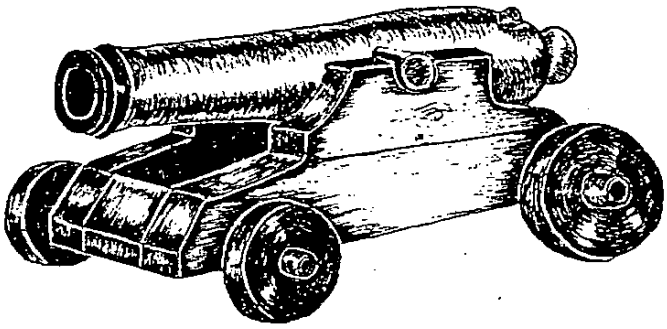
EXCAVATIONS AT

SUTTER'S FORT

1960



by

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State of California
Department of Natural Resources
Division of Beaches and Parks
Interpretive Services

E X C A V A T I O N S

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S U T T E R ' S F O R T

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Louis A. Payen

Report on archeological investigations carried out at Sutter's Fort State Historical Monument from July 1 to August 16, 1960, by the Central California Archeological Foundation under a Standard Service Agreement with the California State Division of Beaches and Parks.

ARCHEOLOGICAL REPORT

State of California
Department of Parks and Recreation
Division of Beaches and Parks
Interpretive Services

September, 1961

INDEX

List of Plates and Figures iii

Introduction 1

Excavation 4

Trench A 4

Trench B 5

Trench C 5

Trench D 6

Trench E 20

Trench F 21

Building Materials 23

Summary of Archeological Investigations, 1955-1960 27

Bibliography 36

LIST OF PLATES AND FIGURES

Plate 1

Drawing of Sutter's Fort in 1849 by W. R. Hutton

a. Offset Wall
b. Kitchen Building
c. Brewery-Distillery Building

Plate 2

a. Trench D, Feature 7 (Offset Wall)
b. Trench D, Floor area (Feature 8) with post holes
c. Trench D, Units R21, R22, and L22, Feature 2 (West Wall of Kitchen Building)
d. Feature 3 (Well #3), Top of Stratum 3 showing small adobe bricks
e. Trench D, Feature 3 (Well #3) and Feature 5
f. Trench D, Feature 5

Plate 3

(a - h scale 1/10 natural size)
a. Adobe bricks of small type from Well #3 (Layer 3)
b. Fired brick of "Zins" type
c. Fragments of large type adobe brick from Well #3 (Layer 3)
d. Wooden shake from Well #3 (Layer 4)
e. Iron harpoon, Well #3 (Layer 2)
f. Olive green colored bottle, Well #3 (Layer 2)
g. Door part, Well #3 (Layer 2)
h. Fragments of large bottle, Well #3 (Layer 2)

(i - w scale 2/5 natural size)
i - l. Bottle Fragments, Well #3
m. Bottle Fragments, Trench D-2
n - o. Bottle Fragment, Well #3 (Layer 2)
p. Bottle, Well #3 (Layer 2)
q. Padlock, Well #3 (Layer 2)
r. Square nail (Machine type), Trench D.
s. Hand forged square nails, Floor Area, Trench D
t. Square copper nails, Floor Area and Well #3
u. Gunflints, Floor Area, Trench D
v. Trigger guard from rifle, Well #3 (Layer 2)
w. Incised bird bone tube, Floor Area
x. Obsidian point fragment, Trench D, Unit R40
y - z. Obsidian projectile points, Floor Area

Figure 1. Künzel Map (A ground plan after an original by Sutter.)

Figure 2. Ground plan of Trenches A, B, and C

Figure 3. Profiles of Trenches A, B, and C

Figure 4. Ground Plan of Trench D, Features 7-15

Figure 5. Profile of Trench D, Features 7-15

Figure 6. Ground Plan of Trench D, Kitchen Structure Area

Figure 7. Ground Plan of Trench D, Features 3-5

Figure 8. Profile Well-fill, Feature 3 (Well #3)

Figure 9. Ground Plan and Profiles of Trenches E and F

Figure 10. Archeological Base Map of Sutter's Fort, showing location of trenches and archeological features

INTRODUCTION

The growing interest in restoring historic buildings and sites has brought the historian and the archeologist together in gathering information needed for restoration. Buildings often have completely vanished from the landscape making it difficult to determine the exact size, plan, and location for the restored structures. Sutter's Fort was such a case in which only one of the original buildings was standing at the time of reconstruction in 1890. This early work was based on a few indications of low mounds of melted adobe (remnants of adobe walls), and from descriptions by men who had seen the fort in its day. The result of the 1890 restoration was a fort somewhat similar in appearance to the original, but by no means having the same dimensions or details. Buildings such as the kitchen and the "shoemaker shop" store group on the northwest corner of the central building were overlooked.

Studies made of historical accounts by Mr. Hero E. Rensch and Monument Supervisor Carroll D. Hall, have indicated differences between the original and present fort. Mr. Rensch's studies of land records showed that the original fort extended to the east of the present fort some 100 feet. To corroborate these findings archeological research was undertaken in 1955 by Sacramento State College in hopes of solving some of the questions as to the location and size of the original fort. Excavation was continued by Mr. Charles Gebhardt in 1957, and again in 1958 (Gebhardt n.d., 1, 2, and 3). During 1958 a pamphlet came to light in the Bancroft Library entitled "Ober Califorinien", published in Germany in 1848 by Heinrich Künzel. Included in his pamphlet is a map of Sutter's Fort drawn in 1847, or earlier (Figure 1).

The finding of this map has answered many of the unanswered questions as to location of buildings and the other walls of the original fort. The Künzel map changed the problems and solved certain of the difficulties confronting the archeologist. It was no longer a task of just trying to find features to give evidence of the original fort's size, but one of proving the validity of the map. The archeological approach changed from test trenching to direct and productive excavation with interpretation of the uncovered features made easier. The Künzel map has been the guide in the placement of the excavations completed over the last several seasons.

This present report primarily will deal with the excavations carried on during July and August of 1960, by the Central California Archeological Foundation under Standard Service Agreement No. 4-10-070, with the State Division of Beaches and Parks. The 1960 excavations were carried out in areas agreed upon during a meeting with Dr. V. Aubrey Neasham, then Historian for the Division of Beaches and Parks. The areas to be excavated were: 1) test for walls of the extension at the original fort east of the present east wall, 2) test for the possibility of additional walls and features on the north side of the present fort, 3) test for store structure to the east of the central building.

I would like to thank Mr. William Olsen, Director of the Californis State Indian Museum, for his guidance and help during the excavation and writing of this report. I also would like to express my appreciation to Mr. Carroll D. Hall, Supervisor of Sutter's Fort State Historical Monument, and his staff for the patience and cooperation with the

work. To Mr. Phillip Coleman and Mr. William Hanson a note of appreciation is due as their laborious field work made this year's excavations successful.

EXCAVATION

The 1960 excavations were started in the area northeast of the present east wall in an attempt to locate remains of the outer limits of the north and east walls of the original fort. Sacramento State College (Trench SSC-G 1955) and Gebhardt (Trench G-H 1958) placed test trenches in this area, but both excavations were just outside of the area of the original fort (Figure 10). Their work did indicate considerable alteration of the original surface by removal of several feet of deposit in landscaping during restoration (Gebhardt n.d. 3, p.14). This year's excavations in this area included three trenches, A, B, and C, which were excavated in three by five foot units and numbered from the north to south. The corner of the present east and north wall was used as the datum (Datum A) and all measurements for the location of the trenches were taken from this point.

TRENCH A

Trench A was started 39 feet east and eight feet south of Datum A and continued to the southeast at an angle of 40 degrees from the present east wall (see Figure 2). The excavation was located in the area where Künzel indicated a wall and structures along the northeast side of the original fort (north wall, spinning and weaving room). The deposit was excavated to hardpan in all units, and in unit 3A and 4A the hardpan was tested to a depth of three feet to insure that no cultural material would be overlooked. The soft overlying material, above the hardpan, consisted of a five to seven inch layer of dark soil and grass roots (sod). Below this sod were six inches of brown gumbo clay, and

three inches of hardpan lumps. Below this was a yellow hardpan which varied in color with depth (see Figure 3, Profile A-A').

Evidence of walls or other features were absent in the area tested by the trench. The broken and disturbed nature of the upper part of the hardpan shows that alteration of the deposit may have taken place. Artifacts recovered were few in number and came from the sod level. Many of the items recovered appear to date from the time of the reconstruction (e.g., red brick fragments, round nails). It is almost certain that in the area of Trench A the surface was lowered several feet at the time of the restoration.

TRENCH B

The location of Trench B was selected close to the existing east wall because the present contours appear to nearly coincide with the contours recorded prior to the restoration (Grunsky, n.d.). The trench was located ten feet west and five feet east of Datum A. Six three by five foot units were excavated to the yellow base material which was encountered at a depth of 24 inches. Very few artifacts were recovered, and all were from the upper part of the dark soil (Figure 3, Profile B-B'): Again, as in Trench A, no evidence of the walls or floor areas could be found. It was evident that grading at the time of the restoration, as well as recent repair work on the present wall in this area, had disturbed the deposit.

TRENCH C

A third trench was excavated to the east of Trench B to explore further any possibility of finding the original north wall and rooms.

Trench C was begun 22 feet east and 22 feet south of Datum A. Four three by five units were removed in the same manner as the other two trenches. The deposit consisted of dark soil from the surface to a depth of 12 inches, brown clay from 12 to 24 inches, and hardpan below 24 inches (Figure 3, Profile C-C').

Feature 1. In Units 2C and 3C a hole, ranging from 30 inches in diameter at the top to 15 inches at the bottom, was found in the hardpan material. The pit was filled with a mixture of yellow, red, and black soil, and contained no artifacts. This feature may be the result of rodent activity or a cavity left by a tree stump.

The absence of traces of walls or other functional features in Trenches A, B, and C can be attributed to leveling during restoration, which erased evidence of the original fort. The excavation in this area provided data which coincide with those of Gebhardt and the Sacramento State College (Gebhardt, n.d., 1, 2, and 3). Any future excavation east of the present fort, in the author's opinion, would be of little value.

TRENCH D

An alignment of maps of the present fort with the Künzel map indicates that walls and buildings existed at one time in the area just outside the present north wall. The Künzel map shows two buildings adjacent to the original north wall in the northwest portion of the fort. The larger is designated as "Brauerei u. Brennerei" and the smaller structure "Küche". (It was these two features that we were primarily interested in locating.) In 1959 the west wall of the court,

or corral, was found in this area (Olsen, 1961, p.28-30). Restoration grading cut the hill down along the north side, leaving only a strip 12 feet wide near the original elevation. A grid was established by using the corner of the present offset wall and the north wall as the datum (Datum B). The units were marked off in three by five foot square units which parallel the present north wall. The trench was two units wide, designated as right and left (R and L) and are numbered from east to west from the datum. The placement of excavations on this grid was determined by measuring the location of walls and rooms indicated on the Künzel map.

Feature 7 (Offset Wall). In 1959, two excavation units were placed on the east side of the present offset wall with the hope of locating the original north wall offset indicated on the Künzel map. An overlay map prepared by Gebhardt in 1958 placed the former wall just east of the present offset wall (Gebhardt, n.d., 3). The 1959 excavation did not reveal any trace of the wall. Measurements made from established points of reference found that year, indicate that the wall was possibly located several feet to the west of the offset wall (Olsen, 1961, p.26-27).

Units D-R1 and D-R2 were excavated to test for traces of the offset wall north and west of the 1959 excavation. The test showed no evidence of the wall during the primary excavation, but a careful study of the profiles brought to light the faint outlining of three courses of brick. The material from which the bricks were made was the same as the soil in which they were buried. This produced little distinction in color and texture between the bricks and the surrounding matrix.

The recognition of the bricks was, threrfore, very difficult. Much disturbance in the upper part of the deposit and thick concentrations of tree roots added to the difficulty in exposing the feature. Once the wall was recognized it was possible to expose it in Unit D-L1 also. Here an eight foot length of individual bricks could be defined (Plate 2a, Figure 4). The present offset wall being built partly over the original, suggests that the reconstructors may have had some clue that this was the original location.

