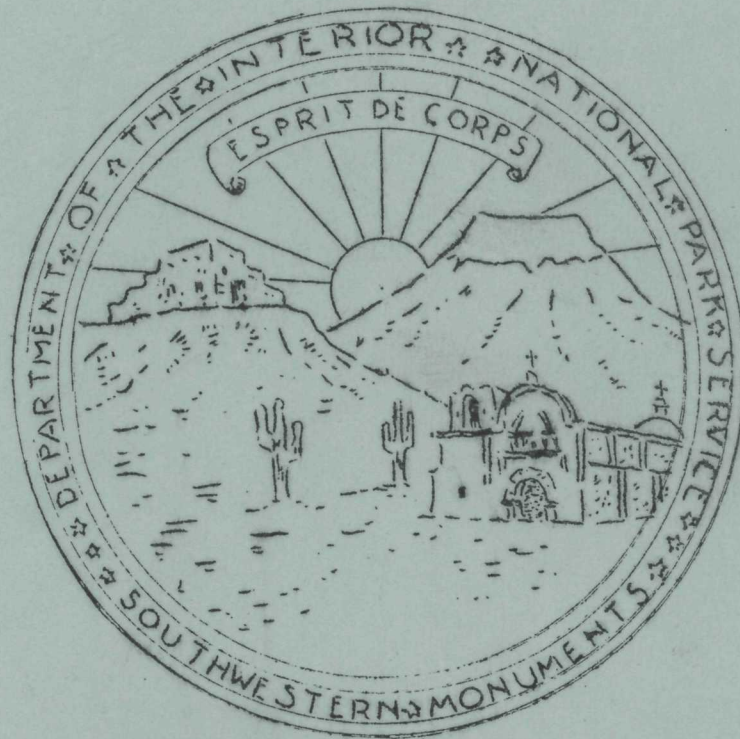


SOUTHWESTERN MONUMENTS

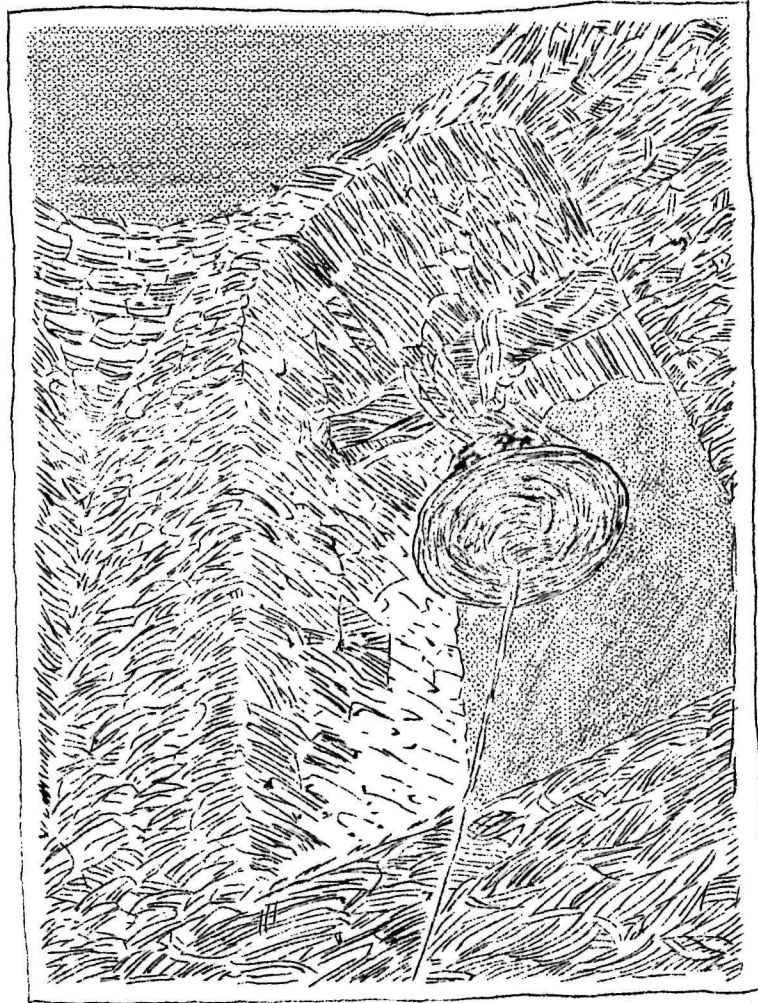
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MARCH

1937



DEPARTMENT OF THE INTERIOR
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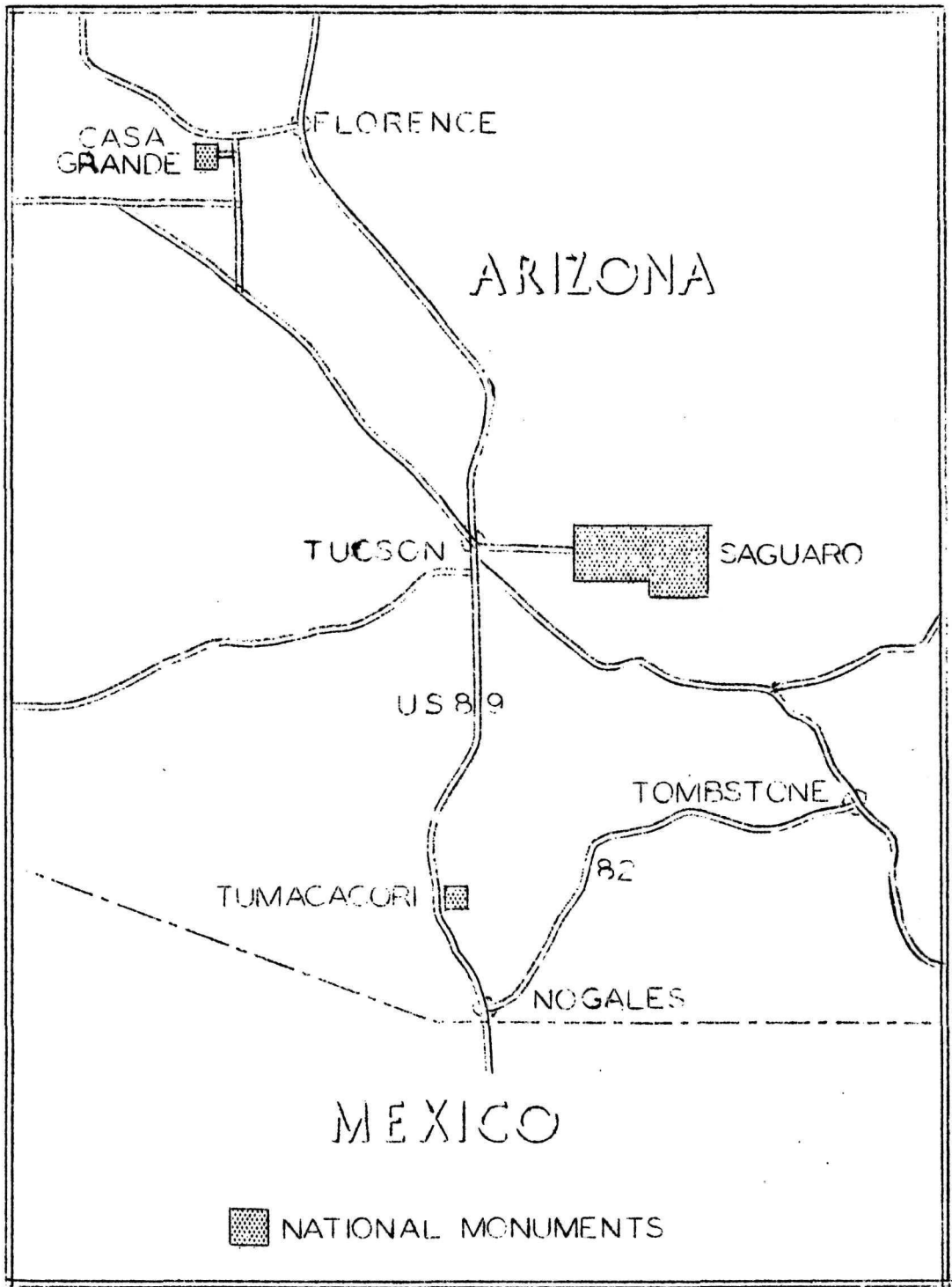
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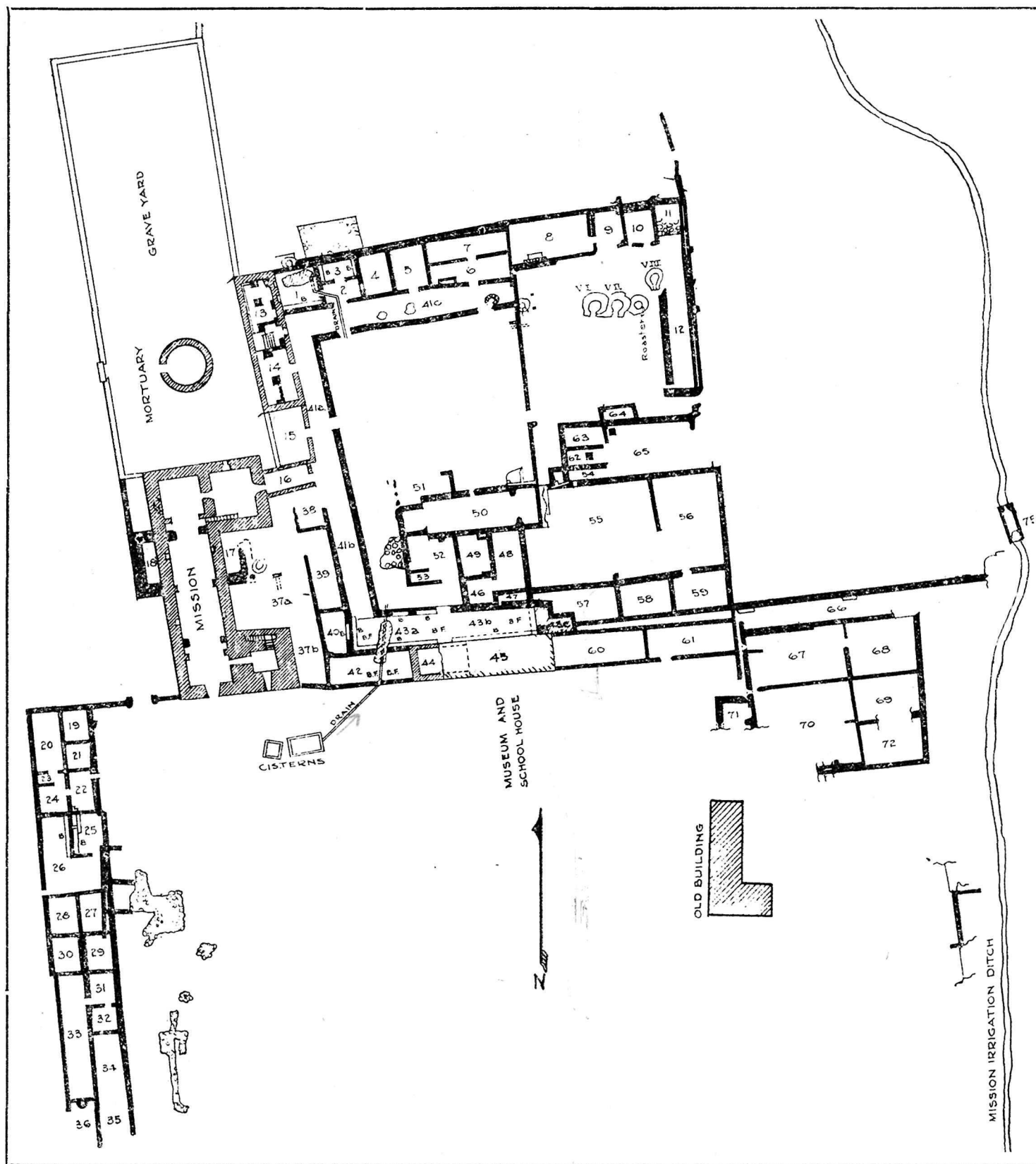
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VICINITY MAP



GROUND PLAN OF
TUMACACORI MISSION

1934

EXCAVATIONS AT TUMACACORI-1934

By Paul Beaubien

(Ed. Note: Father Victor R. Stoner, an authority on the Kino Chain of Missions, has checked this report and made some date corrections. Some of the dates reported by Beaubien in quoting Rensch conflict with those that Father Stoner has found on his research work, and where such conflict occurs Father Stoner's corrections will be shown in parenthesis.)

INTRODUCTION

On December 15, 1934, I arrived at Tumacacori National Monument, Arizona, to take charge of an FERA project instituted to uncover certain ruined buildings adjacent to the present mission. The walls and special features such as benches, furnaces, etc., were to be mapped by National Park Service engineers, after which the soil was to be replaced as found. Such maps would be of significance in the formulation of possible future landscaping or partial restoration plans. Moreover, it was hoped that some of the blurred chapters of Tumacacori's history would become more legible.

Men from the immediate vicinity were detailed to the project by Mr. J. R. Collie, project manager of the welfare board, Santa Cruz County. Mr. Collie cooperated with me to the fullest extent within his power, but due to the varying number of people in need of relief and the unpredictable amount of money available for any definite period, there was great variation in the number of workers reporting for the usual work period of three days. The number of men per shift varied from two to thirty-five, while the days per month varied from one to ten. Altogether 919 man-days were employed in excavation and backfilling before the men were taken from my charge on March 27, 1935.

