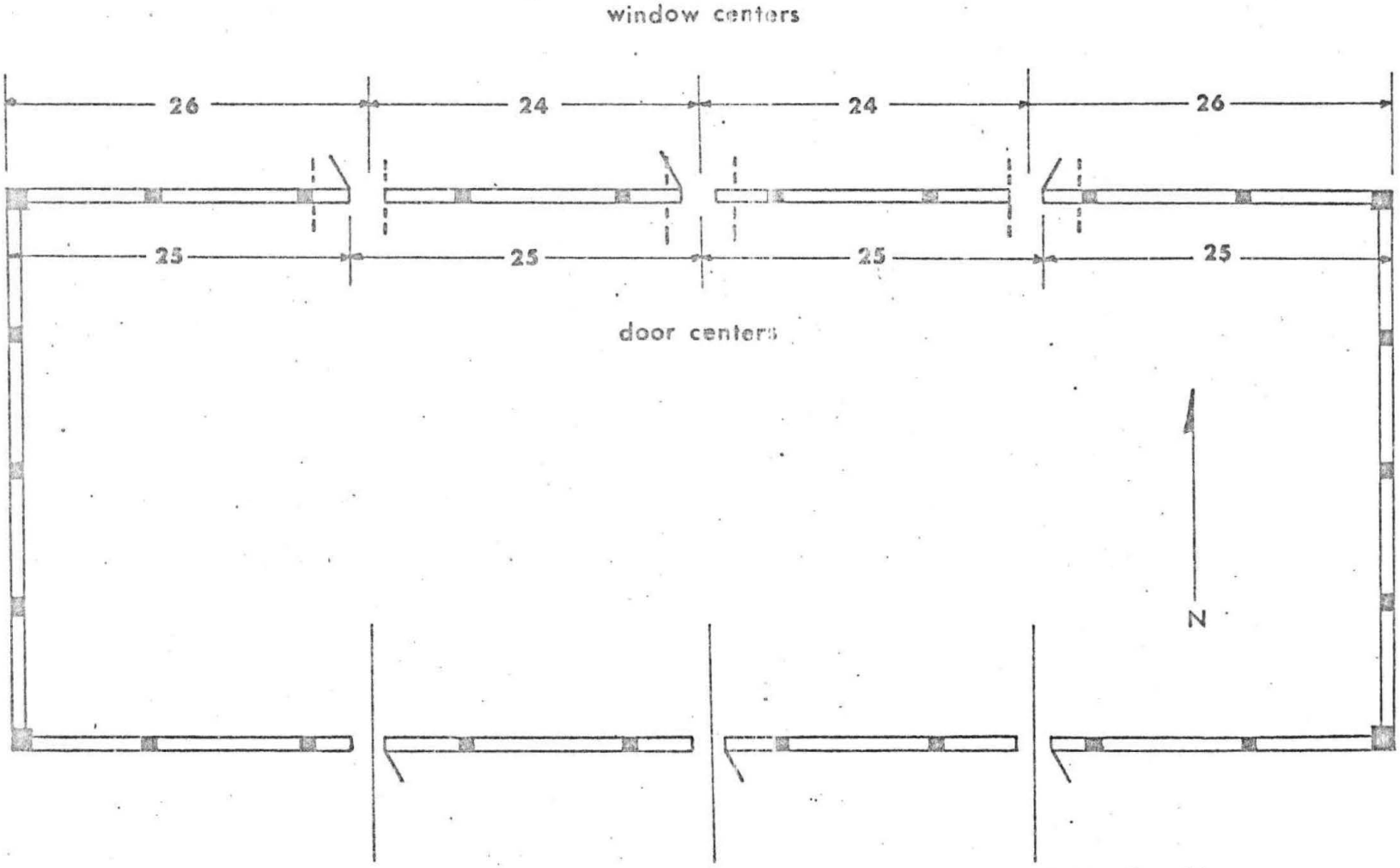


Fig. 135 - Suggested window positions at the second floor of the Fur Store.

the windows were 24 ft. apart on centers, while the distance between building corners and adjacent window centers was 26 ft. Presumably, the same arrangement obtained at the south wall (Fig. 135). As with our suggested doorway arrangement, other arrangements of window positions can be interpreted from the watercolor. However, window arrangements of the extant warehouse at Fort St. James (Hussey 1972: Pls. LXXVIII-LXXX) clearly show how corresponding edges of the first and second floor openings are plumbed. If our hypothetical window arrangement was reversed in its dimensions, the plumbed edges of the side windows would abut posts; this situation would be identical to that at Fort St. James.