Additional excavations to the north revealed that the wall had been cut off by the grading down of the surface. This is very clearly indicated in the profile (Figure 5, Profile B-B'). The bricks were first found 21 inches below the surface. The base of the wall is 40 inches below the surface. The profile clearly shows that the wall footing was placed in a foundation trench dug to the underlying hardpan. This trench was at least 15 inches deep and 34 inches wide, just allowing for the placement of the bricks.

The wall was constructed of 12 by 18 inch adobe bricks which are four inches thick. The one and one-half inch space, or joint, between the bricks was filled with a mud mortar. The bottom course was formed by placing short axis of the east row of bricks parallel to each other. The west row was formed by placing the bricks end to end, on the long axis. The second course of bricks is laid just opposite to this and third course repeats the first (Figure 4 and 5). This way of laying bricks is standard to prevent adobe or brick walls from cracking along a joint. The placement of the wall in a foundation trench indicates that it may have required a firm footing due to its height (said to be

18 feet). Also the slope of the hill required a trench to place the wall on a level surface. Lesser walls found in other locations were placed on, or just below the surface. Drawings from 1849, and a later one some time in the early 1850's, shows a definite slope on which the wall was built. The corner is on the edge of a steep bank of the slough (Plate 1a). A drawing from the early 1850's shows the fort in partial ruin and the north half of the offset and north wall has collapsed (cf. Sutter's Fort State Historical Monument Booklet, p.10). The excavation was near the middle of the offset wall and at this point the surface of the subsoil is sloping to the east. The sloping of the surface required the wall to step down from the south to north allowing for the drop in the elevation of the wall (Plate 1a).

Feature 8 (Floor Area). Immediately west of the offset wall a hard-packed earth floor surface was exposed at the depth of 12 to 21 inches below the surface. The west edge of the floor is cut off by leveling six to ten inches from the original offset wall, making it hard to determine where the wall and floor joins (Figure 5, Profile A-A'). The floor was exposed for 26½ feet to the west and covered the entire width (five to nine feet) of the exposed area (Plate 2b, Figure 4). The floor extends under the north wall and is cut off by grading on the north side, and disturbed by landscaping in Units D-L6 and D-L7. The floor is similar in appearance to that of the shoemaker's shop, and is of hard-packed dark earth with a reasonably even surface (Olsen, 1961, pp.52-53). The packed surface is designated as Feature 8. The material of the floor itself is composed of soil with charcoal and fresh water clam shell fragments scattered through it, sometimes in

thin layers. This hard packed material is from four to five inches thick and lies directly on dark midden material. A slit layer covers the floor, and contains scattered artifacts such as gun flints, porcelain fragments, brass buttons, hand forged nails, and animal bones.

Five post holes were found in various locations on the floor surface (Plate 2b). Three of the holes are square and two are circular in outline. Each of these post holes, or post moulds, has been given a feature number for convenience of discussion (Figures 4 and 5). Features 9, 11, and 12 are square post holes, 6 by 6, $8\frac{1}{2}$ by $8\frac{1}{2}$, and 13 by 13 inches square and seven, eight, and nine inches deep. Feature 11 contained fragments of rotted wood of the original timber. Feature 10 is a round post hole nine inches in diameter and 11 inches deep and Feature 13 is seven inches in diameter and 12 inches deep.

A round pit 37 inches in diameter had been dug into the hardpan surface at 12 inches below the floor (Figures 4 and 5). The pit was found in Unit D-15 and partially under the north wall and contained fragments of the floor material, split animal bones, and porcelain fragments. The function of the pit is not clear, but it may have been a refuse pit dug into the floor during actual use of the feature, or it may have been dug at some later time (Plate 2b).

A small cache of fire cracked stream cobbles was found on the surface of the floor in Unit D-14, and are designated as Feature 15. The rocks appear to have been used in the hot stone cooking method commonly used by Indians in California. Several other items that also can be attributed to Indian manufacture came from the floor area. These

include two obsidian projectile points and an incised bird bone tube (Plate 3w, x, y, z).

The Künzel map does not show a building in this area, but indicates it as a "Hof", court or yard. It is possible that a structure was built in the area after the map was made as a drawing of the fort from the 1880's shows a number of small building and pens here. The position in relation to the offset wall, and the type of artifacts associated with the floor, suggests that the feature was from the Sutter period. At least one, if not more, of the post holes probably are from a fence that is shown crossing the area in the 1850's, however, the others may be attributed to a structure related to the floor built in this area. Additional excavation on the south side of the north wall could possibly shed more light on this feature.

Kitchen Structure Area. On the Künzel map there is a structure shown along the north wall, north and west of the central building, and just east of a small gate in the outside wall. The building as shown was approximately 30 by 15 feet in size and had one door in the center of its south wall and a second in its west wall. There are two projections from the wall on the north side of the room; one is in the northeast corner and the other is near the middle. Their function is not indicated, but they may be fireplaces, or ovens, as the building is listed as "Küche" on the map (Figure 1). A large kitchen is mentioned by Hastings (Hastings, 1845); Bonney tells of a large cook house where the food was prepared for the Indians whom Sutter employed (Lockley, 1923). This surely is the building of which these early visitors wrote even though its location is not given. The drawing by W. R. Hutton in

1849 shows the roof of this building over the wall (plate 1b). The roof, as indicated in the drawing, slopes at a fairly steep angle from a raised portion of the outside wall down to the interior. The map shows the back wall of the structure was built against, but not as part of the outside wall. The same is shown for the north side of the north court area, with the court wall being built along the outer wall forming what appears to be a wall of double thickness. This seems unusual and it is not clear if this was the actual case.

It was hoped that some remains could be found of this building and Units R21, R22, L22, R24, R25, R26, R28, and L28 were excavated to explore the possibilities of recovering the wall footing and floor area. The excavation was placed in such a manner that Units R21, R22, and L22 were in the approximate area of the east wall of the building. Units R24, R25, and R26 were excavated to explore the possibilities of locating a floor such as was found in the shoemaker's shop (Gebhardt, n.d., 3, pp.12-13; Olsen, 1961, pp.52-54). Units R28 and L28 were excavated in the supposed area of the west wall of the building (see Figure 6).

The only trace of the kitchen building was a small fragment of its east wall located in Units R22 and L22 (Feature 2). The wall footing was encountered at a depth of 18 inches below the surface. The soil above the footing contained numerous lumps of hardpan-like material, which must have been deposited there during restoration grading. A study of the profile of the deposit clearly shows that this disturbance had almost obliterated any trace of the adobe bricks (see Figure 6; Profile B-B'). All that remains of the bricks, a three inch thick lens

of adobe material, is in a very poor state of preservation. The width of the wall was 18 inches and it appears to have been built by placing 12 by 18 inch bricks with their long side parallel to one another. Individual bricks were not well defined and only several joint lines between individual bricks could be distinguished (Plate 2c; Figure 6).

The wall is 107 feet west of Datum B, starts three feet north of the present north wall and extends six feet north where it is cut off by the grading down of the surface (Figure 6). The south end is cut off more-or-less square, seemingly as a result of disturbance by restoration construction, or later gardening activities. The wall is 13 feet four inches from the west side of the northwest corral wall (Olsen, 1961, Feature 19), which corresponds favorably with the distance indicated on the Künzel map. A modern pipeline trench has cut through the wall in Unit L22. The lack of traces of the west wall and the floor of the building can be attributed to the disturbance of the deposit. In Unit D-R23 a depression in the subsoil containing numerous fragments of white porcelain, unglazed brown ware, and olive green glass, mixed in a soil fill, was found (Feature 6). The pit, most probably excavated for the disposal of refuse, was in the area of the floor, and may have destroyed any trace of a compacted surface if it ever existed. The procelain fragments are comparable to ones found in Feature 20 and Well #2 of the 1959 excavation (Broadbent, 1961). Fragments of "Ironstone China" made during the early 1850's suggest use of this feature sometime during, or slightly after the Gold Rush. Most probably the digging was done after the collapse of the building (which probably took place in the late 1850's as drawings of the fort in 1860 show this area

vacant of outlying structures). Disturbance from restoration grading, landscaping, a refuse pit, and a pipeline trench in the upper portions of the deposit have contributed to the destruction of any possible remains of walls or floor. What little has been found, helps to establish the location of the east wall of the building and demonstrates that the walls were 18 inches thick and placed on top of, or slightly below, the surface of the ground.

Brewery-Distillery Area. To the west of the kitchen structure, and along the north wall a large building indicated as "Brauerei u. Brennerei" is shown by Künzel (Figure 1). There are a number of historic references, many by Sutter, to the manufacturing of liquor at the fort. Themis (1889-93) notes that the distillery building was 60 feet by 25 feet and was two stories high. The Künzel map shows the building to be approximately 20 by 40 feet. The drawing by Hutton in 1849 shows the roof and the east end of the building showing over the north wall (Plate 1c). The building appears to be two stories high, and has a gable roof. There appear to have been two windows in the north, fairly high up on the wall. The Künzel map shows four circles along the south side of the room, which may represent stills. There are two projections, like those in the kitchen, along the north side of this room. Doorways at the west and east ends of the building are also shown on the map.

Units R32, R33, L40, R40, L41, R41, R42, and L42 were excavated in Trench D in and near the area of the Brewery structure. No traces of this building's walls or floor could be isolated in the units excavated. The deposit was badly disturbed in Units R32 and R33 to a depth of 12

inches, thus obliterating any possible traces of walls in this area. No trace of the wall could be found in the other units and disturbance may be the primary cause here also. Drawings from the 1860's show no building remaining in this area. A drawing made in the mid-1850's shows the building in ruins leading one to believe the structure disappeared from the landscape sometime in the late 1850's.

Feature 3 (Well #3). In an attempt to locate the west wall of the distillery, several other features were unearthed. The first, and most outstanding, was a well, designated as Feature 3. This well is the third to be located within the bounds of the original fort. It is circular shaped, four feet in diameter and had been excavated into the hard sub-material. Twenty feet of the fill material was excavated or bored but bottom was not attained. The well is located in Units L41 and L42 and is partially under the present north wall (see Figure 7; Plate 2d, 2e). The settling of the fill deposit in the well has caused several large cracks to open in the north wall directly above the feature. A large cedar tree just north of the well has sent its roots down into the soft fill, this being the only place roots can penetrate the ground to any depth due to the extremely hard sub-material. This mass of roots made excavation of the well fill very difficult and finally caused abandonment of testing of the deposit.

About three-fourths of the first 11 feet of the fill was removed and the remaining one-fourth of the deposit that is under the wall was left in place to enable stratigraphic study. A six inch auger was employed to test the deposit below this point.

The fill material in the well was found to be in four distinct layers which show different stages of filling after the well was abandoned. This fill material is described from top to bottom, thus starting with the material last placed in the well and working down (Figure 8).

Layer 1 (0" to 18"): Dark soil, similar to the topsoil in the area around the surface of the well, was found in first stratum. Red brick fragments of the type used in the restoration were found scattered in this soil. This part of the fill must have been deposited during restoration (1890-1901) to fill a depression caused by the settling of the well fill materials.

Layer 2 (18" to 26"): Tan silt-like material, containing numerous broken bottles, metal objects, and bone fragments, make up the second layer. The glass was in a lens 24 inches down in the deposit. The type of deposit and profile of this layer suggests the well has settled leaving a depression which was refilled with refuse. The artifacts from Layer 2 include fragments of a very large olive-green, hand blown glass wine bottles of the type made in a five piece wooden mold (Plate 3f, h-l, n, o). Several of the bottle tops recovered still have remains of the corks, copper wire, and seal material suggesting that at least some of the bottles were broken before being opened. The only complete bottle recovered was a small olive-green specimen which was formed in a two piece wooden mold (Plate 3p). Fragments of a "cathedral" type bottle, made of green glass, and a base fragment of a green bottle which has the letters "ON" on one side was recovered in the glass bearing lens. Only two small fragments of porcelain were re-

covered, both unidentifiable. A fragmentary beer mug, similar to one found in Feature 20 (1959), suggests a date for this material of the early 1850's. Small glass buttons that may have been on discarded clothing thrown into the pit also were recovered. Metal objects included an iron pot lid, a crank handle and shaft (of a type used on coffee grinders), an iron harpoon, a door latch slide, an iron padlock, a large chain link, knives, possible remains of tin cans, two iron buckles, a brass trigger guard from a rifle (Plate 3v), and a large brass cap on the end of a piece of rotten wood. Several sawed bone fragments also were found with the other materials. The artifacts appear to have been the type that would have been discarded here during the Gold Rush, but no definite date could be assigned from the present study of the specimens.