Several dozen rooms were partially excavated, and the field notes, plus photographs, form the major portion of this report. The maps, produced by the engineers, are the most valuable contribution to the knowledge of the site.

This report has to do only with my work at Tumacacori and no attempt is being made to write the complete story of the mission. However, a brief summary of the known history, gleaned from "Chronology for Tumacacori National Monument" by H. E. Rensch, will be given by way of introduction.

Tumacacori was the place name of a Sobaipuri (a Pima-speaking group) Indian village, situated in the Santa Cruz valley during prehistoric times. The Santa Cruz flows northward near the eastern edge of Pimeria Alta (the land of the Upper Pimas). Broadly speaking, Pimeria Alta was bounded on the north by the Gila River, on the west by the Gulf of California and the Colorado River, on the south by the

REPORT ON TUMACACORI EXCAVATION (CONT.)

Altar River, and on the east by the San Pedro River. Tumacacori entered the pages of history when a delegation of headmen from the Santa Cruz valley intercepted two Jesuit Fathers, Kino and Salvatierra, at Tucubabia and persuaded them to visit their villages, January, 1691. The headmen hoped the Fathers would establish missions among their people.

1691 - The two Fathers visited the Santa Cruz Valley, and the first Christian services to be held in what is now southern Arizona, took place at Tumacacori in January. (There had been missions among the Hopi Indians of northern Arizona from 1629 to 1680. B.A.E. Bull. 30, Vol. I, page 561.)

1695 - A ranch was established at Tumacacori (now San Cayetano de Tumacacori) with the livestock from Caborca where an Indian uprising had resulted in the death of a priest.

1701 - "On the night of April 11th, Kino and Mange slept in the adobe house at Tumacacori, which had been erected for the missionary that the natives were awaiting to come to live among them." (Evidently there was no building of Spanish origin there in the 17th Century). Later in the summer, a newly arrived missionary, Father Juan de San Martin, took charge of Tumacacori, Guebavi and Bacoancos. A house and a church were erected at Guebavi (the central rancheria), and the two visitas, Tumacacori and Bacoancos, received periodic visits from the Father. A building was begun at Tumacacori.

1702 - Father San Martin departed, and that part of Pimeria Alta now known as Arizona was without a resident missionary for thirty years.

1732 - Another missionary arrived to take charge of Guebavi and its visitas, but died within a year.

1736 to 1767 - In 1736 (Bancroft says 1737, Arizona and New Mexico, Page 12 - V.R.S.), a very rich silver mine, Bolas de Plata, was discovered to the southwest of Tumacacori and many miners, followed by settlers, entered that part of Pimeria Alta. One record suggests that some seventy Spanish settlements were established during the next decade. By 1750, another priest was at Guebavi. Then, except for short periods during Indian trouble, there seems to have been a resident priest at Guebavi who made periodic trips to Tumacacori, until the Spanish monarch ordered all Jesuits from his possessions in 1767.

(From the Jesuit records reported by Rensch, there was never a resident priest at Tumacacori. The only mention of a Spanish building was that one was begun in 1701, just one year before the abandonment of all Arizona missions for thirty years.) (Not true; Kino did not die until 1711. This was during his busiest time. V.R.S.)

1768 to 1784 - After the expulsion of the Jesuits there was a short

REPORT ON TUMACACORI EXCAVATIONS (CONT.)

period of neglect*, but thirteen Franciscan Fathers arrived in Pimeria Alta, 1768. One took charge of Guebavi and its visitas, including San Jose de Tumacacori. (With the advent of the Franciscans, San Cayetano de Tumacacori became San Jose de Tumacacori.) (* Not true; Franciscans came as Jesuits left.V.R.S.)

The early years of the Franciscans were years of trouble with the Apaches to the north, and the Seris to the west. One record states the Church was burned at Tumacacori in 1769. (Probably there had been a Jesuit church there.)

1784 to 1822 - "By 1784, the Indians seemed largely to have abandoned Guebavi, the prey of so many Apache attacks. The mission was moved to Tumacacori." (The period of Tumacacori's real importance dates from 1784.)

Eventually, the Apaches were checked and most of the missions began to flourish. One historian calls the period from 1785 to 1815 the golden period of missions and settlement in Pimeria Alta. "Certainly the Apaches were kept in better control than the period before or after. Settlement was encouraged. Commerce thrived and mining revived. It seems that most of the extant missions date from this period."

1821 and 1822 - Mexico was declared a republic, and Spain withdrew all financial support to the missions. One record states that Tumacacori was burned by the Apaches at this time, and no attempt was made to rehabilitate it.

1827 - The last of the Spanish missionaries left Arizona (from San Xavier). After the departure of the Fathers there were always a few natives in the vicinity. And soon the history of Tumacacori is reported by American travelers.

1849 - Thousands of gold seekers passed by Tumacacori, and a few have left diaries mentioning the site. From 1851 to 1855, the United States Boundary Commission visited the region and described Tubac, Tumacacori, etc., in their reports.

1852 - A French colony from San Francisco settled in the Santa Cruz valley.

1856 - There were more than 500 inhabitants (largely Mexicans) at Tubac, brought there because of revived mining activities. There were 150 silver mines within a radius of 25 miles.

1857 - Emory reports a small settlement of Germans at Tumacacori.

1861 - With the outbreak of the Civil War the Army abandoned Arizona and the Apaches were free to go on the rampage. Tubac and the various

REPORT ON TUMACACORI EXCAVATIONS (CONT.)

American ranches along the Santa Cruz were abandoned for the most part.

1862 and 1863 - The California Volunteers arrived and brought about a semblance of order.

The above outline was abstracted from Mr. Rensch's paper. Of course there have been many changes since 1864. Native families have occupied some of the buildings up to, and after, the time the mission was set aside as a national monument. Papago Indians consider it sacred ground and have buried their dead there within recent years. A few individuals have restored portions of the ruins. Others, believing the Jesuits left buried treasure, have vandalized the place. Every room excavated exhibited the results of vicious pot-hunting.

Some of the destruction was of recent origin. Not once, but time after time, tin cans with labels unrotted, celluloid combs, and other modern artifacts were found in the deepest part of the excavation. And if any artifacts were found in undisturbed soil, I was not aware of it. In fact, only a few objects of material culture interesting enough to be placed in a museum were found and because of the disturbed condition of the soil, none could be used to classify a room as to use, or suggest a period of occupation. This absence of worth while artifacts is another testimonial of the thoroughness of the pot-hunter.

In addition to rumors of buried treasure another cause of vandalism was the amount of building material available to the surrounding farmers. I was told by the laborers that there were few buildings in the vicinity, constructed before the arrival of a permanent custodian, which did not contain some burned brick from Tumacacori.

METHOD OF EXCAVATION

The outline of work demanded some deviation from principles usually employed in work of this nature. First, the dirt from the excavations was to be replaced as soon as the uncovered structures were surveyed by the engineers. As the engineers could come only irregularly, the disposal of dirt was a major problem. Usually when the dirt piled too high, the scene of activity was shifted to another portion of the ruin. Thus, the excavation for any group of rooms progressed at sporadic intervals, presenting a chaotic appearance to some five thousand visitors.

Because of the visitors' interest, special paths were constructed through the "dig" for their benefit.

Normally, when excavating rooms, a two or three foot trench, width being dependent on depth, was cut along each side of a wall, leaving an "island" of undisturbed soil in the center of each room. This arrangement did not lend itself to the taking of comprehensive photographs but it did lessen the amount of earth to be moved twice. Also, the "island"

REPORT ON TUMACACORI EXCAVATION (CONT.)

of undisturbed soil in the center of each room. This arrangement did not lend itself to the taking of comprehensive photographs but it did lessen the amount of earth to be moved twice. Also, the "island" served as a witness that no cross walls, floor levels, or fallen ceilings were overlooked. In some instances, a room was entirely cleaned when special conditions, such as unusual type of floor, abundance of artifacts, etc., indicated that a complete clearance might prove profitable.

A limiting factor was that no remnant of wall or floor was to be damaged. Thus, the only chance to exploit undisturbed stratification was eliminated. Some floors were pierced by treasure hunting holes but always these floors had already been undermined as far as possible from the hole.

EXCAVATION ABOUT THE PRESENT MISSION

Because the present mission is the central structure from which all others must be located, it seems advisable to begin a description of the excavation there. At the outset, no work inside was contemplated but a series of unforeseen factors developed which led to some investigation. First, the Franciscan Order wished to have the bodies of two priests exhumed from the sancturary for removal to San Xavier; second, walls of Rooms 17 and 18 were encountered outside the mission and, possibly, could have continued under it; and third, rainy days dictated a choice either of working under a roof or sending the men home with wages unearned.

The two fathers to be removed were Fathers Belthazar Carrillo and Narciso Gutierrez. In 1784, Carrillo was in charge at Guebavi, and moved with the mission to Tumacacori. He died in 1795. Gutierrez, who succeeded him, died December 13, 1821. Mr. Frank Pinkley has a copy of a burial record which states the bodies of the two priests were taken from an old church and buried in a new, December 13, 1822.

On December 31, 1934, a party from the headquarters of the Southwestern Monuments, with Father Vincent of San Xavier, arrived to move the bodies again. On their arrival, I sent for one of the FERA laborers, Augustine Cardial, who has witnessed some of the vandalism at the Monument. According to Cardial, a party, headed by the superintendent of a mine in Mexico, had dug a treasure hunting hole, fifteen feet deep, where Carrillo and Gutierrez were said to have been buried. The party had found the bones of two adults. When refilling, all the bones were tossed back into the hole, except one skull kept for a souvenir. Cardial's story was supported by all evidence unearthed.

In Father Vincent's presence, a six-foot hole was dug and no bones were found, but another try was made a few days later. At a depth of seven and a half feet, the jumbled parts of two adult skeletons were found, associated with pieces of plaster, bricks, and other debris typical of treasure hunting holes. I removed the four femurs, three of

REPORT ON TUMACACORI EXCAVATION (CONT.)

which were the only long bones unbroken, the fragments of one skull, and about half the smaller bones. Then having something else to do, I let two laborers remove the other bones. No pieces of coffin or cloth were found. Of course, the treasure hunters would have taken any beads, crucifix, or coffin ornaments.

The bones were darker in color and much more fragile than any others found in the church. Also large mastoidian processes on the one skull indicated it was a male. I sincerely believe they were the bones of the two Fathers thrown back in a treasure hunting hole.

The bones were reburied at San Xavier, February, 1935.

ROOM 18

Inside dimensions: 18' 9" long, 5' 6" wide at north end, and 5' 9" wide at south end. Average width of wall: 5' 11". Had been coated, both inside and out, with a thick layer of lime plaster in which were imbedded handfuls of red crushed brick at irregular intervals. The horizontal intervals varied in the bottom row from 8" to 3', but 1' 3" was common. Two, three, and sometimes four horizontal rows of spots were still visible.

However, enough was present clearly to distinguish it from the later type to be seen on the mission and graveyard walls. In this latter type, the spots are imbedded at regular intervals closer together, besides being composed of a different colored material. The spots on the later walls are composed of crushed, over-fired bricks, mostly black and brown in color. The addition of darker colors presents more contrast in a white wall.

The top of the south, west and north walls approach the present ground level. No adobe bricks remained in place; the wall or foundation being composed of large river boulders set in adobe mud. This foundation averages five feet in height, and is found under all walls of the mission except the baptistry and two gaps along the nave which were the entrances to Rooms 17 and 18.

No constructed floor was present but the lower edge of plaster inside indicated the approximate level.

The entrance to Room 18 was indicated by two vertical, non-bonded cracks on the inside of the mission, extending about 8' 6" above floor level. The adobe wall between these cracks did not rest on a heavy stone foundation as did the walls on either side. It is impossible to say whether this opening was once surmounted by an adobe arch or by a wooden lintel.

Just north of Room 18 is an enclosure, the west wall of which is marked only by a light foundation from 1' 9" to 2' 0" wide. When first

REPORT ON TUMACACORI EXCAVATION (CONT.)

discovered, I believed this foundation marked where the graveyard wall once extended to Room 18 before Room 18 was abandoned. However, inclusions of broken, burned brick and chunks of lime plaster may indicate more recent construction. Foundations containing such debris, elsewhere on the Monument, seemed to date since abandonment by the Spaniards. The south end of this foundation was butted against the corner of Room 18 after Room 18 had been plastered.

(Note: Frank Pinkley and J. H. Tovrea, in the monthly report of the Southwestern Monuments, August, 1936, page 123, state the following in regard to the foundation of Room 18: "One startling thing about this foundation, which developed on examination, (when excavated at an earlier time by Geo. Boundey) was that there were a few inches of the adobe wall still standing above the rock foundation and these few inches of the adobe wall CARRIED THE ORIGINAL STUCCO PLASTER WITH THE CHARACTERISTIC RED AND BLACK DECORATION SUCH AS THE WHOLE LOWER SECTION OF THE CHURCH ONCE CARRIED." I saw no black decoration, nor were the decorative spots arranged on Room 18 as they are on the mission proper. However, at the time of the later excavation there was no adobe wall present on the five foot stone foundation which served as the lower part of the wall.)

ROOM 17

Almost a counterpart of Room 18, but slightly larger. The north end of the east wall had been destroyed, either by treasure hunters or by the recent repair work to the mission proper, but I believe the south wall of the sacristy was the north wall of this room. The east wall and especially the southeast corner were damaged greatly by metallurgical operations since the room was abandoned.