The windows of the Fort Vancouver Store were probably closed with single leaf, wooden shutters hung at their sides. While the evidence is only suggestive, we believe the shutters were built of 2 thicknesses joined by Variety #1007 shutter nails. As suggested by Variety #1090 hardware nails, some shutters were about 1 1/2 inches thick and hung with strap hinges. Others may have hung with pintles such as those found in excavation.

Roof

The archeological evidence indicates that the central and eastern portions, at least, of the roof were shingled about 1845-46 by use of Variety #2001 "clasp" or "shingling" nails. Dating of this shingling event agrees with the historic documentation (Hussey 1974b:44).

V - SUMMARY AND CONCLUSIONS

Excavations in and around the 1845 period Fur Store produced a mass of archeological evidence pertaining to the complex history and activities of the area. Combined with historic evidence, the archeology illustrates the varied uses of the area through different periods of time.

Four major subareas were functionally identified by cultural remains. These were a blacksmithing area, a large warehouse, a roadway and drainage system, and a flagstaff. Several stockade lines were also noted in the area. These, like the flagstaff, are subjects of previous reports. Within the warehouse, 3 activity areas and 3 different uses of the building were defined. Hudson's Bay Company first used the building as an Indian trade store and then as a fur store. Later, the warehouse was used for quartermaster and commissary storage by the U.S. Army. In addition to archeologically identified uses, historic evidence suggests that parts of the warehouses were used for undetermined purposes previous to its use as a fur store and subsequent to the USA occupation.

The blacksmithing area was defined by a cultural assemblage of functionally related materials. The latter included tools, manufactures, repairs and workshop scrap. Specifically, repair and manufactures of traps and hardware, firearm repairs and non-ferrous sheathing were indicated. Forge remains and materials associated with forges were also present. No structural remains were found, but some sort of structure is assumed to have housed the activity. Since concentrated evidence of blacksmithing activity was confined to the southeastern corner of the Phase I stockade, but partially overlain by the Fur Store, the activity took place sometime between 1829 and 1836.

The drainage system and covering roadway were unexpected finds. These features were immediately west of the Fur Store and located in such a way as to drain the area between the Fur Store and an adjacent warehouse. The drain consisted of angled, lateral trenches that fed a central trench. Trench walls were maintained by wooden planks about 1 1/2 inches thick that were joined at the intersections of central and lateral trenches.

The central trench and portions of the lateral trenches were covered by a plank roadway that was probably used for wagon traffic. The roadway consisted of long puncheons or rails depressed into the ground and spanned with planks. Planks were about 2 to 3 inches thick, of unknown widths, and laid to form a passage about 8 to 10 ft. wide. Archeological and historic evidence suggest that the road ran from a southern stockade gate to the Fort interior for a distance of at least 70 ft. The underlaying drain may have emptied into a rock-filled sump under the southern gate.

A secondary use of the area was that of trash disposal. Due to the position of the concentrated trash, the material may have been thrown out of the adjacent Fur Store. Since the road was oriented to the first stockade gate known for the Fort, it is possible that the roadway and drainage system were built as early as 1829. It is known that the road was still in existence by mid-1860, and we assume it to have been in use ca. 1845.

As mentioned, the stockade lines and flagstaff base found in excavation were discussed in previous reports of this series. Stockade lines of all Fort Vancouver construction phases were found south and east of the Fur Store. Presence of the Flagstaff in the center of the blacksmithing area clearly showed that smithing ceased in this area by 1841 at the latest.

Bulk of the archeological evidence stemmed from the location of a large warehouse termed the 1845 period Fur Store. Position of the Store was identified by alignments of subsurface wooden footings. Footings described the perimeter of the building as well as a longitudinal medial alignment. The structural plan was oriented east-west and measured 40 by 100 ft. Heavy wooden sills undoubtedly spanned the footings and were leveled by wooden shims on the footings. Each footing position probably marked the horizontal location of a large post set on or in the framing sills. Spaces between the uprights probably were filled with horizontal wooden timbers whose ends were mortised into post grooves. At regular intervals, framed openings were set into the horizontal infills for doors and windows. Thus, the basic construction of the Store was the post-in-sill or "Canadienne pateaux en coulisse" technique widely used at HBC installations and heavily favored at Fort Vancouver.