Layer 3 (26" to 136"): Orange colored adobe melt with numerous adobe brick fragments, some almost complete, made up the bulk of the material from this level. All the bricks contained straw and are of two sizes. The smaller bricks measure $8\frac{1}{2}$ by 4 by $2\frac{1}{2}$ inches, while the larger (all fragmentary) originally appear to have been 12 by 18 by 4 inches. The smaller type came from the upper part of the brick fill and the larger examples from the lower portion of this fill. Ash was found in abundance at the depth of 72 inches in this brick layer. The only artifacts recovered other than the bricks were a fragment of yellow porcelain and two square iron bands around rotten wooden beans.

This layer must represent filling of the well pit with the collapsed remains of a building, or more possibly, from an oven or fireplace from the original fort, as many of the bricks are burned, often

only on one end. The ashes found in the brick material do not appear to explain the burning of the bricks in the well. There is a possibility that the bricks were thrown into the pit from the nearby brewery building, the burned bricks being from the fire boxes of the stills.

Layer 4 (136" to 222"): Dark, loose soil, somewhat clay-like in consistency, was found during the auger test. The upper 12 inches tested contained bone fragments and a wooden shake. Near the lower portion of the fill, fragments of burned adobe brick were found. The nature of the fill is difficult to explain, but must represent a mixture of soil from the surface and organic material thrown into the well. This would suggest filling of the pit with materials other than collapsed building debris, since the majority of the fill was not cultural material.

Layer 5 (222" to 246"): The fifth layer was not as distinct from the fourth as were the preceeding strata. The material found in Level 5 was light gray in color and was composed primarily of wood ash. The layer must have derived from wooden debris burned in the well. No artifacts were found in this level, and the well could not be tested below this depth (246 inches) due to the auger becoming lodged in tree roots.

Well #3 is not indicated on the Künzel map, or mentioned in historic accounts, as were the two previously partially excavated wells. The time of abandonment of the third well is not as clear. What has been found, however, indicates abandonment sometime in the early 1850's. Several items from Layer 2 compare with specimens found in 1959 (Fea-

inches deep. The pits have straight sides with conical bottoms. There seems to be no definite pattern to the layout of the holes. It is very possible that these are post holes from some structure built by Indians in pre-Sutter time.

TRENCH E

A limited amount of excavation was carried out within the bounds of the present fort walls. The first area tested, designated as Trench E, was excavated for the purpose of locating the junction of the corral and offset wall. Trench E consisted of a 5 by 6 foot unit, placed two feet north of Datum C (southwest corner of the reconstructed store group on the northeast side of the present fort). The excavation was placed between the present wall of the stores and the area excavated in 1959 (Olsen's Area A). The continuation of the corral wall footing was easily picked up in the southwest portion of the excavation (see Figure 9). Where the offset wall should have joined the corral wall, two modern tile drain pipes have been placed (one in the last several years). To add to the confusion, the pipes converge at this point, and are just deep enough to destroy the thin traces of the adobe bricks. There still remains between the two pipes a small trace of the offset wall, extending to the north, but it fades out within a few feet. It seemed useless to continue any further excavation for the offset wall due to the modern disturbance. Unit E is surely the area, though the evidence is obscured, where the two walls converged forming an additional reference point in the alignment of the original fort with the present reconstruction.

From the disturbed deposit above the wall came numerous fragments

of porcelain, square nails, and glass. A small copper object was found with the date 1871 stamped on it. This date suggests that at least some of the trash material was deposited there at this time.

TRENCH F

Trench F consisted of a 3 by 5 and a 3 by 3 foot unit excavated four feet nine inches south and seven feet east of Datum C (see Figure 9). The excavation was placed in the area believed to be where the front wall of the rooms designated "Speicher" and "Bäckerei" were located. Measurements derived from the Künzel map indicate that the front wall of this building was located ten feet south and just east of the junction of the corral wall and offset wall. No trace of the front wall of this structure could be found in the two units excavated. An iron water pipe four inches in diameter ran the length of the two units and has disturbed the deposit in what may possibly have been the wall location. This same pipeline caused damage to several archeological features as noted in 1959, and include cutting through the end of the corral wall, destroying an Indian burial, and cutting through the top of the well. Such a toll by one small pipeline trench shows the necessity of having trained archeologists on hand if any more work of this nature is done. It is possible that additional work could uncover partition walls, or floors, but this would require removing the wide walk that covers much of this area.

A depression 2 by 3 feet in diameter and eight inches deep (Feature 17) was found in the red subsoil at the depth of 21 inches in Trench F. The depression contained several lumps of burned clay and rock which were scattered through a dark soil deposit. The feature is below the

level of Caucasian artifacts and probably originated from the pre-Sutter (i.e., Indian) period. A similar depression, filled with fire fractured rock, was found in 1959 in the area of the Indian cemetery (Olsen, 1961, p.93).

BUILDING MATERIALS

Adobe Brick. The primary building material for the outer walls, corral walls, and building walls was adobe brick. The central building is the only example standing of this adobe construction, though six occurences of adobe wall footing have been exposed archeologically to date. Adobe buildings are mentioned by Bancroft as being in the interior of the fort (Bancroft, 1890). An adobe brick, now on display, said to have come from the central building measures 17 by 11½ by 4 inches and is made of a mixture of tan clay and straw. Archeological examples of bricks from the corral walls, shoemaker shop wall, and the offset wall measure 12 by 18 inches (Plate 3c). Examples from the offset wall and fragments from Well #3, show that their thickness was about four inches. The well examples show the straw ingredient to be a natural grass rather than grain straw. Smaller adobe bricks also were recovered from Well #3, and measure 8½ by 3 3/4 by 2½ inches (average), thus resembling a modern brick in size (Plate 3a). One end of these smaller, as well as some larger bricks from the well are burned. The bricks, especially the smaller ones, may have been in an oven Sutter mentions in his diary (The Society for California Pioneers, 1939).

The adobe bricks are made of several different colored soils. The specimens from the corral walls, kitchen, shoemaker structure as well as some from the well are made from reddish to yellow clay which resembles the red subsoil of the fort knoll. The bricks in the offset wall, and a few samples from the well are of grey to tan colored material, much the same as the top soil of the area. It is not clear which

type of material held up best, but the reddish clay bricks are the more easily identified archeologically while the darker ones blend with the dark soil and are very difficult to detect.

Briefly, the brick patterns recorded archeologically to date are as follows: Bricks were placed end to end to form an 18 inch wide wall in two of the inner buildings (shoemaker's shop and kitchen). The south corral walls and outer wall were formed by placing a double row of bricks, one row short axis parallel (side by side) and the other row long axis parallel (end to end), making a 30 inch wide wall (Figure 4). The west corral wall was formed by placing two rows of bricks, in which both rows have the long axis parallel forming a wall 36 inches wide. The mortar appears in all cases to be made from the local surface soil and is dark in nature and not distinguishable from the matrix in which the walls were found. The only exception to this was in the mortar of the offset wall where a few of the mortar lines contained a lighter colored material of a yellowish hue.

Fired Bricks. During the excavations a number of red fired bricks were recovered. The majority of these were of a dark red, fine grained type, used during reconstruction activities at the fort.

Bricks of an orange color, with a granular texture (Plate 3b), were recovered in the excavation of the shoemaker's shop floor in 1959 as well as from the fill in Well #2. These bricks compare closely with a brick at the State Library which was made at Zin's Brickyard, Sutterville, in 1847. Sutter, in 1847, obtained brick from Zin's for use at the fort (The Society for California Pioneers, 1939). Fired brick was

also used at the repair of the Central Building in the early 1850's (Themis).

Roofing. Tule thatch was used in the earlier period of the fort and was replaced when shakes were available (Hall, n.d.). Sugar pine shingles are mentioned in Themis (1889-1893) as having been used. The only archeological evidence of roofing material is that of a possible shake recovered in Well #3. This specimen measures approximately 19 inches long and three and a half inches wide. It is now in a very poor state of preservation, but appears to be made of cedar (Plate 3d).

Lumber. Lumber used, as mentioned in early accounts of the fort, was local oak, cottonwood, pine and cedar from the mountains and redwood from north of San Francisco. Bancroft mentions buildings in the fort of wood which were from Fort Ross (Bancroft, 1890). The only archeological evidence of lumber is in the form of post molds and rotten wood found in various features. Post molds in the floor area (Feature 8) suggest upright beams measuring 6 by 6, $8\frac{1}{2}$ by $8\frac{1}{2}$, and 14 by 14 inches. The timbers used in the central building (are, or were) 5 by $7\frac{1}{2}$ inches and 15 feet long. Two small 4 by 4 inch posts of what appear to be redwood were found at two corners of the refuse pit in the 1959 excavation (Olsen, 1961, p.31). Redwood sills, found in 1957 by Gebhardt, near Well #1, measure 2 by 6 inches and 3 by 3 inches (Gebhardt, n.d., 2, p.7).

Nails. Square iron nails occurred in nearly all excavated areas and were especially abundant in a refuse pit found in 1959 (Feature 20) (Olsen, 1961, pp.30-31). The nails range from one inch to six inches or more in length and appear, for the most part, to be machine made.

Two hand wrought nails were recovered from Feature 8, however (Plate 3s). Square nails were found in the sill noted by Gebhardt from Well #1 (Febhardt, n.d., 2, p.7) and in a wooden box lid on the shoemaker's floor in 1959 (Olsen, 1961, p.52). Square, copper, or brass nails also were recovered from Feature 8 and in Well #3 (Plate 3t). Eight and ten penny nails, shingling and flooring nails are among hardware on an order list made by Sutter (Sutter's Fort State Historical Monument Files).

Other Hardware. Various items such as a large door lock, several large hinge hangers, an iron stake holder for a door bolt, and two padlocks have been recovered to date. The door bolt fixture (stake holder), which coincides with a 6 by $1\frac{1}{2}$ inch wooden side bolt, and one of the padlocks is pictured in Plate 3g and h. Door locks and padlocks also were on Sutter's hardware list mentioned above. Window glass has been found in abundance in various locations during excavation. The glass is thin and uneven with occasional bubbles, but is not to be classed as crude or poor quality. The glass has been found in association with materials discarded during the 1850's, but it is not certain if this was the type used in the original fort.

SUMMARY OF ARCHEOLOGICAL INVESTIGATIONS, 1955-1960

The first archeological excavation was started at Sutter's Fort in 1955 by the Sacramento State College field class in archeology. At this time there were some indications that the original size of the fort was larger than the present reconstruction. Studies of land deeds and land maps by Mr. Hero Eugene Rensch demonstrated that the fort was wider and extended farther to the east than at present. The Sacramento State College excavations primarily were in areas outside the present fort walls (Figure 10). Very little evidence of the original fort came to light at this time, other than a possible floor surface near the present northwest bastion, and a trash-filled depression east of the present fort. The latter may be evidence of the ditch shown extending east from the fort on the Künzel map.

The second attempt to locate the remains of the original fort outline was carried out by Mr. Charles L. Gebhardt in 1957. The areas east of the present fort were tested by the excavation of several long trenches. These trenches indicate the area was scraped during landscaping at the time of restoration, thus destroying any possible trace of the original fort structure (Figure 10, Trenches G-B 1957 and G-A 1957). The 1957 excavations also tested a depression in the lawn southwest of the Central Building, which preliminary augering and exploratory excavation strongly suggested was the well noted in an early-day photograph (Gebhardt, n.d., 2).

In 1958 Gebhardt continued excavation of the well (Well #1). This well was found to be 96 inches in diameter and, in part, filled with

debris from the time of restoration. The bottom was not reached by the excavation, but the test augering suggests that it was greater than 112 inches in depth (Gebhardt, n.d., 3, p.10). Excavations along the northwest side of the central building exposed a hard-packed earth floor, thought to be the shoemaker's shop on the basis of its location in the recently discovered Künzel map. Detailed stratigraphic studies of the excavation in this area by Mr. William Campbell also indicate what possibly was the original surface of the ground during the Sutter Period (Campbell, n.d., pp.21-22). Trenches also were placed in the area east of the present fort and, as in the past, no evidence of walls or other features could be isolated due to reconstruction leveling.