Here and there a few square inches of plaster hung to the inner surfaces of the south and east walls, but no red spots were seen. Considering the limited amount of plaster remaining, the absence of spots was not surprising even if this room had been plastered in a similar fashion to Room 18.

The entrance to this room was similar to that of Room 18.

NAVE OF MISSION

Found four lime plaster-river boulder structures which may have been altar or pilaster foundations. The northwest one had been disturbed somewhat. The boulders of the northeast one were found loose in the soil with fragments of lime plaster still adhering to their surfaces. The tops of the south pair were flush with the latest constructed floor, and all four had been about two feet in depth.

REPORT ON TUMACACORI EXCAVATION (CONT.)

The purpose of these foundations is unknown, but I do not believe they were fragments of old walls (J. H. Tovrea, Monthly Report of the Southwestern Monuments, January, 1935). No wall foundations set in lime plaster were found at Tumacacori. Also, it would be an unusual coincidence to have similar sections of two walls exhibit missing segments of equal length at the same relative position. Further, the only other wall of approximate width was the south wall of Room 12 more than 200 feet away. Again, the north pair had been disturbed somewhat by treasure hunters, but the south pair were symmetrically rectangular.

A purpose for the south pair (as supports for a choir loft) is logically presented by Frank Pinkley and J. H. Tovrea in the monthly report of the Southwestern Monuments, May, 1936, pages 375 to 379.

A burial of a young girl was found between the restored altar and the southwest foundation. The grave had been lined with burned brick and boulders, presumably from nearby. Two or three of the brick carried lime putty (I use the word putty instead of plaster to denote the absence of sand). One of these bricks exhibited grooved decoration, and may indicate the character of the original surface of the side altars.

An unusual feature, of unsuspected significance at time of finding, was discovered at the northeast corner of nave. Here the foundation projected into the room about eight inches, just below the old floor level. Later it was found that this offset carried from the disturbed boulder-lime plaster structure to the northeast corner of the sanctuary, while in the sacristy, the thick adobe wall overhung the foundation a corresponding distance. Evidently, the adobe wall was laid about eight inches too far east for the foundation.

SANCTUARY

The specialized plaster as on Room 18 was found low down on the west wall, and the west half of the north wall. In the southwest corner, this plaster ran behind the pilaster which supports the west half of the arch between sanctuary and nave. It is certain that this pilaster was erected after the wall had once been plastered. The lower edge of this plaster was 3.3 feet below the latest constructed floor level of the sanctuary, and 0.4 feet below the lower plaster line of Room 18. The latest floor level of the sanctuary was 2.8 feet above the latest floor level of nave.

A semi-cone-shaped lump of lime putty reenforced with brick was found underneath the statue niche of the west wall. The surface bore some red and green paint, and was modeled with a curvilinear design. I believe it to be the ledge which projected from the niche. As it carried a more elaborate design than the ledges of the nave, it was a welcome find. It could be restored to place with dowels and plaster of paris.

In the northeast corner, two pieces of lime putty decoration were

REPORT ON TUMACACORI EXCAVATION. (CONT.)

found. Their surface had been painted brown and then covered with some sort of gilt. Their original part in the decorative scheme can only be guessed.

SACRISTY

Because of many rumors of an underground passage leading from this room, more dirt was moved than was really practical. The north two-fifths was excavated to a depth of ten feet without finding any trace of a tunnel. The top eight or nine feet had been disturbed by treasure hunters but the test hole extended at least a foot into undisturbed gravel. Here again the specialized plaster of Rooms 18 and 19 was found below the present floor level. Only a thin strip remained on the north wall at the old floor line, but there were two red spots of crushed brick in the west half and two to the east.

One of my first theories in regard to this plaster was that the crushed brick was inserted in a first coat of plaster to hold a second layer. I abandoned this theory for several reasons. The nave, sanctuary, and sacristy have had two coats of thick lime plaster and, with large areas of the under coat exposed, there is no crushed brick in evidence. Another point is that the imbedded pieces of brick are troweled smooth with the surface instead of projecting slightly as would be desired were they to serve as structural features. Again, the pieces are arranged in groups instead of being scattered to do the most good as a tie. To my mind the red brick insertions can be classified only as ornamentation -- the forerunner of the later type of brown and black decoration to be seen in the walls of the present mission.

The finding of the same specialized plaster in Room 18, the sanctuary, and the sacristy indicates they were in use at the same time. That Rooms 18 and 17 were plastered seems proof enough that they were completed and in use.

It now seems the present mission has been remodeled; Rooms 17 and 18 abandoned, and the floor of the sanctuary raised 2.8 feet. The plaster behind the pilaster in the sanctuary indicates the present dome was not built at first because the pilaster supports the arch which in turn supports the south side of dome. So the roof was changed also. Perhaps it was raised because the floor below was raised. As no plaster is to be seen behind the pilasters higher on the walls and as none of the specialized plaster is to be found except at floor level, it appears the remodeling took place after a period of neglect when rainy weather had an opportunity to remove it. A long period of neglect with some wall erosion would explain why the upper margins of the entrances to the side rooms are not in evidence, since, here and there, the walls would have to be resurfaced, especially around an opening. It is doubtful that such a thick wall would have been supported by a wooden lintel for a distance of 13', but it is possible. If by any chance the lintel was burned, all

REPORT ON TUMACACORI EXCAVATION (CONT.)

the wall between the door jambs would have to be rebuilt from the ground up.

According to a burial record, Father Gutierrez, who died in (December 13, R.R.S.) 1821, was taken from an old church and reburied in a new one, (Frank Pinkley, Mission of San Jose de Tumacacori, Page 7, (December 13, R.R.S.) 1822. This would allow two years for the completion and subsequent rebuilding of the present mission.

PATIO

Just east of the mission was a patio with the walls of some of the surrounding rooms still above ground. This area was termed a hollow square in 1860 by Prof. W. Wrightson, whose description follows:

"The church is an adobe building plastered with cement and coped with burnt brick..... Adjacent to the church, in the form of a hollow square, were the residences of the priests, containing spacious and airy rooms, with every evidence of comfort and refinement, while surrounding these in the interior, was an arched colonnade, forming a shady walk around the whole inclosure. To the east of this square of sumptuous residences was an oblong building, where the metallurgical operations were carried on. Here are still the remains of furnaces and quantities of slag, attesting the purpose for which this was formerly used; and further still to the east was the garden, including about five acres and surrounded by a cahone wall. The acequia passed through this, and here are the remains of a bathing place and a washing vat. There are also fruit trees and vines still growing..... To the south of the mission building, and fronting the church, was laid out a large plaza, which was surrounded by peon houses, thus forming a respectable village."

To the best of my knowledge, the above is the most accurate of any early description.

ROOMS 13 AND 14

At the northwest corner of the patio are the walls of a one-time two story building. The ground floor was divided into two rooms by a stairway, but there is no evidence of a partition in the upper story. The west wall of this building, which serves in part for the east boundary of the graveyard, is withstanding erosion better than the other walls because of the plaster covering on the west surface.

The floor level of the upper story is well marked by the holes which held the supporting beams. Except for a few large beams near the stairway, whose part in the original structure must be guessed, the beams averaged

REPORT ON TUMACACORI EXCAVATION (CONT.)

6 $\frac{1}{2}$ " in diameter, while varying from 5" to 8". The horizontal distance from center to center of beams averaged 15-9/10". One large beam projecting from south wall along the east side was probably inserted after the building was finished, to give additional support to the east end of the floor beams. The north end of this log is missing.

The stairway was of adobe bricks, with stone capped treads. Some of the large flat stones, 2" to 5" thick and sometimes 3' long, were topped with lime plaster about one inch thick. I believe the whole stairway had once been plastered.

At the foot of the stairway was a small vestibule with a doorway, 4' 3" wide, leading to the patio. Possibly this was the only doorway when the structure was first completed. Laborers on the project said they could remember when two families inhabited this building. Undoubtedly some changes may be attributed to these later occupants. Speaking in general, an inclosure at Tumacacori rarely had more doors than were absolutely necessary. The entrance midway in the east wall of Room 14 was unnecessary until the room was separated from the central doorway by the short length of walls between the two pilasters at the foot of the stairway. This light wall of unplastered adobe bricks exhibits a different character than other walls of building. It is laid on a plaster floor and butts against plastered pilasters. The adobes are lighter in color and, quite noticeably, contain few pebbles. The location of the doorway in question would weaken the wall where the second story beams were supported and apparently there was something heavy to support with nine (one was omitted from the map) pilasters and two heavy pillars on the ground floor.

An old description by Powell, 1849, (recopied from Rensch's "Chronology for Tumacacori National Monument") refers to this building: "...East of the church there was a large square yard, on the west side of which, passing under some solid arches, we came to a flight of steps leading to a granary, etc. It is a very large establishment and the monks and priests had every accommodation to make life comfortable....." As the stairway here was the only flight of steps encountered outside the mission, and the solid arches could refer to a cloister (the arched colonnade of Prof. Wrightson) along the west side of patio, it seems that Powell thought the second story to be a granary. On what characteristics he based his opinion, I do not know. Perhaps, if he had visited the place in 1820, he might have identified it as something else.

The pillar of Room 14 proved interesting. Observing some plaster on one of the inner adobe bricks, I removed the top layer of adobes and decided they had been appropriated from at least three old walls on the Monument. Three types of plaster were represented on inner surfaces of bricks of the top two courses; one type, 3/4 inch thick, which had been applied with a trowel; a thin white wash on another; and a white wash

REPORT ON TUMACACORI EXCAVATION (CONT.)

topped with red stain on a third.

On the floor between this pillar and the pilaster to the south was a streak, 1' 2" wide, of roughened plaster, indicating a former wall. There is no evidence of a wall butting against the pilasters, however. The pilaster at the south end of Room 14 leans to the side several degrees but was plastered the same time as the wall.

An interesting feature of Room 13 was the bench along the east side. The bench was 1' 5" high, 2' 2" wide at south end and 2' 5" wide at north end. On top the bench in front of the north pilaster, was a circular depression, about 3" deep, which would serve very well for holding an olla upright. The bench was in a fair state of preservation with much of the plaster covering intact.

The batter along the west wall of this building was 8" wide at the north end of Room 13, and decreased in width gradually until it disappeared just short of the south wall of Room 14. From the floor it rose vertically 1.2 feet then sloped into wall 2.2 feet above floor level. Where small areas of plaster were missing, the batter was composed of small boulders set in adobe mud. At a few other places on the Monument this sort of construction was resorted to in order to save a wall weathering away at ground level. Whether the inside of this building was ever in need of such repair is doubtful.

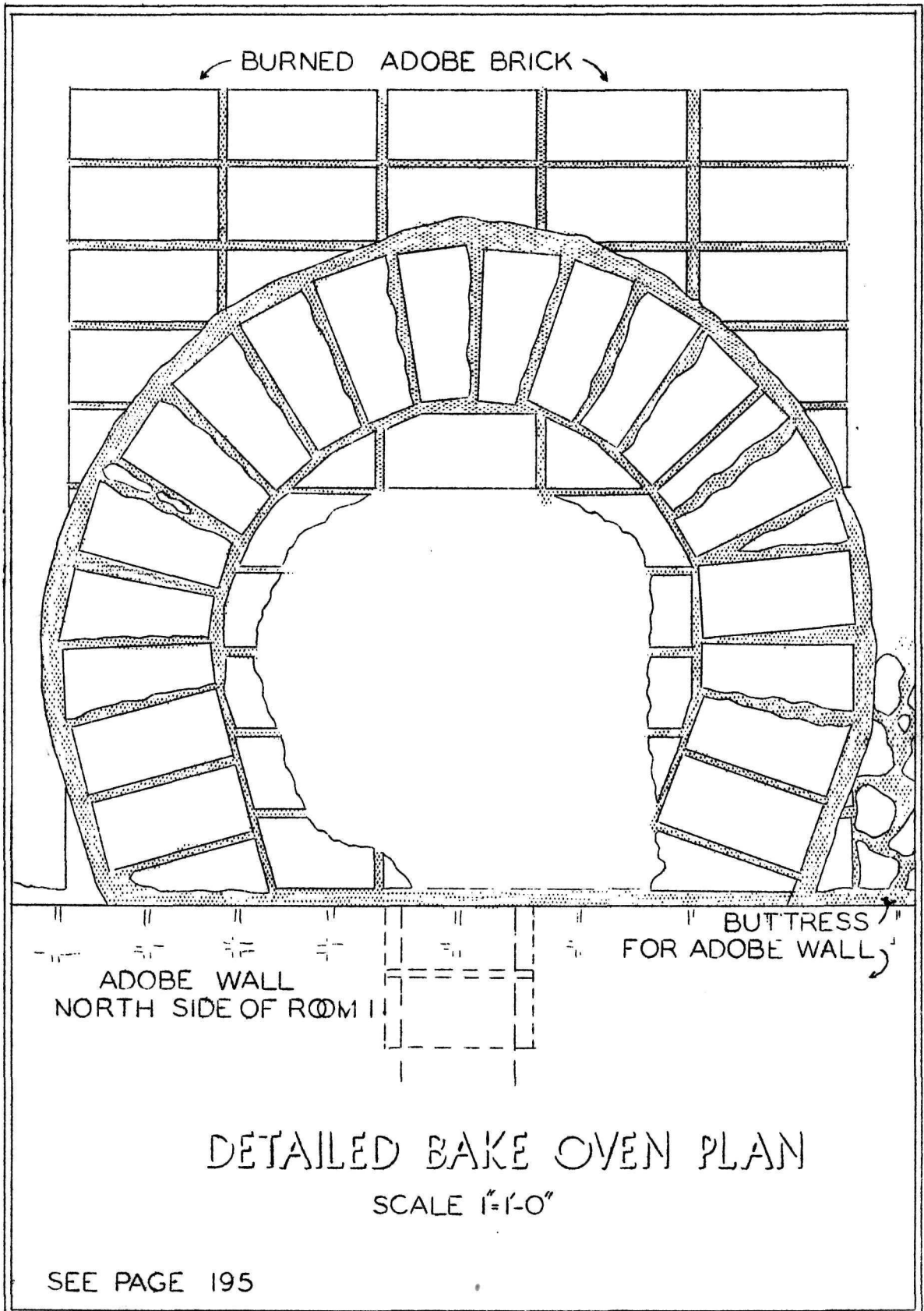
There were two small apertures in the west wall of this building. They were rectangular in shape, and about twice as large inside as out. I do not have their measurements but they could easily be measured now from the graveyard side of wall.