Historic evidence indicated the building was 2 stories high and had a hipped roof. Total building height was about 35 ft. and the walls were about 23 ft. high. Three double doors with arched tops were set at ground level in the north wall. They appeared to have been about 5 ft. wide and 7.5 ft. high. We interpreted the doors to have been positioned 25 ft. apart on centers and from building corners. A smaller door was archeologically identified in the west wall at ground level from a supernumary footing and trash concentrations outside the Store. The smaller door was between 2.5 and 4 ft. wide, and of unknown height. A combination of archeological and historical evidence suggests that there were no windows in the ground floor of the Store.

The ground floor appeared to have had an exceptionally strong joisting arrangment which was disrupted in the southeastern corner by the subsurface foundations of a large screw-type baling press. The disruption may have occasioned the use of repair footings archeologically noted under the sill positions of the southeastern corner. In any event,

the heavy floor joisting was clearly in keeping with the activities of a large warehouse.

While elevation of the second floor is unknown, we interpreted the sills of the second floor windows to have been 17.5 ft. above ground level. We also interpreted the windows to have been set 24 ft. apart on centers, with outer window centers being 26 ft. in from the building corners. Windows were restricted to the north and south walls which had 3 openings each. These windows were about 2.5 ft. wide and 3 ft. high; they did not appear to have had glass panes. Windows were closed with single leaf shutters of suitable dimensions which may have been made of 2 thicknesses. Both strap hinges and pintles were used to hang the shutters, but we cannot say which hardware went with which shutters.

At least two-thirds of the hipped roof was shingled ca. 1845-46 and other shingling events may have occurred. Archeological evidence of a stairway between floors was completely absent.

By the time of its use as a fur store, and probably earlier, the ground floor of the building was partitioned into 3 rooms that appeared to have been equal in size. It is possible that further partitioning was present previous and subsequent to the fur store period. The western room contained a heating device during the time of the Fur Store and possibly earlier during the Indian trade store period. The heater was identified from British firebrick, a crucible, lead castings and masses of flowed asphalt. These items plus other archeological materials strongly suggest use of the west room as a cooperage during the fur store period. The west room was probably used for storage during the U.S. Army period, although there was no concentrated evidence of the occupation.

Another heating device was identified in the central room of the Store by the presence of British firebrick and stovepipe. This device probably associated with the concomitant trade and dispensary activities of the Indian trade store period. It is possible that the device was a small furnace used for medical purposes, or it may have been a simple stove used by medical personnel living in the Store. While only a limited variety of trade materials were archeologically recovered in the central room, the quantity of glass and weaponry items indicates the vast amounts of these materials that once flowed through the Store.

It is not known whether the heating device of the central room was used during the fur store period. Little material evidence of fur storage and processing was found in the room; indeed, little would be expected of such activities. It is possible that the slate tablets and pencils noted for trade store use of the room also were used for

fur storage activities. Even U.S. Army evidence was skimpy in the central room and consisted mainly of distinct nail varieties, metal screws (?), and obvious military buttons. This evidence we interpreted as part of the quartermaster and commissary usage of the Store, as opposed to historically referenced administrative functions.

There was no concentrated evidence of trade or dispensary activities in the east room, although it is difficult to believe the area was not used during the indian trade store period. Fragments of a cordial bottle were found in the area, but this item could have derived from USA use of the room. The best evidence for the fur store period consisted of slate tablets and pencils plus the foundations of a large baling press. Presence of the fur press inside of the Store was not surprising considering the rainy climate of Fort Vancouver. Neither was the large size of the press surprising in view of the depot functions of the Fort. Both archeological and historical lines of evidence agree that the press was actuated by one or more large screws.

In summary, the 3 periods archeologically known for the building are HBC Indian Trade Store, HBC Fur Store, and USA Quartermaster and Commissary storage. These are respectively dated at ca. 1836 or earlier to ca. 1845, ca 1845 or earlier to 1849, and 1849 to ca. 1859.

The varied activities that took place in and around the Fur Store point up the complexity of the archeological record at Fort Vancouver. Moreover, we have dealt with one small segment of a past cultural center whose technological diversity and social dynamics can only be outlined at present. A full appreciation of the myriad activities and events that characterized Fort Vancouver lifeways has yet to be made vivid.

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