The third, and most successful season of excavation was that of the Central California Archeological Foundation under the direction of Mr. William L. Olsen in 1959. The investigations, for the first time, were able to locate traces of adobe walls of the original fort. The wall features found in 1959 include 23 feet of the corral, or courtyard wall, east of the central building and 12 feet of the corral wall north of the central building (site). The west wall, and some additional surface of the shoemaker's shop floor, was also uncovered. A second well was located east of the central building. The well pit was rectangular (3 by 5 feet) with a depth of over 144 inches. This well, not shown on the Künzel map, is mentioned in Themis as a source of drinking water (Themis, 1889-1893).

Other features also were brought to light, including a refuse pit and a number of post holes. A detailed study of the porcelain fragments from the well and refuse pit by Sylvia Broadbent indicate a dating

ture 20) that were in association with porcelain dating from 1851 through 1856. It is most likely that the well was abandoned sometime in the 1850's and filled shortly thereafter. The presence of building materials in the fill also indicate filling was done when the fort fell into ruin. The well not being shown on the Künzel map suggests that it was either over-looked in drawing the map, or more likely not dug as of that time (1847). The location of the well in relation to the brewery and distillery building suggests the possibility of its having been used as a water supply for this establishment. It would not have been unreasonable to have had a well in connection with the building instead of carrying water from the well in the middle of the fort compound.

The second possibility which would explain the well not being on Künzel's map, would be that the well was dug during the Gold Rush by later owners of the building. Additional wells probably would have been necessary to supply the influx of gold seekers who came to the fort in 1849 or 1850.

Feature 4 (Figure 7). A complete articulated pig skeleton was encountered in Unit R40 at a depth of ten inches below the surface. The skeleton was oriented in an east-west direction and was in the area where measurements indicate the west wall of the brewery stood. The animal must date from the period after the fort walls had collapsed and the area was being used as a farm.

Feature 5 (Plate 2e, f; Figure 7). Twenty small pits, apparently post holes, were found in the hardpan surface in Units R40 and R41. The holes range from 4 to 12 inches in diameter and from $4\frac{1}{2}$ to 12

of early to mid-1850's for this material. The finding of a Central California Middle Horizon Indian cemetery has established without a doubt that the site of the fort was a prehistoric Indian habitation and burial site (Olsen, 1961, pp.62-94).

The excavation by the Central California Archeological Foundation described herein marks the fifth season of excavation at Sutter's Fort. The area east of the fort was again tested, with negative results. Here, again leveling at the time of restoration has been the primary factor for the absence of original fort remains. Excavation along the north side of the present fort disclosed traces of the offset wall, and the east wall of Sutter's kitchen. The uncovering of the offset wall marks the first occurrence of an outside wall found so far. A third, and heretofore unknown, well was found just west of where Sutter's brewery and distillery are shown on Künzel's map. A hard-packed floor area of unknown date was found just west of the original offset wall. A number of post molds, or holes, penetrating this floor suggest the possibility of a structure in the corner of the courtyard. The juncture of the offset wall and the southeast corral, or courtyard wall, also was located.

To date, there have been unearthed a number of features that can be assigned to the original fort on the basis of Künzel's map. The features which coincide with the map are as follows: Well #1, Shoemaker's Shop floor area, west wall of Shoemaker's Shop, south and west walls of the Corral, or Courtyard, east wall of the Kitchen, the Offset Wall, and the junction of the Offset Wall and Corral wall. Hard-packed earth floor surfaces found near the northwest bastion may represent the

floor area of the Carpenter Shop room (Figure 10, Trench SSC-C).

Two additional features, through obscure, also have been found which lend support to the proposed alignment of the present fort with Künzel's plan. The first is a small fragment of adobe brick material in the area of the offset wall bastion shown on the Künzel map (Olsen, 1961, pp.39-40). Due to the incompleteness of the feature, it is hard to be certain that this was part of the gun tower, but the recovery here of a small cannon ball or "grape shot" would lend credence to this supposition. The second feature is the possible trace of a ditch, which appeared as a trash filled depression, in Sacramento State College's Trench G. At the time of excavation, the depression was incompletely explored. One cannot, therefore, be sure if this feature represents the one shown on the Künzel map. The location of this feature by the Sacramento State College, and the ditch shown on Künzel's map appear to agree rather well, however. To find the true nature of this feature, however, additional excavation will be necessary.

Several of the walls recovered archeologically during the last two years have been found to be several feet from their indicated location on Künzel's map. This discrepancy probably can be explained by error in measurement, drawing the map, and by the small scale of the published map. The Künzel map shows all the walls of equal thickness, while in reality the walls vary from 18 to 36 inches in thickness. The marked result of this drawing error, or liberty of the draftsmen, is apparent in the way the corral walls join the central building. The south corral wall appears to have joined the building two feet south of the corner of the building instead of at the corner as indicated on the

map (Olsen, 1961, pp.45-46). The west corral, if extended to the central building, would not join at the corner as shown by Künzel. Olsen suggests that modification of the central building may have caused the apparent difference (when the ends of the structure were repaired). This may have been partly the cause, but the fact that this difference occurs in two directions here, as well as in other areas, suggests that the original map has a slight inaccuracy. Further indication of this small difference is shown in the measurement of the shoemaker's shop. The map shows the inside width of the room as ten feet, but the actual measurement is closer to 12 feet. Another point of variation is the relationship of the kitchen structure and shoemaker's shop wing. The two walls line up with each other instead of being staggered, or offset as the map shows them. Well #1, according to Gebhardt, however, occupies the exact location shown on Künzel's map. The error, or difference showing up in the placement of walls is so slight it can be overlooked and the map can be accepted as essentially correct. The variation could, or should be, recognized only where it is apparent in any future restoration. In general, the walls so far found, indicate that the Künzel map is very close to the actual fort's outline. Landscape grading at the time of restoration and placement of fixtures such as pipelines and building foundations have disturbed or removed the deposit thus destroying any possible remaining trace of the walls not recovered to date. The lack of evidence in these areas does not suggest discrepancies in the map, however.

Another point to consider is how the Künzel map and early drawings of the fort agree. A number of drawings and wood cuts showing the fort

just prior to, and during, the Gold Rush are available for study. Description of the various sketches are given by Olsen in his report (Olsen, 1961, pp.15-23). Unfortunately, only a few of the available pictures lack the apparent free interpretation of the artist's subject. The Hutton drawing made in 1849 seems to be the most accurate reproduction of the original appearance of the outer walls and bastions (Plate 1). The plan of the archeologically located walls and buildings, appear to be very close to their original position on the map. In general the various drawings agree as to the general location of buildings and wall outline with the Künzel map. The Hutton drawing, as well as several others, should be used in conjunction with the map in future restoration work.

Several features were found that may have been part of the original fort, but are not shown on the Künzel map. Such finds raise a problem of whether the feature is from the pre-Sutter period, the Sutter period, or the post-Sutter times. Their absence on the map, and lack of historical data, make their placement and interpretation difficult. Features such as Well #2, Well #3, and the floor area in the corral (Feature 8) present such a problem. Well #2 was not shown on the map but is mentioned by Themis as being a source of drinking water. Well #3 was in a location where it could have been used as a water supply for the brewery and may have been, therefore, part of the original fort. The artifactual material from the wells indicates filling probably took place in the 1850's. The post holes in the floor surface suggest that a building, perhaps constructed of wood, stood in the corner of the courtyard or corral. The structure is located where the

offset wall could have formed one of the walls, the post molds suggesting that beams held up the roof. The rectangular refuse pit, designated as Feature 20 in the 1959 excavation, may have had a different function prior to being filled with refuse during the early 1850's. Two small redwood posts, one at each corner, and its relation to the corral wall, would suggest the pit had some other use, possibly as a privy.

The stratigraphic details of the relatively shallow deposit at Sutter's Fort are somewhat complex. The situation is complicated by a vertical change of type, and length of occupation, and use of the site. The knoll had been occupied by Indians prior to Sutter's arrival. In the area mainly north and east of the central building the refuse midden of the Indian period is evident in the profile as being a black, "greasy" soil containing thermal fractured rock ("cooking stones") and fresh water clam shells. The first occupants also made modifications of the underlying sterile materials in several areas in the form of grave pits, and other excavations. The surface of this midden is compacted and is overlain with a stratum of Caucasian refuse. It is believed that the midden surface was the surface during the Sutter Period (Campbell, n.d., pp.21-22). The overlying refuse stratum is lighter in color and can be attributed to the period during and after the gold rush when refuse collected about the area. Gebhardt also found in his excavations a gray silt lens, or stratum over the surface and assigns it to the melting (disintegration) of the adobe walls. The same material was found overlying the shoemaker's shop floor, the floor area in the corner of the corral (Feature 8), and in the artifact stratum of

Well #3. The grading and construction of the present fort is clearly marked in most areas by a lens of mortar, broken red brick and/or broken lumps of disturbed hardpan material. Dark humus soil is found directly over this lens and appears to be material filled here for development of lawns and gardens. The main value of the stratigraphic study is that it has shown a sequence of events in the forming of the refuse deposit in which the original fort's features have been preserved.

An important item for consideration is whether the surface should be lowered to the original level in any future reconstruction of the fort. Filling of the surrounding property near the fort has caused the fort knoll to loose part of its original illusion of height as evident in early drawings. Removal of the upper part of the deposit would cause additional loss of the height as well as causing destruction to unexcavated archeological features that may still remain.

Before any attempt be made to do restoration of the topography of the fort grounds, an accurate contour map should be made. With such a map, it could be determined how much soil was removed or filled in certain areas by comparison with a contour map of the original surface made by Grunsky in 1890. Archeological work has been handicapped in the past by the lack of such a map and would certainly be a must in any future work.

The information now available from archeological investigations at Sutter's Fort has contributed greatly to the growing body of data available for future restoration planning. Though there still is much to be desired, in historical as well as archeological information, the

situation has improved greatly in the past five years. Archeological investigations have by no means answered all the unsolved questions of the historians, nor has the historian answered all the questions now put forth by the archeologist. The data now gathered from drawings, the Künzel map, historical descriptions, and the physical findings in the ground, have provided much of the information needed for a faithful restoration of Captain John Augustus Sutter's fort of "New Helvetia".