The short length of wall between the two pilasters just north of stairway was indicated only by one course of fired brick lying loosely on the plaster floor. It is doubtful that a true wall was ever there.

A distinctive feature of this building was the character of the adobe brick employed in the walls. They were light gray in color, and contained more small pebbles than any others thought to be of Spanish origin. However, the plaster on the outside of west wall is undoubtedly of Spanish date.

The inside plaster of this building was crudely applied - was much more uneven than any other plaster I found. This suggests that these rooms were replastered since the early quarter of the 19th Century.

The difference of adobe aided in distinguishing the east wall of Room 13 from the west wall of Room 1.



REPORT ON TUMACACORI EXCAVATION (CONT.)

ROOM 1

In the west wall were two recesses; marks at their margins indicated their use as cupboards. Both were 3' square, 1' deep, and 4' 5" above floor level. However, the north one had once reached to floor level, and had been filled in afterward. It is quite probable that the north one was a door and the south one a window before Room 13 was constructed.

In the north wall were two openings lined with fired bricks. The west one led to a bake oven, and was 9" wide and 10" high. I do not know the exact height of this opening above floor level but it was approximately 2' 9". The other opening was $3\frac{1}{2}$ " high, $5\frac{1}{2}$ " wide, 1' 9" above floor level, and 1' 1" west of east wall of room. It extended at a downward angle through the 2' adobe wall, but was blocked by the later 1' 9" boulder wall. Perhaps at one time this opening had been part of a drainage system for waste water.

The east wall was sadly vandalized. Also it had been undermined from the large treasure hunting hole.

Along the south wall had been a bench (bench table) with only an adobe core remaining. A plaster line in floor, 6" in front of core, indicated the original width to have been 1' 9". Three broken brick at west end, but apparently in place, indicated there had been two courses of burned brick on top, giving a height of 2' 3". Along the north wall there was evidence of a bench constructed entirely of burned brick. The remains never exceeded two courses in height but the plaster line above indicated a height of 1' 4", or four courses of brick with the plaster between and on top. The bricks used were $3" \times 12\frac{1}{2}" \times 12\frac{1}{2}"$ (there were no two bricks of the same size at Tumacacori. Whenever a brick size is given in this report, it is the average of several measurements). There was a $3\frac{1}{2}"$ plaster fill back of the bricks, giving 1' 4" as the width of bench.

In the northwest corner of Room 1 was a large quantity of burned brick with lime plaster adhering to their surfaces. A few were smoke-blackened. Their occurrence suggested, at first, the possibility of an inside bake oven destroyed by the treasure hunters.

A large treasure hunting hole had been dug through the floor. In the east portion of room, the floor had been of fire brick, while the west portion of floor was of well laid stone flagging. Both materials had been set in lime plaster. The brick, $2\text{-}3\frac{3}{4}" \times 6" \times 12\frac{1}{2}"$, were laid in a herring-bone pattern as in Rooms 2 and 3. An unusual feature of the room was the plaster lined conduit or drain leading in from the patio, through Room 2. It ended in the treasure hunting hole.

There was little wall plaster present, except on the north wall over bench. The west wall had been plastered in part with adobe mud, sometimes

REPORT ON TUMACACORI EXCAVATION (CONT.)

two inches thick. I believe this wall had been exposed to erosion for a time and then smoothed over with adobe mud before a final application of lime plaster. This would indicate a period of time with roof gone. All lime plaster was approximately $3/4$ inch thick. From the plaster line in floor along the whole length of room in front of south bench it was evident that the present floor had been laid after the bench was plastered.

At the northeast corner of treasure hunting hole, 6" from east wall and 1' 5" from north wall, was what first appeared to be the corner of an underground room. This plastered corner extended downward 1' 9", and terminated where the walls had been undermined from the treasure hunting hole. From the corner, the plaster faces extended about 2' west, and 1' 6" south, before ending in the treasure hunter hole. The north face corresponded rather closely to the front of bench while the east face appeared to be in line with the east edge of conduit. The significance of this structure is lost in the treasure hunting hole. Perhaps the conduit led to a cistern in this corner of the room, and was mistaken for a treasure vault by the treasure hunters. The loose brick in the northwest corner of room could have been from a cistern.

The central portion of this room lying over much of the treasure hunting hole was not excavated.

ROOM 2

The west wall was broken by the doorway to Room 1. A very little plaster on the sides at floor level gave the exact width of door. A large gap in the south wall prevented the exact location of the door which was certainly there. The doorway to Room 4 was closed crudely with courses of different sized burned brick and adobe mud. The thin wall between Rooms 2 and 3 had been vandalized considerably and the exact location of doorway was not ascertained. The floor bricks butted against this partition but the few bricks which would have located the doorway were missing.

The floor of burned brick, laid in a herringbone pattern, was fairly well preserved. However, the pattern was broken by two rows of brick side by side, with bricks laid end to end, which extended from the south doorway to the north doorway. Investigation under this break in pattern (where bricks were already missing) disclosed nothing, and I have no theory about this unusual feature.

A few small holes in floor may indicate storage places for small objects. I found a portion of a small jar in one such hole, while later in Room 7 a large olla was found under the floor. I suspect the storage of small articles in this manner is less typical of the Spaniards than of the natives who occupied these buildings after 1827. The plaster-lined conduit crossing a corner of the room was under one thickness of brick, $2\ 3/4$ ".

REPORT ON TUMACACORI EXCAVATION (CONT.)

ROOM 3

The only interesting features of this room were the two benches (wall tables) and the floor. Some bricks were missing from each but compared to other structures at Tumacacori; they were well preserved. The west bench, with two rows of brick laid end to end along the back wall and a third row in front with brick laid side by side, was slightly wider than the east one. On these brick in a few places was a $\frac{1}{2}$ " layer of white plaster, unlike the red-topped benches of the south side of patio.

North of Room 3 was a solidly built floor of river boulders (stone paved terrace). From east to west this floor was level but the north edge was about 0.8 of a foot lower than the south side. The east and west edges had an abrupt straightedge appearance while the north edge was ragged. The south edge merged with the stone reenforcing wall which protected the north wall of Rooms 1, 3, 4, 5, and 7. Some lime plaster remained on the north face of the boulder reenforcing wall; the lower plaster line being 1' 10" above the boulder floor. Evidently, almost 2' of fill had accumulated over the boulder floor before the wall was plastered. The top of the reenforcing wall sloped downward from the inner wall so I do not believe it ever supported an adobe wall.

ROOM 4

There was no constructed floor present; the floor level given on Plan is that of a hard uneven earth floor on which occurred more or less loose soil. The wall carried quite a bit of plaster, $\frac{3}{4}$ " to 1" thick, but there was no definite lower edge to establish a floor level.

A test pit, about 6' square and 5' below adjacent floor levels, was excavated without finding anything of importance.

The only entrance to Room 4 was the filled-in doorway leading to Room 2. Evidently, Rooms 1, 2, 3, and 4 formed a separate unit in the original structure.

ROOM 5

This room contained more plaster than any other on the north side of patio. The walls carried the usual white plaster, $\frac{3}{4}$ " to 1" thick, while the surface of the plaster floor was rather dark in color. I believe the dark color was due to use instead of stain.

A small cache of lead ore (?) was found under the floor, 1' from west wall and 6' from south wall.

A mortar was found just inside doorway, 10" above floor level.

REPORT ON TUMACACORI EXCAVATION (CONT.)

ROOMS 6 AND 7

Room 6 had been floored with plaster laid over large boulders, but much of the plaster is now gone. Construction here suggests that boulder floors elsewhere were once topped with plaster. A trench around the walls of Room 7 uncovered only a boulder floor but, as suggested above, the room had probably been floored with plaster.

Two holes in the floor of Room 7 were noteworthy. One, with center 1' from south wall and 6' 3" from east wall, contained a large olla. The olla, containing only a few minute fragments of egg shell beside earth, was found upright with mouth about one inch below floor level, had the boulder floor been covered with plaster. Under the floor and almost touching olla, were two other artifacts; a small jar, and a crude candlestick (?) fashioned from a portion of a fired brick.

The other hole, figure-eight-shaped, had contained two wooden posts, side by side. The contents of this hole were so well rotted that the type of wood or the exact size, about 5" and 6", could not be determined. This hole was at base of south wall, 5' 6" east of west wall.

The three light walls of the storage bin were of unplastered adobe bricks laid on the plastered floor, and butted against the plastered south wall of room. I suspect it dates since 1827.

The most perplexing problem in regard to Rooms 6 and 7 concerned the types and amount of plaster in the room fill. Three types were abundant. The top two to four feet of fill were composed of fallen walls carrying the usual room plaster, $3/4$ " to 1" thick. Between these fallen walls and the floor was a layer of loose fill, from 6" to 2' 6" thick, which contained large fragments of two other type plasters. One type was from 3" to $4\frac{1}{2}$ " thick, contained a core of broken brick, and had one polished red surface. This type exactly resembles the remnants of floor to be seen in the mission. Isolated chunks of this plaster had also been found in Rooms 1, 2, 3, 4, and 5. The third type was plain white in color, and varied from $1\frac{3}{4}$ " to 3" in thickness. One side appeared to have been laid on smooth earth while the other surface was very smooth, or, it could be said, polished. Except for the excessive smoothness, this latter type suggested a plaster roof.

The last two types were mixed indiscriminately in the loose fill. Pieces of both were found inside and on top the storage bin. From the top, I removed a section of an island left by trenching around the walls, and nothing developed from which I could form an opinion. Sometimes one type was on top; sometimes the other. Sometimes the smooth surfaces were up; sometimes they were down; and, sometimes they were on edge. In regard to quantity and distribution, I estimated there was about half enough of each type to cover each room, and they were evenly distributed over both rooms.

REPORT ON TUMACACORI EXCAVATION (CONT.)

The red flooring suggested a second story but were that the case, I believe supporting evidence of some sort would have been discovered. If the white type had not been found above the red so often, I could have been sure it was the missing plaster from the boulder floor. I believe now that the broken pieces of red flooring had been introduced after the rooms were abandoned and that the whole fill had been churned by treasure hunters.

Except for the east one, all walls of these rooms were of the double adobe type characteristic of this side of the patio. The bricks measured $2\frac{3}{4}$ " to 3" x $11\frac{1}{2}$ " x 24". The east wall was of the single adobe type, but it may not have always been so. Possibly the adobe bricks of the eastern half have been removed in the last hundred years. The foundation which would have supported this tier of adobes was not noted, but the south wall of Room 8 lacked an even foot of reaching the east wall of Room 6.

No evidence of a door was found in the east wall of Room 6; the gap shown, on Plan, seemed to have resulted from vandalism. However, the extra width of the east end of this room would permit an opening through the east wall in front of Room 8 at the expense of having a curved south wall.

ROOM 15

A special feature of this room was a floor of burned brick, $1\frac{1}{2}$ " to 2" x $10\frac{1}{2}$ " x $10\frac{1}{2}$ ". The bricks were laid checkerboard fashion instead of the herringbone manner so common about the patio. Much of the floor had been destroyed by vandals, but several courses were uncovered along the west wall near the north end. Between the two western courses was a row of spalls. Evidently the floor had been laid from the east and when the last row of bricks did not fill the final space, some small pieces of brick were used to bring the last row against the west wall.

The plaster of this room was unusual also. A white wash had been applied to the walls on the south, east and north. On the west wall a thin layer of ash colored plaster had been troweled before a final application of white wash; while in the doorway on both sides was found the white wash topped with red stain, which is believed to be associated with the oldest buildings on the Monument. The plaster on the west wall, unlike any other on Monument but akin to the plaster of Room 38, may be seen where this wall extends through the north wall of Room 16.

The north end of the east wall butts against the corner of Room 14, and the upper part of the west wall has been restored by Mr. Frank Pinkley.

The artifacts of this room consisted principally of tin cans.

REPORT ON TUMACACORI EXCAVATION (CONT.)

ROOM 16

The walls of this room are still standing several feet above ground level. Probably, much of them are recent. Local people speak of Room 16 as Pedro Calistro's room. Calistro, an Opata Indian who died recently, was known as the "Keeper of the Mission" and lived nearby for many years. (See article "Indian Holy Week at Tumacacori", Southwestern Monuments Monthly Report for August, 1935).