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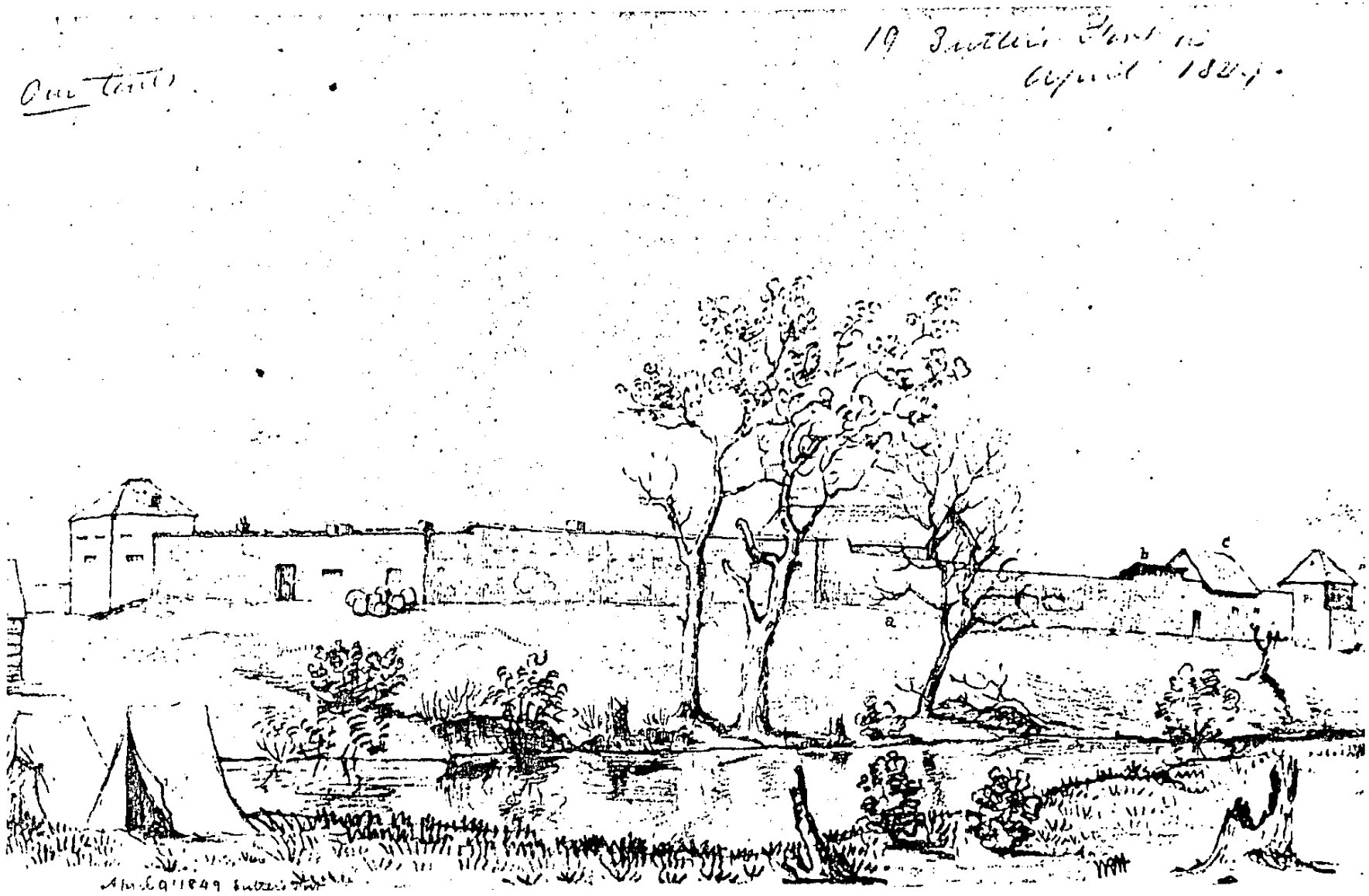
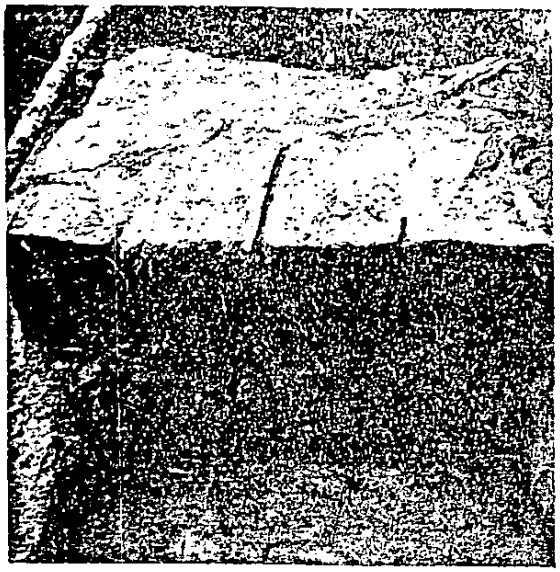


PLATE I



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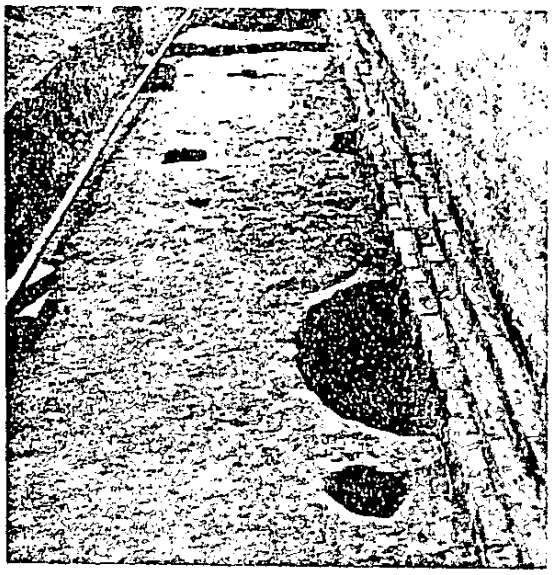

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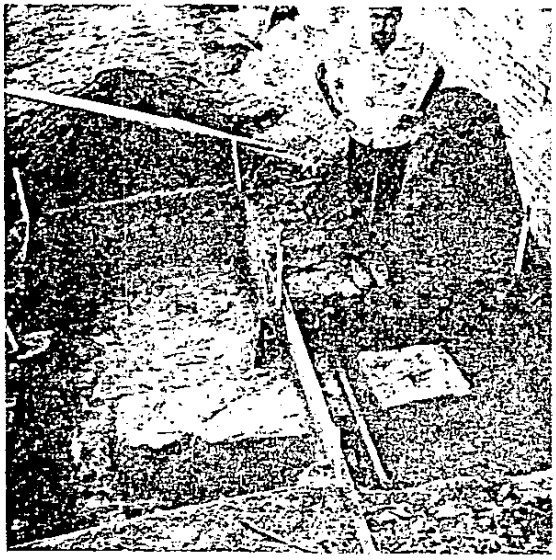

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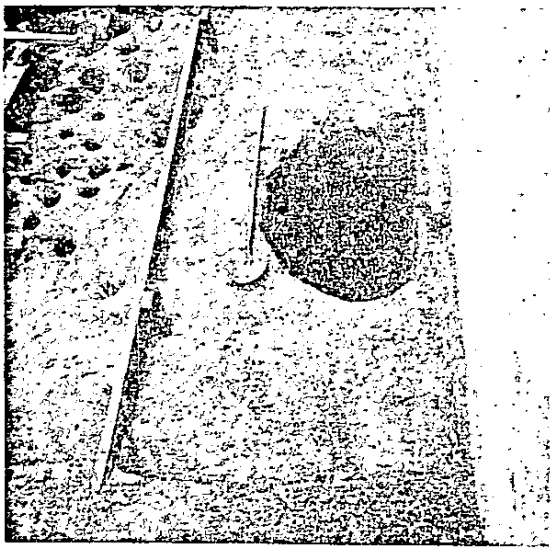

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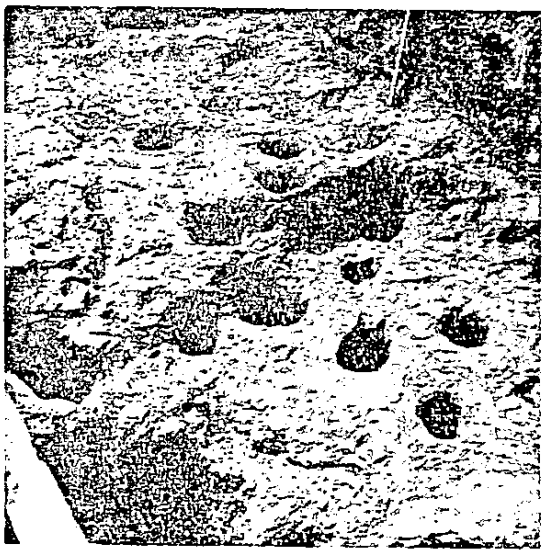

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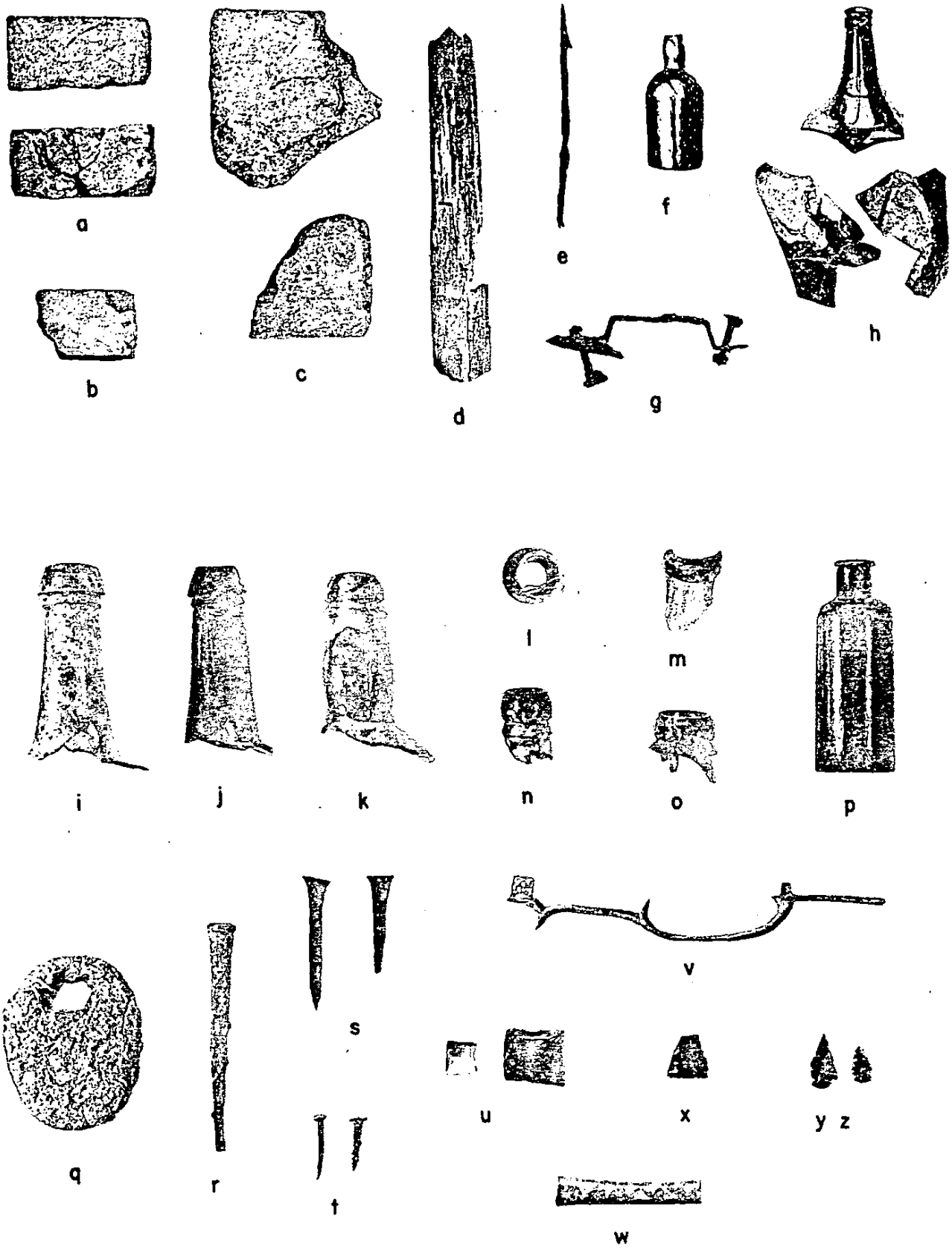
PLATE 2



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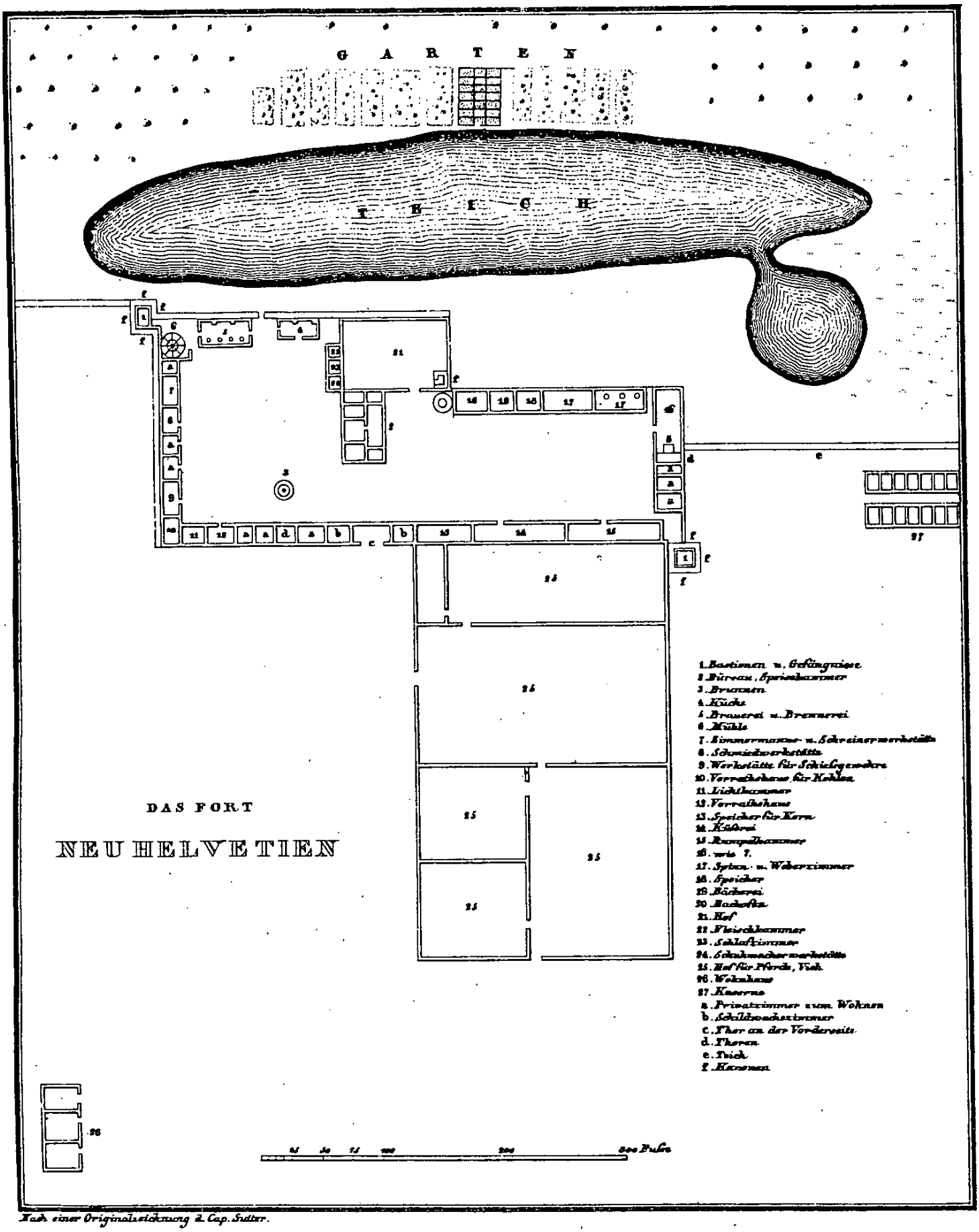
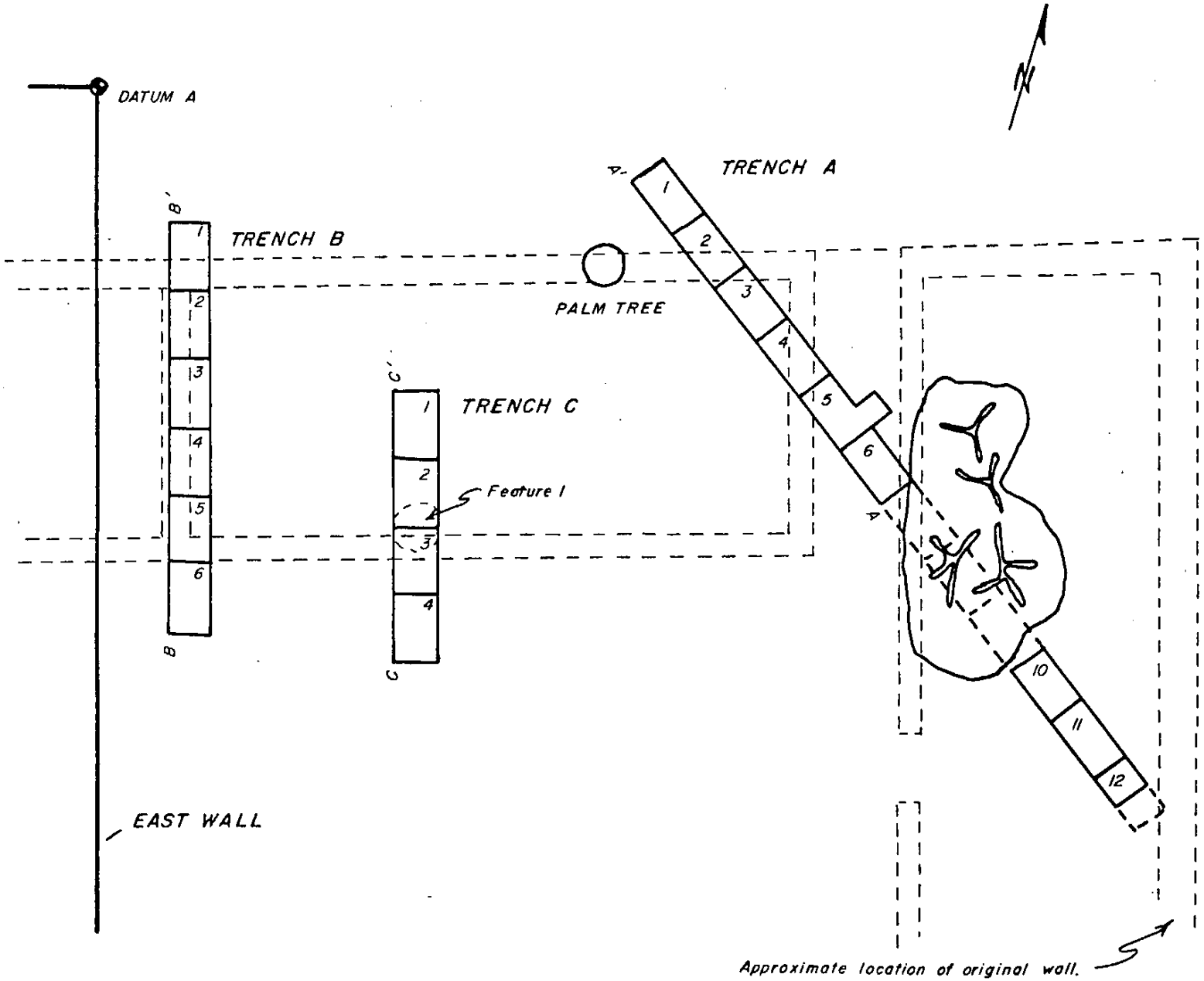


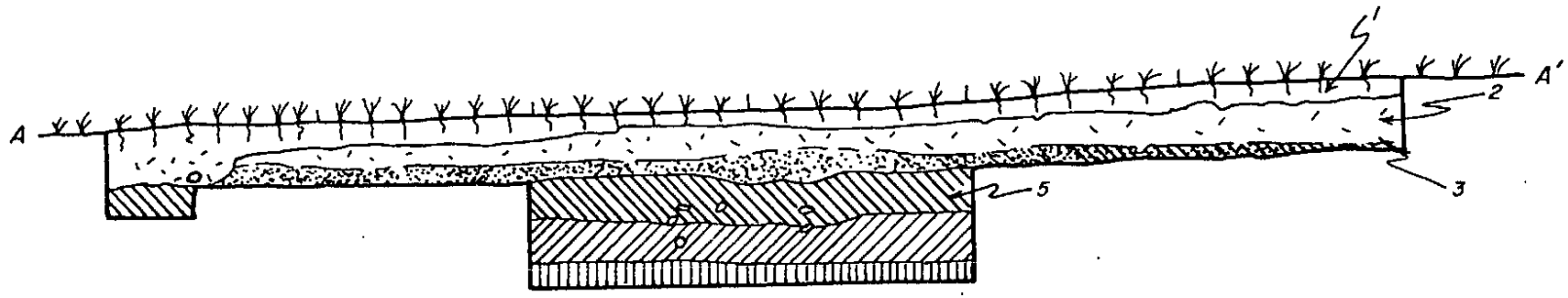
Nach einer Originalzeichnung d. Cap. Sutter.



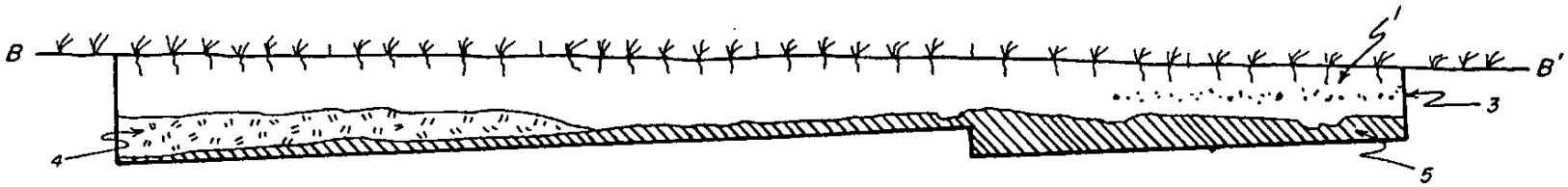
GROUND PLAN OF TRENCHES A, B, & C

SCALE 1" = 10'

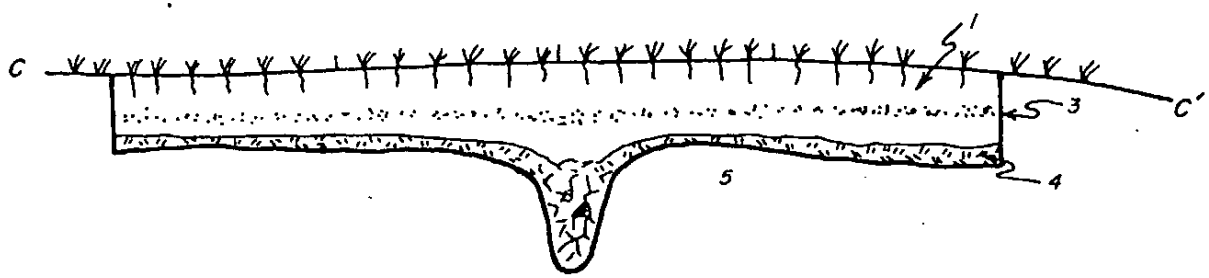
FIGURE 2



TRENCH A (A-A')



TRENCH B (B-B')



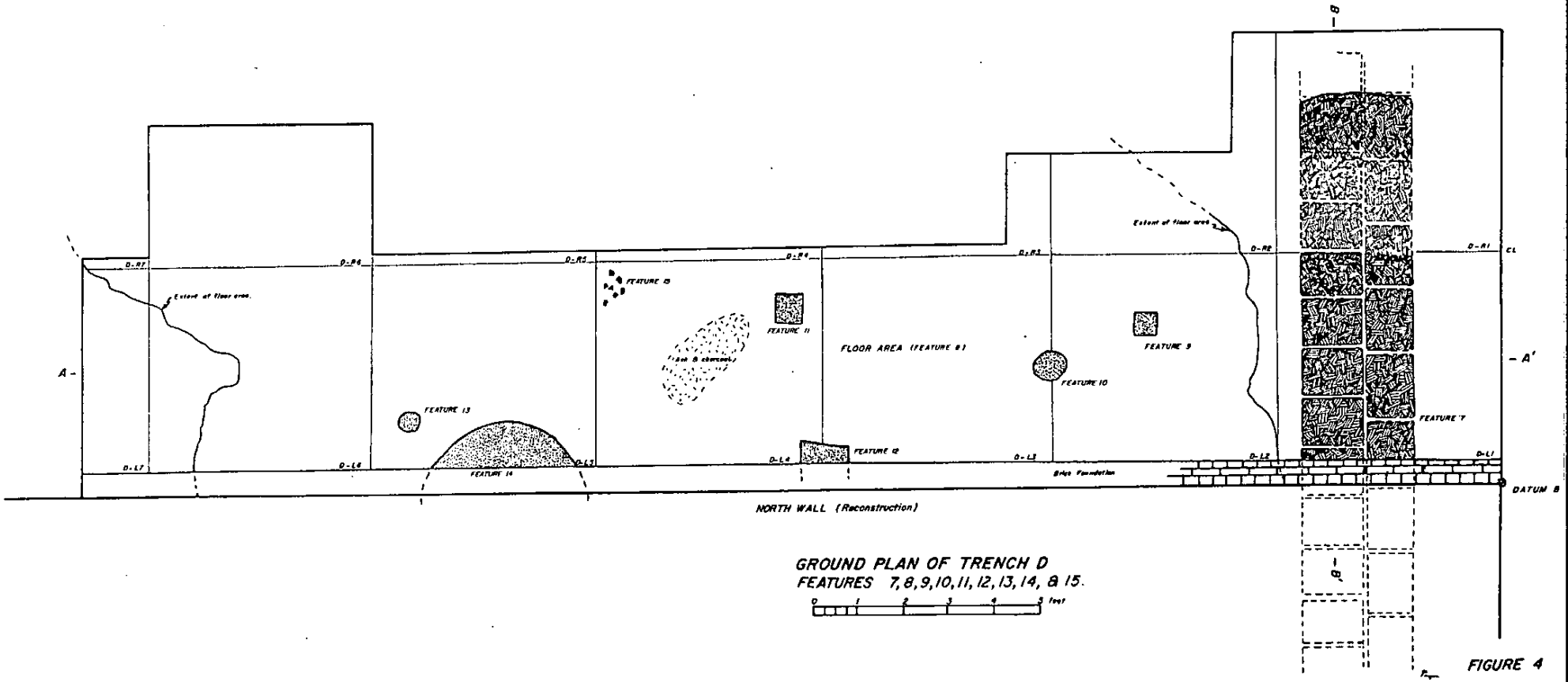
TRENCH C (C-C')