The east wall contains pieces of fired bricks, a piece of modern glass, and a recently sawed timber. Both ends of the wall butt against a thick layer of plaster which suggest that part of the side walls are of Spanish origin. Several wooden boxes of modern date are built into the south wall. The north wall is divided into two parts by the west wall of Room 15. The age of the western portion is important, for, possibly, there was once an entrance to the graveyard here. Now, visitors reach the graveyard via the sacristy window, and one would not expect to find only the one entrance, on the west, to the graveyard. However, nothing was learned about the age of this segment of wall from excavation inside, and I did not dig outside.

The west two-thirds of this room have been deeply excavated by treasure hunters and I could not learn if the west wall of Room 15 once passed underneath. There were several square feet of plaster flooring along the north wall near the east end. Perhaps, this floor, about 2' 6" below present ground level, belonged to Room 38 before the south wall of Room 16 was constructed.

ROOM 38

Due to vandalism not much of these walls remained. A portion of the south wall carried some unusual plaster: a brown sandy application, 1" to 1½" thick, topped with white wash. Some adobes of west and east walls had been reutilized as they carried a white wash topped with red stain on surface inside wall.

ROOM 39

Another room sadly vandalized. Several adobe bricks of the east wall carried white wash topped with red stain on surfaces inside wall.

ROOM 40

A few floor brick, laid in a herringbone pattern, were found along east wall, but rest of floor had been destroyed by vandals. A large amorphous mass of bricks and plaster was found in a treasure hunting hole under floor level in north part of room.

REPORT ON TUMACACORI EXCAVATION (CONT.)

Four or five square feet of plaster on the east wall near the north end proved interesting. A thick, 1", layer of white plaster had been troweled on a covering of white wash topped with red stain. If there were two building periods at Tumacacori, one in which lime was scarce and applied only with a bruck, and another when lime was more plentiful and applied thickly by trowel, here is positive proof of their relative ages.

A short bench was found on east wall. As this left a very thin wall between Rooms 40 and 43a, this bench may have been a wall niche topped with a wooden lintel or an arch of adobe bricks. The bricks forming the bench top were missing, but their impressions remained in a layer of plaster.

ROOM 42

The north, west and south walls are of an earlier period than the east wall which butts against the side walls and contains more pebbles than the others. Evidently the entrance has been blocked by the more recent wall. The gap in the north wall, dug by some fool seeking treasure in a drain, would not be wide enough for a doorway with sides at right angles to the wall.

Except for the treasure hunting hole, the floor was in good condition. A 3" layer of wood ash was found in the northwest corner where the square corner had been rounded out and a few brick inserted into the walls to form a small crude fireplace. Adjacent walls evince signs of heat and smoke. Undoubtedly, this room has been occupied since 1827.

The wall plaster, where it remained, varied from $\frac{1}{2}$ " to 1" in thickness.

An interesting feature was the drain passing under the floor. It began at the restored tanks in front of mission and emerged into the patio through a large hole in the north wall of Room 43a. It should be noted that the drain of Rooms 1 and 2 fell about .1 of a foot in 25 feet. The floor level of Room 43a, about 140' from south end of drain, of the latter drain was 0.5' higher than the floor level of Room 1. Possibly, there was once a continuous drain from the tanks in front of mission to Room 1. The drain of Room 42 was $2\frac{1}{2}$ " high and $7\frac{1}{2}$ " wide.

ROOM 43

43 was the number given to the south portion of cloister that once surrounded the patio on the south, west and north. Apparently the principal entrance to the patio was through the south side, and it is marked by a filled-in arch in the south wall of Room 43. 43a is the part of this enclosure west of the arch, and 43b is the part between this entrance and a deep treasure hunting hole at the east end. 43c is the treasure

REPORT ON TUMACACCRI EXCAVATION (CONT.)

hunting hole, and is bounded on the west by an underfloor wall. This wall is a continuance of the east wall of Rooms 47 and 48.

Directly in front of the arch mentioned above, the floor has been destroyed by vandals, but Mr. Boundey, then custodian of Tumacacori National Monument, assured me the driveway had once been paved with bricks in which were worn deep ruts by cart wheels. Two and a half bricks were found in place in driveway and indicated the floor pattern differed from the herringbone pattern to either side.

There was a bench extending along the west side and most of the south side. It terminated with a ragged end in the treasure hunter hole of 43c. It was missing in the driveway, while the plaster line in floor indicated it had once ended flush with each side of arch. In several places this bench gave evidence of having been topped with a thin layer of plaster stained red. This red stained plaster was much thicker than the white wash topped with red stain to be seen on older walls. The wall plaster, 3/4" to 1" thick, was plain white in color.

One short bench and part of another were found in the western portion of the north wall, while not enough remained of the eastern portion of wall to indicate the occurrence of others. The eastern portion of the easternmost bench had been destroyed so its exact length could not be determined. The westernmost bench was in fair condition and perhaps its length indicates the distance between the pillars of the colonnade mentioned by Professor Wrightson, 1860. However, I discovered on proof of a colonnade or arcade anywhere. The two short benches had thin back-walls whose original height I do not know.

The drain which entered Room 42 from the south had been entirely destroyed in Room 43a. However, its passage through the north wall was marked by a large stone lined hole.

There was a large treasure hunter hole through the floor of Room 43b. From this one, like most others, the adjacent floors had been undermined. After settling, the floors always sloped toward the holes. I was never able to reach the sides of these holes without damaging structures above; so was never able to examine the strata pierced by the treasure hunters. There were many rumors of underground passages or tunnels at Tumacacori, and I suspect that most had their birth with vandals who had dug through the floors of Rooms 43 and 45 to find the floors and walls of older buildings on the same level as Rooms 46, 47 and 49.

All of 43c had been excavated to a depth of about 7' below floor level by treasure hunters. The fill was typical of all treasure hunter holes except it contained more large boulders. There was a large shapeless mass of boulders set in adobe mud, in the southwest corner of the room. Probably, boulders had been loosened from this mass to supply

REPORT ON TUMACACORI EXCAVATION (CONT.)

the loose boulders of the fill. The floor of Room 43, on the wall between 43b and 43c, was interesting. Above the adobe wall bricks was a $\frac{1}{2}$ " layer of lime plaster; above this plaster was a 5" layer of adobe mud; and, above the solid adobe was a 3" layer of plaster in which were set the floor brick.

On the outside of the north wall, 43c, was the bottom end of a wall drain similar to the drains on the walls of the mission. Below, and to the east, of the drain was a lump of plaster and brick whose part in the original scheme could not be guessed. Just above this object was a layer of loose soil and pieces of brick in the wall. Evidently the wall had been rebuilt at one time. The drain appeared to belong to the older wall but quite possibly it could have been constructed at the time of rebuilding and just had its lower end seated in the older wall. The layer of loose soil and broken bricks could be seen in the wall from the drain east of the corner, along the east wall, and west to the corner of Room 45. The level of this layer corresponded to the floor level of Room 43. The eastern part of the south wall butted against the corner of Room 45.

An unusual feature of construction about 43c was the depth of walls below floor level. There was no floor present but the bench height at southwest corner indicates a floor level similar to 43b. Probably, the walls were begun at ground level and then filled with earth to support a brick floor at the proper height.

AREA 41

41 was the number given to the area which I supposed to be the west and north portions of the cloister. 41a designates the part in front of Rooms 14, 15 and 16; 41b lies south of 41a; while 41c applies to the section in front of Rooms 2, 4, 5 and 6.

The west wall of 41a was marked by a stone foundation on which, in a few places, was found one course of adobe bricks, $3\frac{1}{2}$ " x $11\frac{1}{2}$ " x 24". In front of the entrance to Room 15 was a 5' gap in the adobe bricks, which I think marks a doorway between the patio and cloister. I did not dig in the gap to see if a boulder foundation was present.

Six adobe bricks, $3\frac{1}{2}$ " x 12" x 24", seemed to be in place against the east wall of Room 14. The group was laid three courses high and two bricks long. Possibly they marked the site of a bench.

Just north of these adobes and south of the east entrance to Room 14 a test pit was begun. A boulder floor was encountered on a level about 2' below the east wall of Room 41a. About five square feet of this floor was uncovered without reaching an edge, when refilling became a necessity because it appeared the FERA project was about to end. Previously, I had suspected the light colored, pebbly adobes of Room 14 of having been laid on foundations or walls of earlier date.

REPORT ON TUMACACORI EXCAVATION (CONT.)

In this test pit against the side of Room 14, all courses of adobes seemed to be the same.

The original west wall of 41a exactly in front of Room 16 had been destroyed and then rebuilt with a mixture of adobe and fired bricks.

The the present ground level, one course of small boulders extended foundation-like about 6' northeast from the corner of Room 16. This is shown as a stone wall on an earlier map of Tumacacori. It may have marked a recent wall but it had no part in the original construction.

Much of the east wall of 41b was traced by trenching along each side of the foundation, and it was never uncovered from the top. Perhaps, another door as in front of Room 15 would have been found had it been uncovered properly.

The south wall of 41c was marked by a stone foundation without any adobe bricks. A break near the west end gave passage way for the drain. A much longer gap near the east end may be attributed to vandalism. Near the latter break was a problematical structure which the laborers identified as a foundation of a primitive flour mill. On this foundation could have been placed a nether stone with spindle. On the nether stone and pierced by the spindle would have been the upper millstone attached to which would have been a pole projecting horizontally. A burro hitched to the pole and walking in a short circle would furnish power for the operation of the mill. The grain would be introduced around the spindle, and the flour would be collected at the edges of the stones. To support the theory of the laborers, there was a hard-packed adobe floor from 5' to 8' in all directions from the foundation. The floor, yellowish in color, could be distinguished both in color and in density. As this floor was above the south foundation of 41c, the milling operations were subsequent to the destruction of the wall.

Immediately in front of Room 4 and perhaps a part of the south wall foundation was a short length of stone foundation whose original purpose is doubtful.

About three feet in front of the foundation, and on the same level, were found together a small milling stone, a small mortar, and the major portion of a metate.

The east wall of 41c continued southward to form the east boundary of the patio. This was only a rock foundation with the south end terminating in a modern drain ditch. About 9' south of 41c this foundation was pierced by a plaster lined drain. Both ends of drain ended in treasure hunting holes. No fired bricks were used in the construction of this drain, in contrast to the brick drains of Rooms 1 and 42.

REPORT ON TUMACACORI EXCAVATION (CONT.)

ROOM 50

Possibly these foundations mark the site of an early mission. Facts in support of this belief are: the large size; appropriate proportion of length to width; foundation stones correctly placed to support the pilasters of a choir loft; the absence of any knowledge of other foundations which might locate one of the early missions supposed to be at Tumacacori; and, stone foundations high enough to carry plaster, unlike any other building on monument except the present mission. The constricted sanctuary is not uncommon in early Southwestern missions.

The objection voiced to Room 50 being a mission is because of the weakness exhibited at the offsets in the side walls near the west end. To some (J. H. Tovrea, Monthly Report for Southwestern Monuments, Jan., 1936, page 44) these offsets have suggested the possibility of two buildings of two different periods. As the foundations on either side of offsets are similar in character and on the same level, I see no reason for speaking of different periods. Possibly, they are two rooms of the same building with the partition removed. However, if there was a partition there at one time, the foundation stones have not been molested by treasure hunters as the soil had not been disturbed in modern times. There is a possibility of the stones having been removed to be used elsewhere, a practice noted frequently with adobe bricks. However, it seems improbable that the foundation would be removed in its entirety without taking any stone from the adjoining walls. In line with the latter statement, it would be just as probable that the foundations once overlapped a short distance and that someone had removed the overlapping sections.

Again, the weakness at these offsets is none too important if they occurred inside a building and were not exposed to weathering and rodents. For, if Room 50 be considered as a mission, I believe the side rooms, 51, 52, and 53, would have been under the same roof.

The two offsets had been uncovered when I reached Tumacacori, but they were further cleaned after my arrival. I found the north one to have been disturbed by a trench at some previous time. Probably, the trench for the pipe line ending at hydrant just short of offset had been dug a greater distance than necessary. But the south offset did not evince signs of having been disturbed. After all the darker soil had been brushed from the foundation, the offset was still unexplained. A thin wall could have been curved around the corner and still remained on the foundation. But this would have been an unusual construction feature not to be expected.

On the side walls near the east end, a few adobe bricks, 3" x 12" x 25", remained in place on the foundations. The brick at the northeast corner, several courses high, were laid across the wall or side by side, instead of end to end as was the usual procedure at Tumacacori. Disregarding any lime plaster that may have covered the outside surface,

REPORT ON TUMACACCRI EXCAVATION (CONT.)

this gives a wall thickness of only 25". The foundation ranged from 30" to 36" in width, but wherever it remained the wall above was only 25".