1 DARK SOIL
2 BROWN SOIL
3 HARDPAN LUMPS
4 RED SOIL
5 YELLOW HARDPAN

PROFILES OF TRENCHES A,B,& C

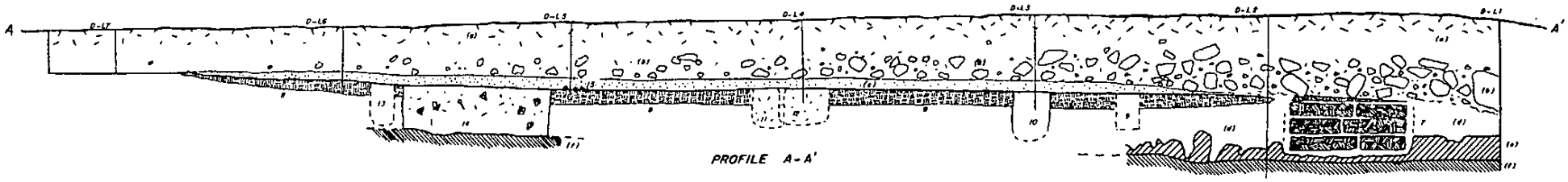
SCALE 1" = 4'

FIGURE 3

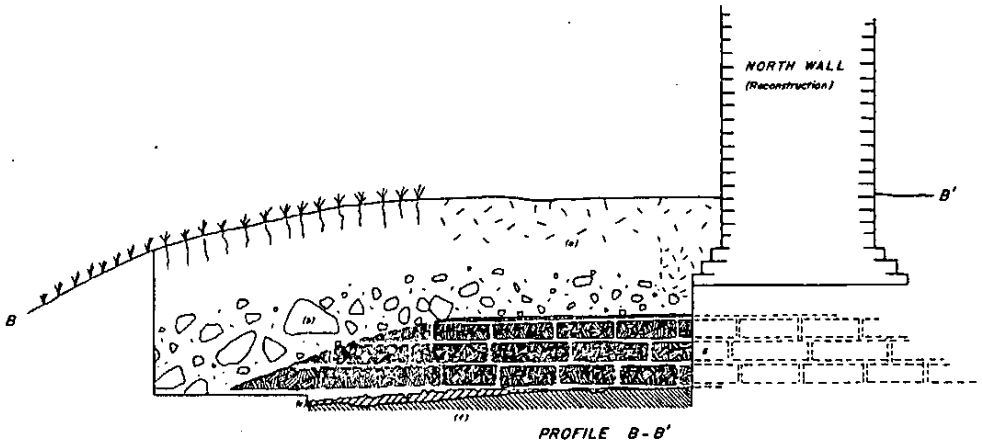


GROUND PLAN OF TRENCH D
FEATURES 7, 8, 9, 10, 11, 12, 13, 14, & 15.

FIGURE 4



PROFILE A-A'



PROFILE B-B'

KEY TO SOIL

(a) Disturbed dark soil.
(b) Hardpan lumps in dark soil.
(c) Silt.
(d) Dark midden.
(e) Yellow clay.
(f) Hardpan.

PROFILES OF TRENCH D

FEATURES 7,8,9,10,11,12,13,14,& 15.

0 1 2 3 4 5 feet

FIGURE 5

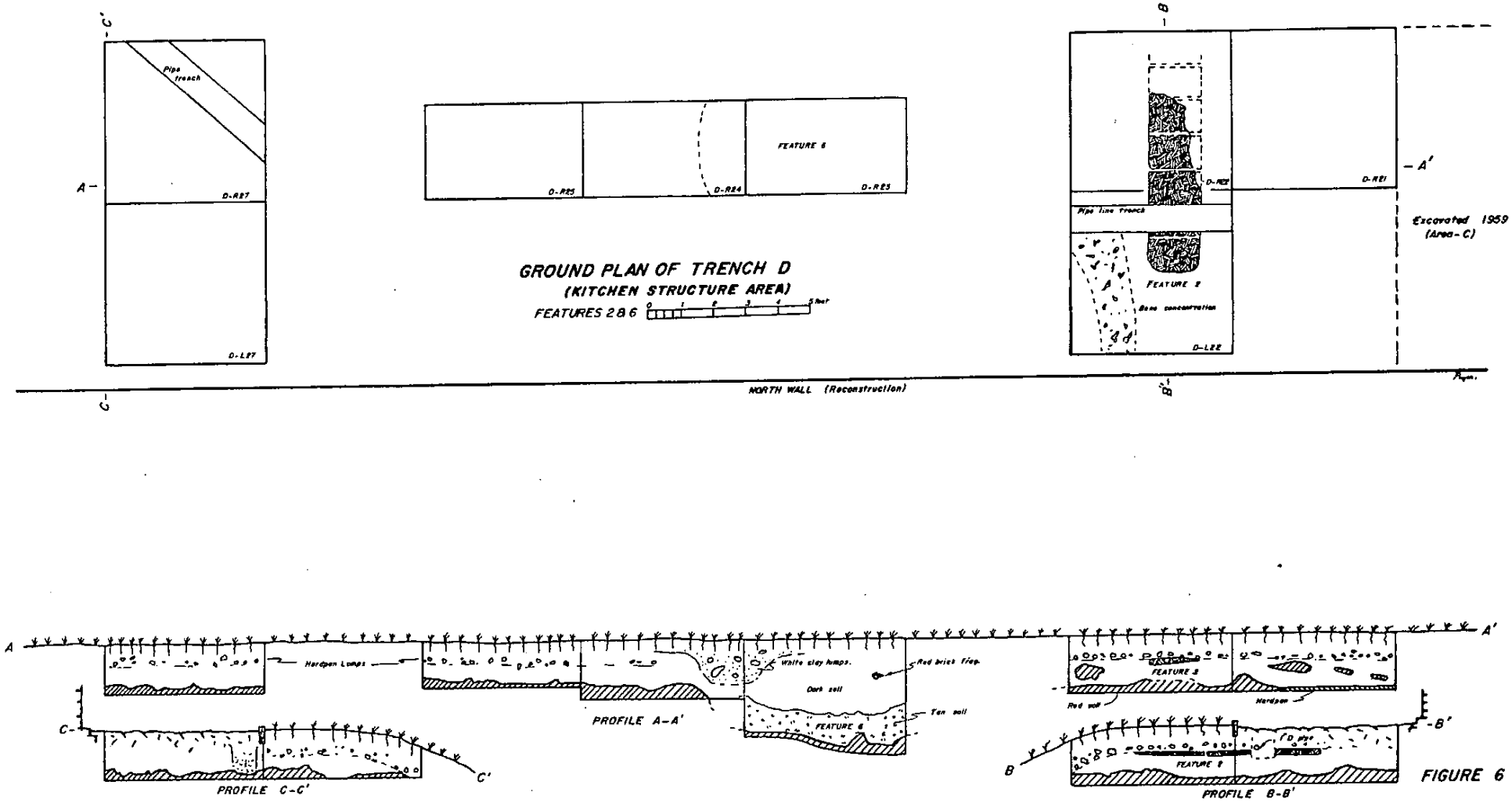
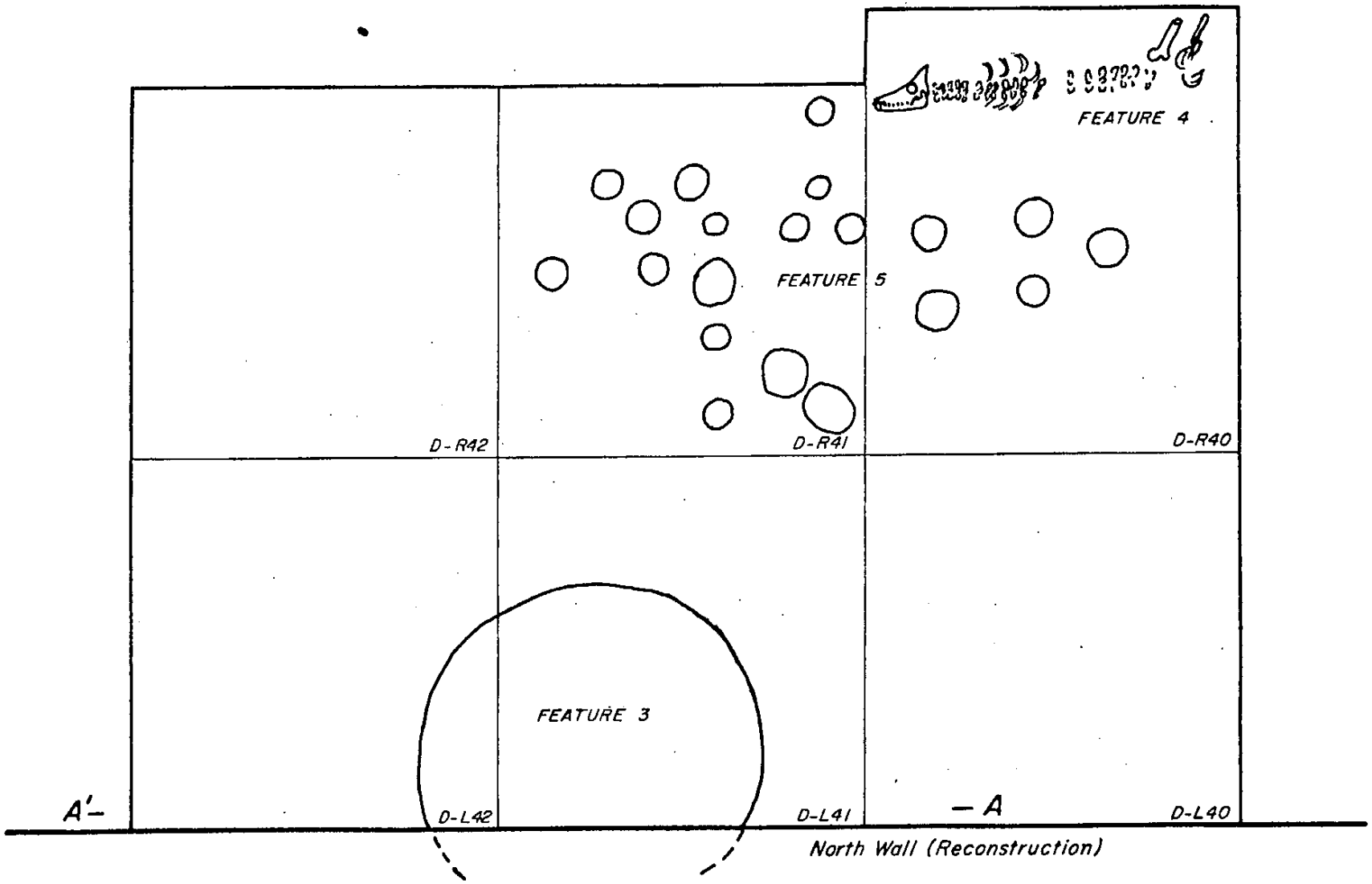

GROUND PLAN OF TRENCH D
(KITCHEN STRUCTURE AREA)
FEATURES 2 & 6
Pipe trench
D-R27
D-L27
D-R25
D-R24
FEATURE 6
D-R23
D-R22
D-R21
Pipe line trench
FEATURE 2
Bone concentration
D-L22
Excavated 1959
(Area-C)
NORTH WALL (Reconstruction)
Hardpan Lumps
White clay humps.
Red brick frag.
Dark soil
Tan soil
FEATURE 6
PROFILE A-A'
PROFILE C-C'
FEATURE 3
Red wall
Hardpan
FEATURE 2
PROFILE B-B'