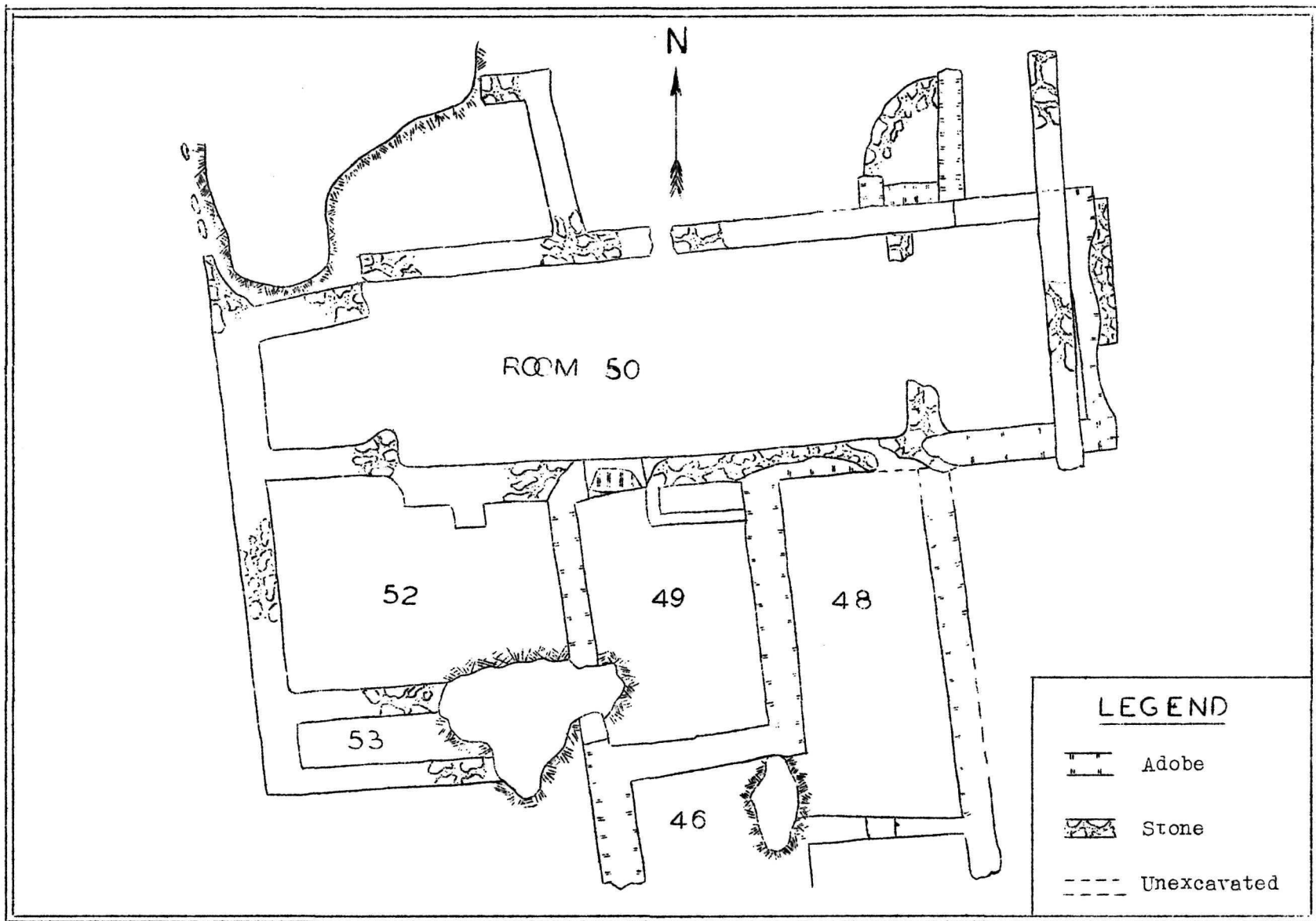
Here and there a bit of white wash topped with red stain remained on the inner surface of the walls, both on the stone foundations above floor level and on the adobes. On some spots of plaster here, as well as in Room 46, there was a thin film of lime over the red, which could be rubbed off very easily. Whether this was a coat of white wash or a deposit of lime from the soil, I do not know. It seemed to be on some of the wall surface where the white wash topped with red stain was missing.

Along the south wall near the east end, a little blotch of plaster lay on the hard packed, but sloping, adobe floor. This bit of plaster, a mixture of red and white, resembled stains left on a floor near a wall newly calcimined by an awkward workman. I do not believe this bit of plaster marks the floor level but I do believe it marks the level on which a constructed floor could have been laid. However, no evidence of a constructed floor was discovered. The elevation of this bit of plaster is several inches under the top of the foundation of Room 50.

In the eastern portion, a short length of foundation projected inward from each side wall. These could have been foundations on which were built pilasters to support a choir loft. Also, they could have been ends of a vandalized partition foundation. However, their tops were flush with the floor instead of being equal in height to the side wall foundations. The north one was the smaller but it was as large as the foundations of the pilasters supporting the choir loft of the present mission. Just a few feet west of the south one, a trench for a modern pipe line had been dug through the wall of Room 50.

Midway along the top of the south wall, an interesting construction feature was encountered. The stone foundation had been covered with a layer of plaster for a distance of about 4'. In the plaster, a row of brick had been laid flat, side by side. At each end of the row, one brick had been set on edge with top slightly above the row of flat brick. The two end bricks of the flat series had been broken to a triangular shape, 6" wide at base, and laid with the pointed ends northward. This caused the edgewise bricks to have their south ends farther apart, approximately 12", than their north ends. Also, the edgewise bricks sloped gently to the south. Although this structure was a foot above floor level, I believe it to mark a doorway.

At the east end where a doorway was to be expected if Room 50 was a mission, I did not find one. Of the two walls encountered there, the inner one was the foundation of the east wall of patio, and was about 18" above the foundations of Room 50. The position of the patio wall prevented the uncovering of the inner surface of room wall.



REPORT ON TUMACACORI EXCAVATION (CONT.)

ROOMS 52 AND 53

Except for a few adobe bricks, laid side by side, on the east wall foundation, only stone foundations remained. The side walls of Room 53 ended at the edge of a treasure hunter hole which extended into Room 49. The north wall of Room 53 did not end in as ragged a fashion as did the south wall, so the rim of the treasure hunter hole may have coincided with the side of a doorway or the end of the wall.

Some fifteen square feet of hard level adobe floor remained in the northeast corner of the room. Here and there, but always within a foot of the wall, a bit of white wash plaster seemed to be in place on the floor. To me, it seems improbable that an earth floor would be white washed, but I do not know. The plaster, while thin, was much more substantial than the thin white film noted in Room 50 which I thought could have been deposited by ground water. The walls adjacent to this floor carried some white wash topped with red stain.

The stone foundation, 2' 2" x 1' 9", was found against the north foundation with top flush with floor. I always identified such structures as pilaster foundations, but the purpose of any one is unknown.

The western portion of Room 52 had been disturbed to a shallow depth by vandals. Just west of Rooms 50 and 52 was found what first appeared to be a floor of small boulders, two or three inches below foundation level. From one to seven feet away, the boulders thinned rapidly, presenting a very ragged margin. Perhaps the boulders had been placed there to protect the walls from running water after rains.

ROOM 49

There was nothing here to indicate a floor level, and there was no plaster present. The only evidence of a doorway was the one between this room and Room 50, but at one time there could have been a door to either Rooms 46 or 49 without being found now. A thin stone foundation inclosed, on the south and west sides, a pit in the northeast corner of room. The pit was excavated to a depth of about four feet before a firm and smooth earth floor was found.

ROOM 46

Little of this room was excavated because of a big tree. No plaster was seen, and there was no floor at the north side.

ROOM 48

This room was in a fair state of preservation, with a plaster floor and some wall plaster. The wall plaster was of white wash topped with red stain, plus a thin film of soft lime. The white film

REPORT ON TUMACACCRI EXCAVATION (CONT.)

could be brushed easily from the red under-plaster.

The floor was covered with a thin layer of lime plaster (my notes do not give the exact thickness), which was dark in color on the surface. I believe the color was due to use and not to any stain. The most important character of the floor plaster was that it contained small pieces of slag, evidently as reinforcement. The presence of slag indicates smelters were operated at Tumacacori at an early date. On the other hand, it indicates that this series of rooms, Nos. 46 to 53, were constructed after 1736 when the discovery of the Bolas de Plata silver mine brought mining men to Pimeria Alta.

The sides of the west entrance were excavated a bit but a tree prevented the clearance of the door. Another doorway was found midway in south wall. This door, 3' wide, had been neatly filled with adobe bricks. There was a little white wash on the filled-in door but no red stain. The south wall was unusual in another respect, being 1' wide at the east end and 1' 9" wide at the west.

This room had been excavated before, as a bucket coated with cement and a celluloid comb were found on the floor.

ROOM 47

No plaster remained in this room. The adobe floor was 6" below the plaster floor of Room 48. All walls were well made of close set adobe bricks except for a vertical crack at the east end of the west one-fourth of the south wall. This suggested another room just south of the eastern three-fourths of Room 47; one that I could not reach without destroying the floor of Room 43b. The floor of Room 43b was constructed about 2' 9" above the floor of Room 47 and, without digging on the south side of the north wall of Room 43b, little can be said of Room 47. I have no explanation for the thin section of the Room 43b wall near the west end of Room 47.

The east wall of Rooms 47 and 48 continued south, under the floor of Room 43. Non-bonded joints showing in the wall between Rooms 43 and 45 indicate that the underfloor wall was once much higher. The plaster on the exposed portion above present ground level is the only plaster nearby.

ROOM 8

Room 8 differed in appearance from the rooms to the west. The adobe bricks of the north wall were laid unevenly on loose soil. In fact, a layer of slag lay under the eastern part of this wall. The double wall between Rooms 8 and 9 was well constructed, but there was no stone foundation under the south wall.

REPORT ON TUMACACORI EXCAVATION (CONT.)

At the base of the south wall was a problematical structure (see plan) of fired brick covered with lime plaster. A 5" layer of wood ash covered this platform and extended into the room some five feet while gradually decreasing in thickness. Just outside the room at this point was a reenforcing wall of stone. Perhaps the problematical structure inside was the floor of a fireplace while the reenforcing wall was necessary to uphold or protect a heavy chimney.

Near the center of the room was found a large millstone. The hole, bushed with lead, extended only half way through the stone; evidently, it was a nether stone. It was found in loose soil above floor level, with the working face at an angle of about 30 degrees from the horizontal.

Several large mesquite trees, growing within the room, prohibited a thorough exploration. One grew just inside doorway so only the tops of nearby walls were outlined. A test pit, 6' below floor level, disclosed nothing but a few river boulders scattered through the soil. Possibly, a boulder floor has been vandalized here.

The poorly laid north wall, over a layer of slag, suggests to me that at least some of this room was built or rebuilt after abandonment by the Spaniards.

ROOM 9

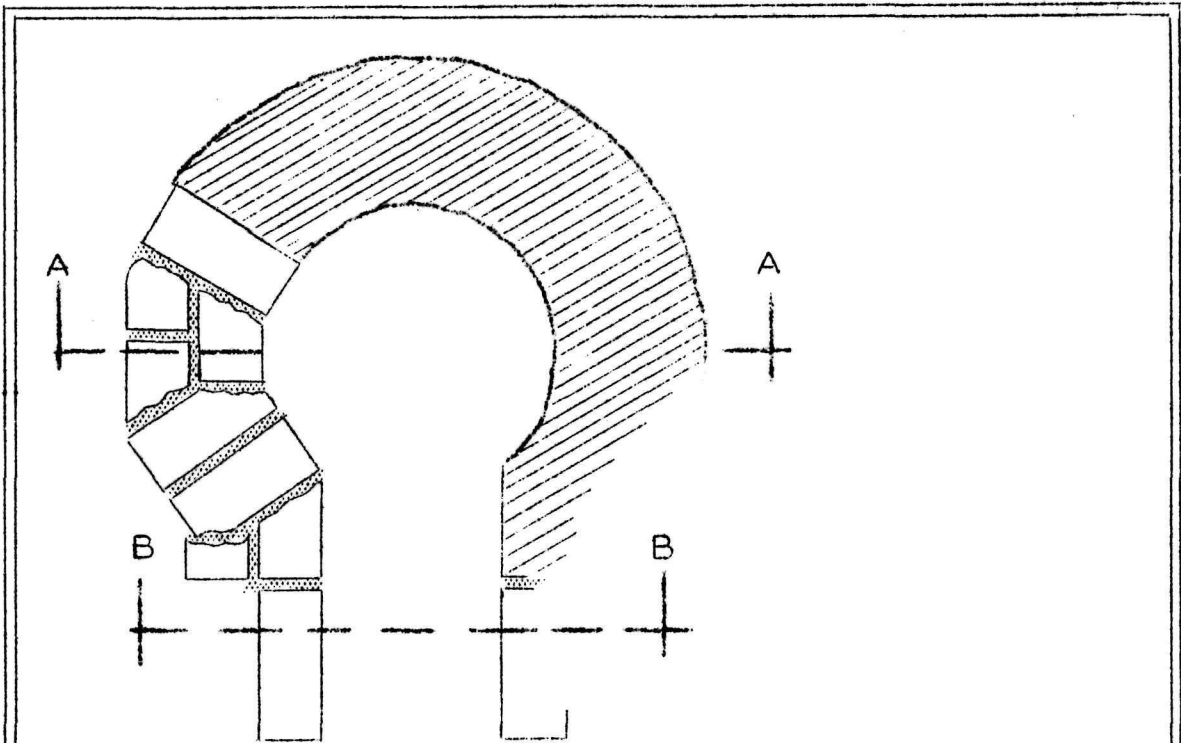
The north, east, and south walls were laid on loose dirt. I am unable to explain the filled-in corners of the east side. The north wall, near the west end, carried about one square foot of plaster which had been applied with a trowel. The plaster lay over several adjoining bricks, so was in place; that is, plastered bricks from other walls had not been assembled into the wall here.

ROOM 10

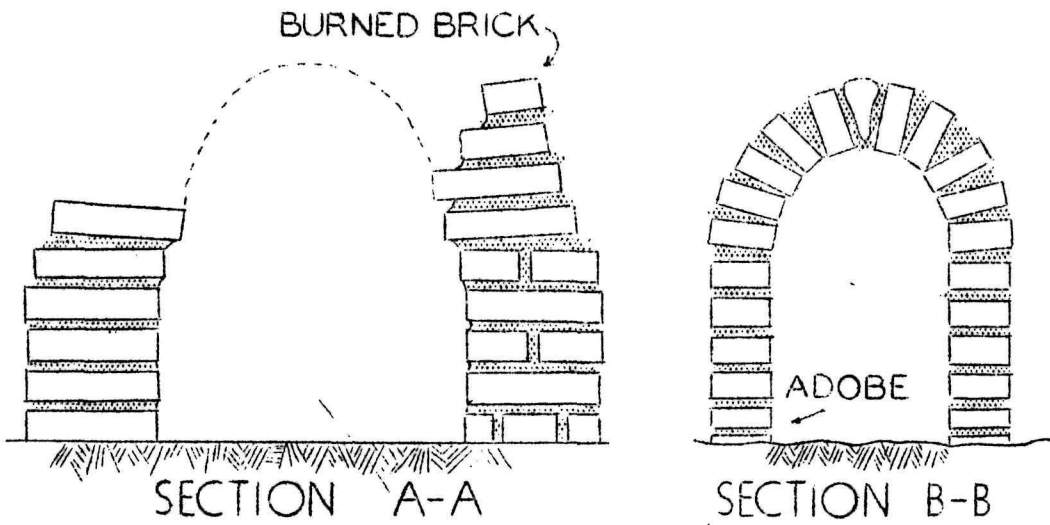
The south and west walls were laid without stone foundations. The outer north wall was of adobe bricks, 3" to 4" by 12" by 24", without a foundation. Most of the adobes of this latter wall carried some whitewash plaster stained red, either on one edge or an end, Evidently they had been removed from another building. The inner north wall was of boulders laid in mud. The east wall was well laid on a stone foundation.

ROOM 11

This room had a well-made boulder floor but contained no plaster. There were no adobe bricks on the east wall and only three at the west end of the north wall. The foundation stones of the west, north and east walls were slightly higher than the floor, but there was no trace of a south wall. Against the west wall, near the south edge of floor,



PLAN OF VASO III



SECTION A-A

SECTION B-B

DETAILS OF VASO III

SEE PAGE 212

SCALE $\frac{1}{2}'' = 1'-0''$

REPORT ON TUMACACORI EXCAVATION (CONT.)

were found about two pounds of copper sheeting from which small discs had been stamped. Possibly the discs had been used either for medals or coins.

The north portion of the west wall of orchard began at the northeast corner of Room 11.

AREA 12

Not a room, but an area partially inclosed by boulder foundations. Excepting the present mission, the south and west walls were the heaviest and best made foundations found on the monument. The inner portion of the east wall, 1' 7" wide and one course of small boulders deep, probably served as a foundation for a light wall at one time. The eastern part of this wall, is composed of small boulders loosely scattered in the soil. They did not have the appearance of a wall foundation; but rather, suggested a batter of boulders and mud which had weathered away. No floor level was apparent.

In the northern portion of the inclosure were found about 200 pounds of animal bones; mostly sheep and cows, but with a few horse and pig bones. Two mandibles of domestic pig and one of peccary were noted.

Between A 12 and the east wall of the patio were five problematical structures (see plan). When they were being surveyed I suggested to the engineers that three could probably be vasos (primitive smelters), and that another could have been an ore roaster. The problematical structure by the patio wall was identified by two or three laborers as a place where several families could cook food. However, I am unable to identify any of these structures without comparative material.

Vaso I or V I had been partially uncovered by the time of my arrival. Part of a broken pot had been found in the arched entrance. Some lime plaster, one inch thick, was still clinging to the inner surface of the arch. This plaster was smoke blackened but gave no indication of intense heat. Except for a six inch lining of dried mud and charcoal, the bowl part of structure was filled with broken brick, slag, earth and pieces of lime plaster.

I was unable to determine whether the charcoal and adobe mixture was an integral part of the structure, or whether the bowl had once filled with charcoal and mud before a test hole had been excavated by some treasure hunter. This lining was not found in V I or V II.

V II differed from V I by having a conduit through the north wall, besides being of adobe brick. The floor of the conduit sloped into the bowl. Possibly this was a smoke flue but all evidence of the super-

REPORT ON TUMACACORI EXCAVATION (CONT.)

structure had been demolished long ago.

V I, V II and V III all possessed a smaller diameter some two to three feet above the earth floors, but whether the missing tops were dome or bottle shaped could not be determined from the remaining evidence. Possibly they had been hourglass shaped as the adjoining structure.

One of the laborers, none too reliable on other bits of information, spoke of recently seeing such structure in use in Mexico. According to this information, the complete structure should have an inverted bowl shape. Fuel and copper ore could be introduced through a small hole at the rear, near the top. A large bellows playing into the arched entrance would create a small blast furnace. The molten material would pour out the entrance where a large pot would be buried with the rim flush with floor. The slag would escape over the pot, depositing the heavier copper below. If the ore carried sulphur, it would have to be roasted before the smelting operation.

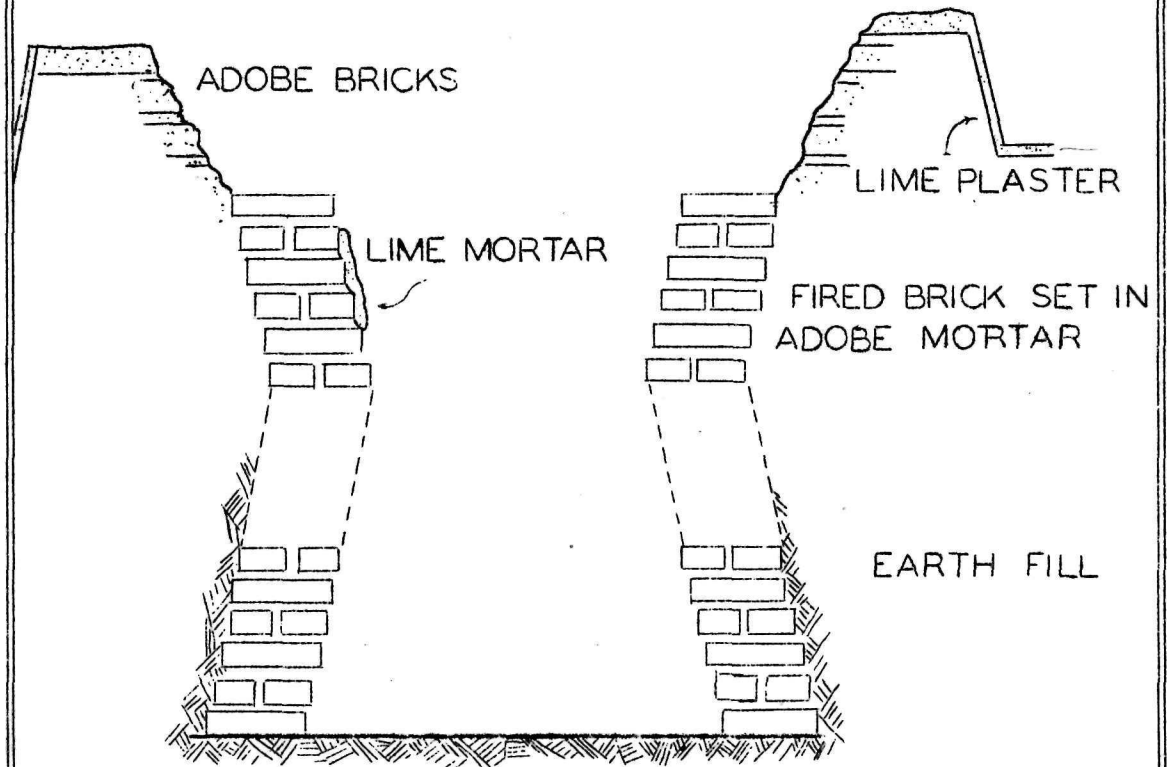
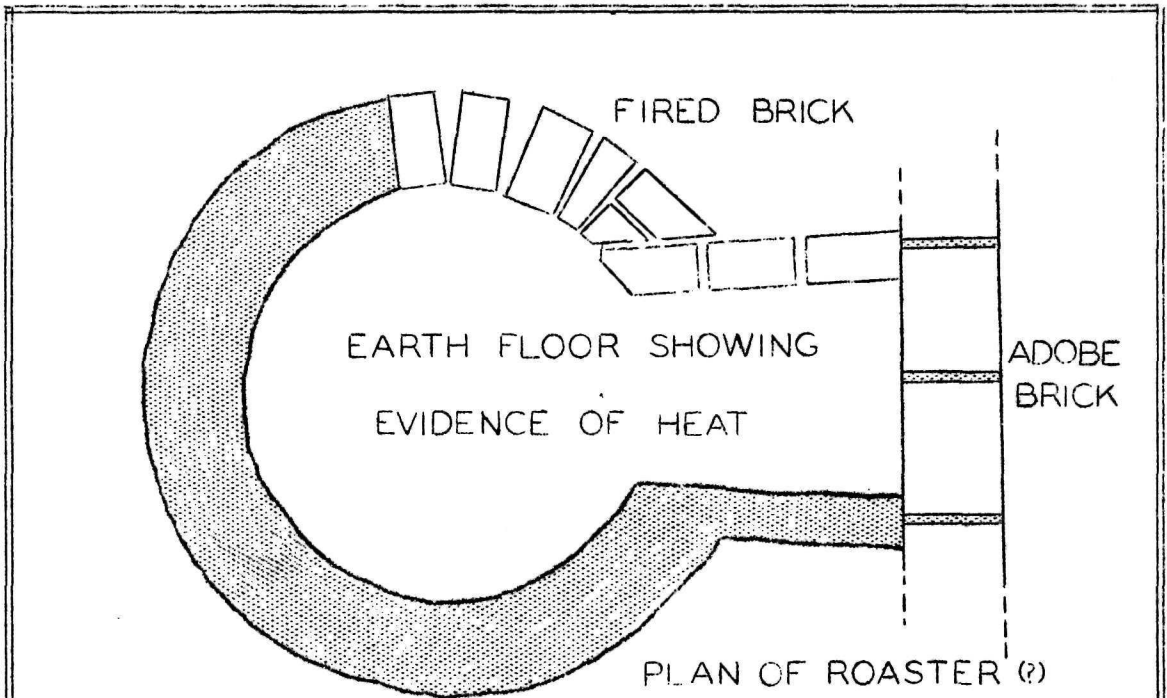
If these were vasos or primitive smelters, one would expect to find evidence of intense heat, a character not encountered. Perhaps an inner lining had been removed in recent years when some citizens of Tubac gathered quantities of slag here to be resmelted by modern methods.

The use of the problematical structure beside the vasos (Plate 3) is unknown. Its proximity to other structures tentatively identified as smelters suggested that its purpose was of a metallurgical nature. Some lime plaster inside the upper part was black from smoke, but was not fused. About six inches of wood ash lay on the earth floor. Resting on the ash layer were several tin cans whose paper labels had not entirely rotted. The top of the arched entrance had been vandalized. However, it appeared to have been a foot more in height than the entrances of the problematical structures nearby. The floor level of this structure was $3 \frac{3}{10}$ feet lower than the floor level of V II, and 3 feet lower than the floor level of V III.

The problematical structure by the patio wall was simply a brick-lined hole with a side entrance. The vertical portion had been smoothly plastered inside with lime plaster. The side entrance was located by removing loose fill in the surrounding packed soil; there were no constructed sides of burned or adobe brick. Slag was conspicuous by its absence in comparison with the structures several yards to the east, but pottery was more abundant here than at any other area on Monument. A broken burned brick from this hole bore a deep impression of a chicken's foot. Evidently a chicken had stepped on a freshly made adobe before it was placed in a kiln.

AREAS 54, 62, 63, 64 and 65.

Only stone foundations found here except for the adobe pilaster of A 65 and the south walls of Areas 54 and 65. The two pilasters of Areas



SEE PAGE 212

SCALE 1"=8'

REPORT ON TUMACACORI EXCAVATION (CONT.)

65 and 62 are almost in line with a third on the wall between Areas 54 and 55. The wall between Areas 54 and 62 is above their west wall. Nothing was found to indicate the age of these foundations, except their low level, but they may well be among the oldest on the Monument.

AREAS 55, 56, 57, 58 and 59

The east wall foundation of Areas 56 and 59, with the east foundation of Areas 11 and 12, form part of the western boundary of the old orchard. As this boundary is at the brow of a slope, it has suffered some damage from erosion.

The north foundation of Areas 55 and 56 carried one course of adobes for more than $\frac{2}{3}$ its length. These bricks were of an unusual size, 6" x 15" x 24". No other adobes approaching this size were seen on Monument.

The north wall of A 57 ended just short of the west wall, and the south wall ended in a treasure hunter's hole.

There was a hard, uneven adobe floor over much of this area. Immediately above the adobe floor were several layers of odd colored soil, quite porous and friable. These layers varied greatly in type and thickness, sometimes within a few feet.