FIGURE 6



GROUND PLAN OF TRENCH D

FEATURES 3,4,&5 SCALE ½"=1'

FIGURE 7

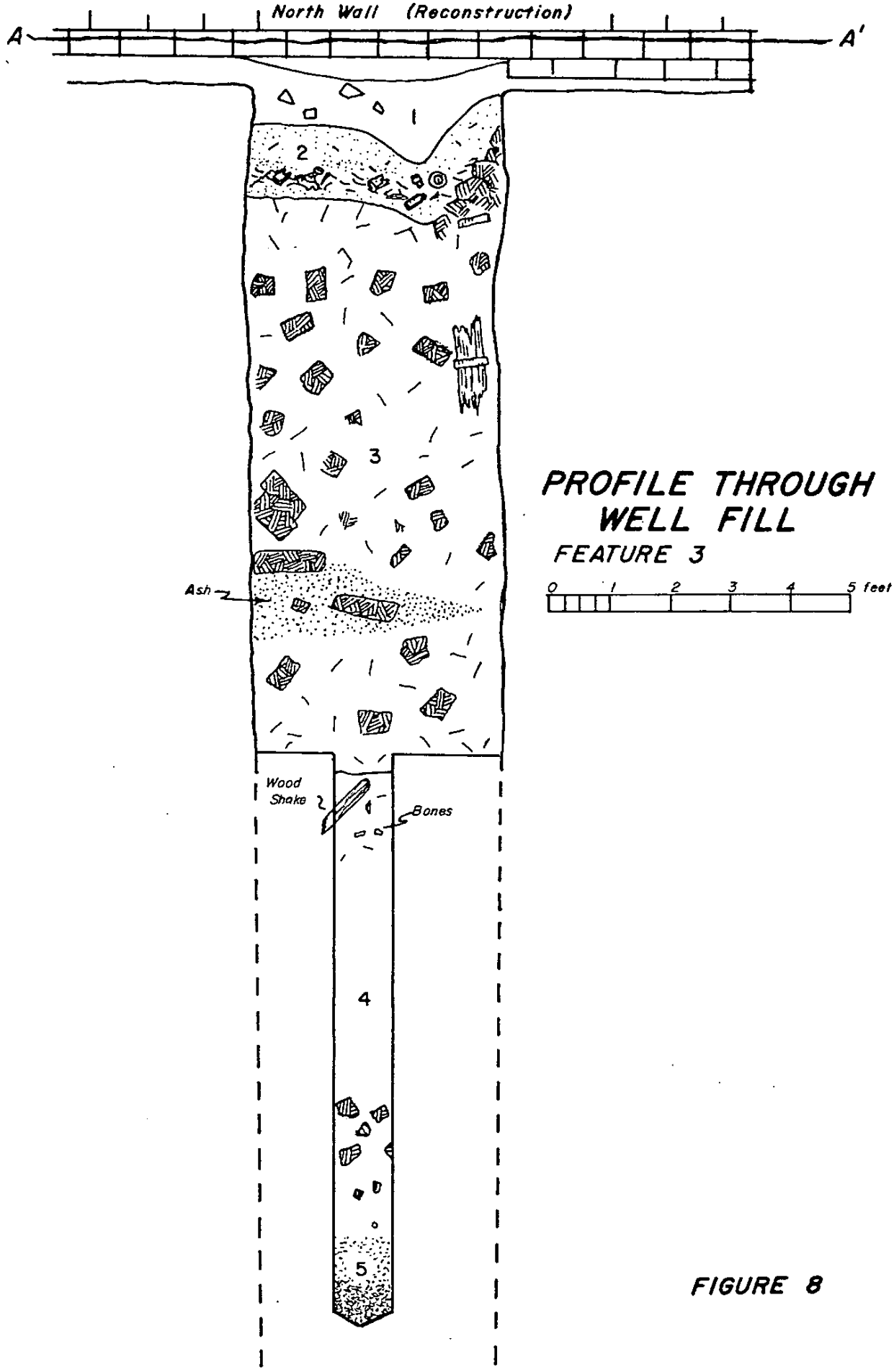
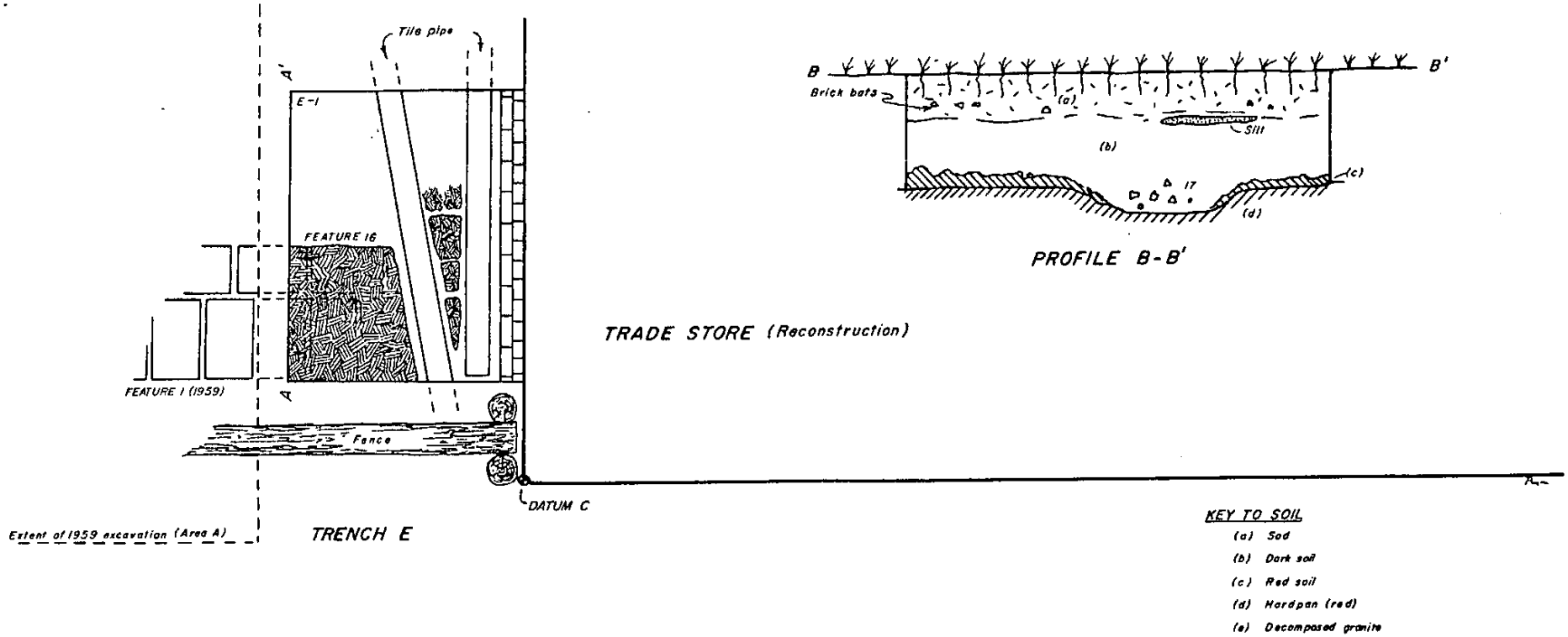
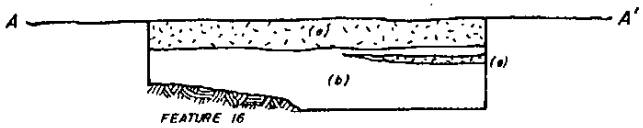

North Wall (Reconstruction)
A
A'
1
2
3
Ash
Wood Shake
Bones
4
5
PROFILE THROUGH WELL FILL
FEATURE 3
0 1 2 3 4 5 feet

FIGURE 8

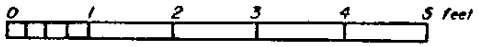




PROFILE A-A'

GROUND PLAN OF TRENCHES E & F

FEATURES 16 & 17



TRENCH F

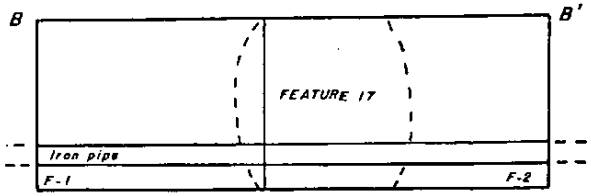
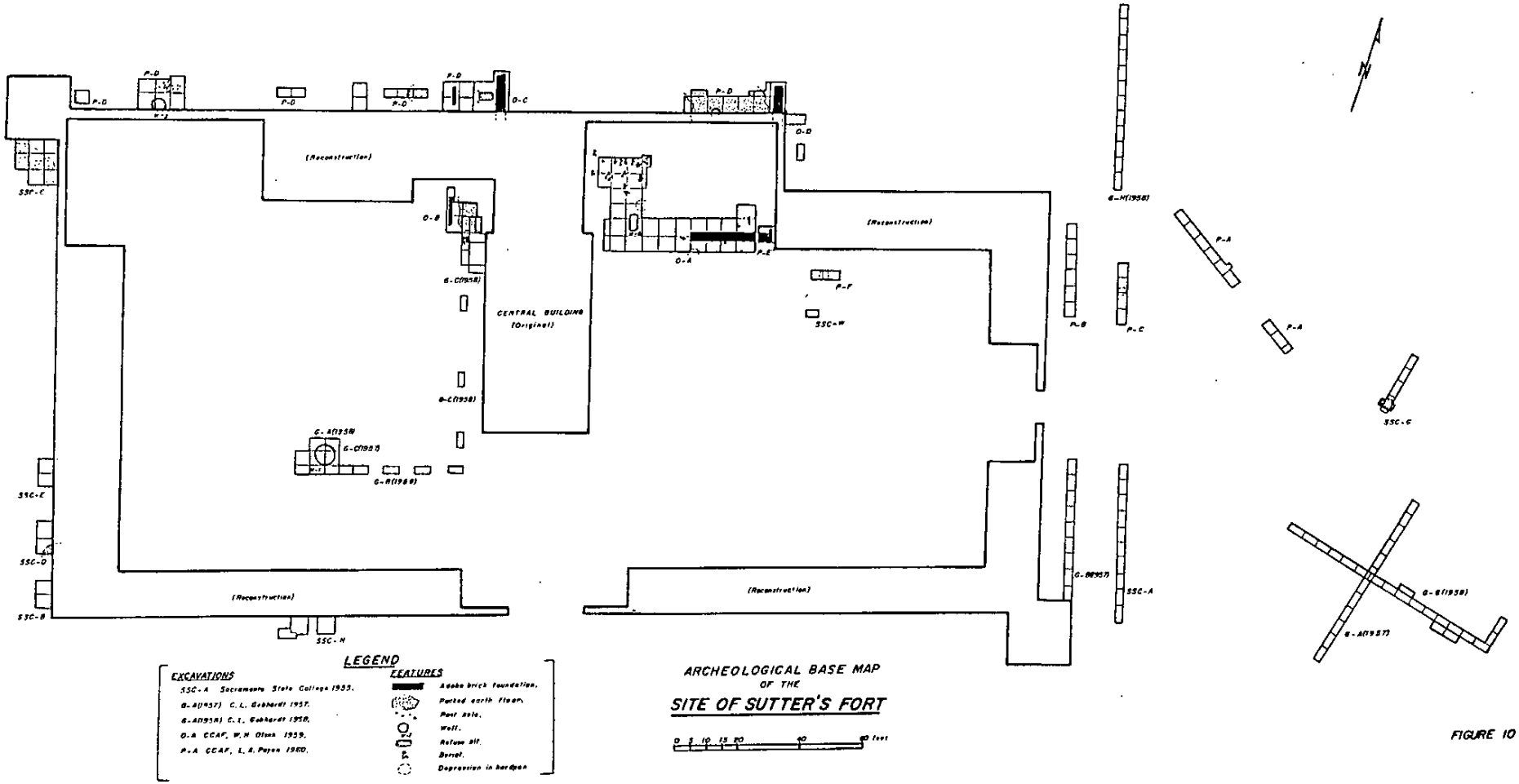


FIGURE 9



ARCHEOLOGICAL BASE MAP
OF THE
SITE OF SUTTER'S FORT

FIGURE 10