Some examples are given below:

North side, A 55	East side, A 55	South side, A 55
white $6\frac{1}{2}$ "	white 4"	white 2"
dark blue 1"	blue 1"	blue black 7"
light blue 7"	white 1"	light blue 5"
adobe floor --	black 1"	black $\frac{2}{3}$ "
	adobe floor --	white $\frac{1}{2}$ "
		adobe floor --
North side, A 57	North side, A 57	South side, A 57
white $2\frac{1}{2}$ "	(a few feet west)	white 3"
blue 2"	white 4"	black 1"
black $\frac{1}{4}$ "	blue black 2"	sandy
white 1"	very friable	sediment 2- $\frac{3}{4}$ "
blue, pwd. 8"	soil from	brown $5\frac{1}{2}$ "
black $\frac{3}{4}$ "	white to	adobe floor --
white $\frac{1}{2}$ "	yellow 5"	
adobe floor --	adobe floor --	

REPORT ON TUMACACORI EXCAVATION (CONT.)

South side, A 58	West side, A 58	South side, A 59
white 2"	white 2"	yellowish 5"
blue 2"	blue 1"	blue, ashy 4"
black 1"	sandy sediment 3"	yellowish 4"
brownish red $\frac{1}{2}$ "	blue 2"	adobe floor --
blue 6"	brownish black 1"	
adobe floor --	adobe floor --	
North side, A 60	South side, A 60	Center, A 61
white $3\frac{1}{2}$ "	white $3\frac{1}{2}$ "	white 5"
black 2"	black $\frac{1}{2}$ "	blue 5"
brown $1\frac{1}{2}$ "	sandy sediment 1"	black 1"
blue brown 5"	black 1"	blue, pwd. 5"
adobe floor --	blue $\frac{1}{4}$ "	adobe floor --
	adobe floor --	

Some of the laborers on the project believed these layers resulted from burning the manure of a corral on several occasions. Perhaps, their explanation is as good as any. Modern methods of farming would demand that the fertilizer be taken to the fields but, I was told, some of the more lazy native farmers have cleaned their corrals by burning within the last few years. Just what sort of soil would result from keeping a corral free of manure by burning, for a long period of time, is something I don't know, but I suspect it would appear much like the soil of these rooms. The black layers did contain small pieces of wood charcoal.

These layers extended over the walls of Areas 57 and 58; which indicates the corral (if it was a corral) was in use after the walls of Areas 57, 58 and 59 were demolished. Perhaps, Areas 55 and 56 were corrals at one time and Areas 57, 58 and 59 were stables or storerooms for husbandry supplies. Then with the abandonment of Areas 57, 58 and 59, Rooms 60 and 61 became the storerooms or stables. The short length of wall connecting the northeast corner of Room 61 with the southwestern corner of orchard would have maintained a stock-proof corral.

Perhaps, some of the fires were set by the Apaches who are on record as having burned Tumacacori several times. As they couldn't get much smoke from adobe bricks, they must have had something to burn.

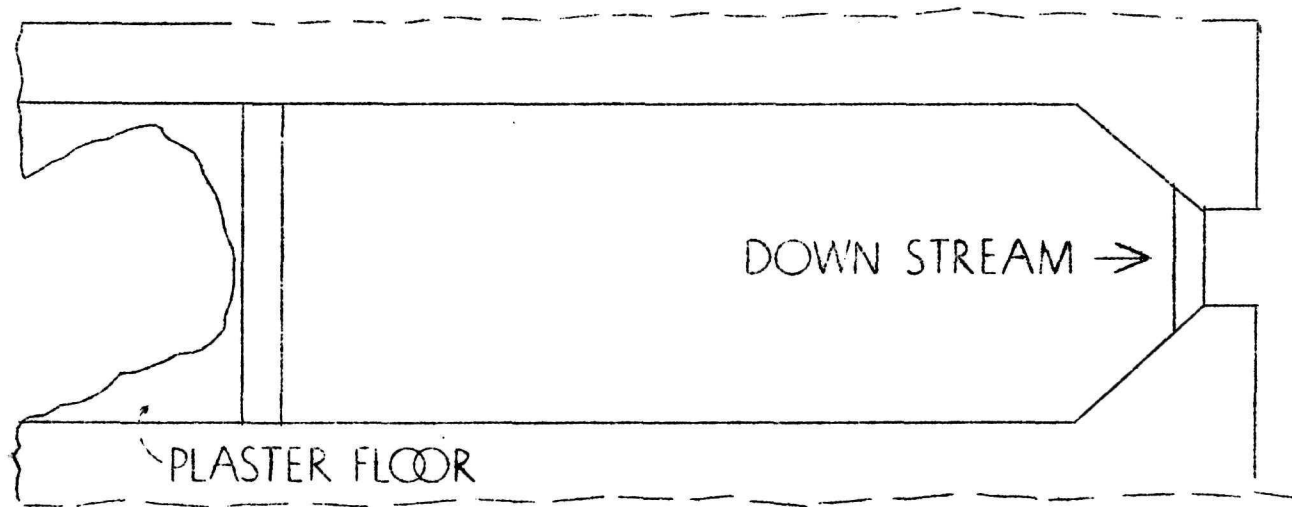
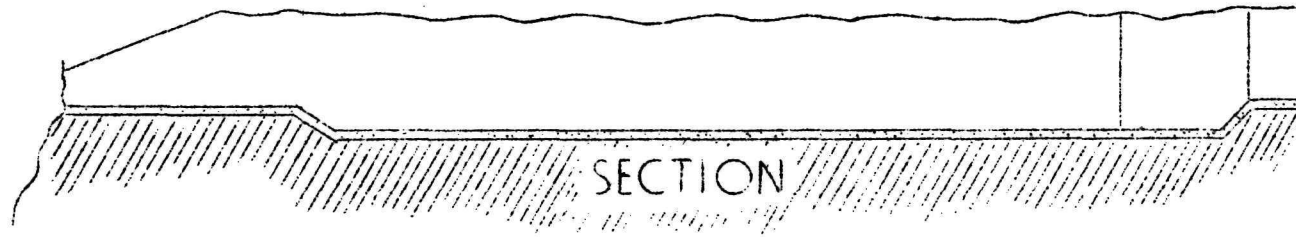
ROOMS 60 AND 61

Some adobe bricks remained in place on the stone foundations, and a few carried white wash topped with red stain on surfaces inside the wall. Evidently they had been taken from another wall. One brick carried several layers of plaster thinly applied with a brush; first, white; then, red; then, white; then, black; and then, white.

Soil layers, not so thick but similar to the layers of Areas 55, 56, etc., were found in these rooms. The layers did not extend over the

PROBLEMATICAL STRUCTURE

NO 75



PLAN

SEE PAGE 215

SCALE $\frac{7}{16}'' = 1'0''$

REPORT ON TUMACACCRI EXCAVATION (CONT.)

dividing wall however. Nor did they extend south of these rooms.

The north wall of Rooms 60 and 61 was outlined by trenches on either side, and was never cleaned from the top. Possibly, doors would have been found. (Because visitors to the Monument had a habit of walking on walls newly uncovered, it was advisable to uncover the wall tops just before the rooms were to be backfilled. The laborers were taken from my charge before the refilling of these rooms was contemplated.) I do remember one gap, where a pit for an outdoor toilet had recently been excavated through the wall.

AREAS 66, 67, 68, 69, 70, 71, 72 and 74

Nothing found here other than the foundations. One of the younger laborers of project said that some of the younger boys of the neighborhood had scraped out a large swimming pool in this area, just a few years ago. Said lots of walls were found, and a few burials. The pool was filled from the nearby irrigating ditch which is probably the acequia mentioned by Prof. Wrightson, 1860.

AREA 75

75 was the number assigned to a problematical structure of burned brick, with plastered walls and floors. It was located in an irrigation ditch, about 14' inside south wall of orchard.

The constricted outlet would serve to raise the level of a stream flowing through this structure. The raise in water level might be desired to provide a "washing vat" or to introduce the water to another irrigation ditch. A 3" dip in the floor at the south end with a corresponding 3" rise at the north end suggests a secondary purpose for which I can not account.

ROOMS 19 to 36

Quoting from Prof. Wrightson's description: "To the south of the mission building, and fronting the church, was laid out a large plaza, which was surrounded by peon houses, thus forming a respectable village." Evidently this series of rooms represents the peon houses of the west side of plaza.

The east wall was eventually uncovered, and nowhere were there enough adobes in place to indicate a doorway. While this group of rooms had not been subject to much treasure hunting, water from the hills to the west had washed away much of the adobe and some of the light foundations. The thin wall between Rooms 23 and 24 contained some fired brick, indicating late construction.

Offsets in the side walls indicated that all rooms were not

REPORT ON TUMACACORI EXCAVATION (CONT.)

constructed at the same time, but I was never able to tell which of two adjacent rooms was the older. Foundations of older walls were found under the east wall of Rooms 25, 26, and 27.

The only constructed floor was found in Room 23. It was made of broken and overfired brick, laid irregularly in adobe mud. One brick in the northwest corner of Room 21, elevation 60 $\frac{2}{10}$, may indicate the floor level. The floor level of Room 22 is more confusing, with 6 or 7 bricks in the southeast corner, elevation 59 $\frac{6}{10}$, and $2\frac{1}{2}$ brick in the southwest corner, elevation 60 $\frac{8}{10}$. In Room 25, the small area of smoke-blackened, adobe floor probably represents a floor in that room.

The floor levels of the other rooms could only be approximated from foundation levels.

The only plaster of this group of rooms was found in Room 32, where the adobe wall bricks had been smoothed with adobe mud before an application of white wash. No red stain was discovered.

The benches of Rooms 25 and 26 were much alike, and appeared to be cheap imitations of the benches in the rooms around patio. They were constructed of adobe brick, plus a top course of fired brick laid unevenly in adobe mud. Many of the fired brick were broken; some were overfired and twisted; and, some carried a little lime plaster indicating their removal from other structures.

Foundations of other rooms in this group extended south to a distance some fifty-six feet beyond the monument boundary. The outside of the east and west walls had been uncovered when the project was taken from my charge. Later, the trenches were backfilled before they could be properly surveyed.

ROOM 79

Only a floor of broken, burnt brick, laid in mud, found here. This lay directly in an old roadway, a few feet from a cattle guard. Where there should have been stone foundations, I found nothing except on the west side where a wall, 3' long and three courses of burned brick high, remained. This structure was only a few inches below the surface of the road.

An old drawing of Tumacacori by J. Ross Brown shows a series of rooms in this vicinity. Several long deep trenches were excavated without finding anything. I believe he drew, with artist's license, the west side of plaza as if it extended west instead of south.

REPORT ON TUMACACORI EXCAVATION (CONT.)

AREA 80

80 was the number assigned to the lime kiln some 100 feet north of the graveyard, beyond the monument boundary. This was a circular structure with a bench, $8/10'$ wide and 3' high, around the inside. The remaining wall above the bench was nearly 4' high. The floor was 7' feet in diameter. An arched doorway, $2\ 7/10'$ wide, through the southeast side would serve for introducing fuel.

The walls had been constructed with adobe bricks, but due to the intense heat needed to produce quicklime, the inner surfaces of the adobes presented the appearance of overfired bricks.

In operation, pillars of limestone would be built bench-high on the floor. Arches of limestone would be built from the pillars to the surrounding bench. Above these arches more limestone would be placed. Fuel would be placed under the arches and ignited. After burning, perhaps for two days and nights, the arches would crumble, and the bottom layers of lime would be ready for use. The stone which had not received enough baking, would be placed in the next charge. Of course, impure nodules in the limestone would be discarded as worthless. Thus, quite a bit of reject material would accumulate if the kiln was much used.

There were several mounds of rejects adjacent to this structure, besides some unfired limestone. We found a few inches of slaked lime (slaked by rain water) on the floor, close to the bench. As there was possibility of this structure having something to do with metallurgical operations, a sharp watch was kept for slag and pieces of ore. However, this is the one area on Monument where none was found.

Several mounds in this vicinity suggested the possibility of small dwellings. Two or three were trenched without finding anything. A stray sherd or two were found in this vicinity, as one might find near any long occupied Indian village.

AREA 37

37 was the number assigned to the area between the mission and the west side of patio. 37a was a large area east of nave, and 37b was the small area just east of bell tower. This was a pleasant area in which to work, being in the shade of the mission on warm afternoons and protected from the prevalent southwest winds at all times. Such a delightful spot must have appealed to the treasure hunters as most of the area had been dug and redug, usually deeper than I cared to discover.

The remains of the south wall of 37b was constructed of a mixture of fired brick and unweathered adobe brick. Perhaps there was a wall there before 1827, but the remains found appeared to be more recent.

REPORT ON TUMACACORI EXCAVATION (CONT.)

An interesting feature of the area was the amount of copper it contained. Small pieces were everywhere in addition to a few large pieces. Altogether, some fifty pounds were collected. Samples taken to the University of Arizona were said to be copper with no silver.

There were three problematical structures of burned brick here which I have identified as units of a foundry. The north structure was identified as the retort. It was round in shape, and consisted of a deep foundation filled with sand. The top of the brick side walls was found at the present ground level, and the superstructure, perhaps dome shaped, had been demolished. The sandy floor inside was a few inches below the surrounding wall. The floor was almost covered with a thin layer of copper which had solidified in place. Small streams of copper had worked their way to a depth of six inches in the floor.

At the southwest side, an inch and a half below the floor level of the north side, was found a smooth, heat-darkened outlet for the molten metal.

About 1' 2" below the outlet was the top of another structure, 2' 8" high. This horseshoe-shaped structure of mud and fired brick is where the metal could have been cast. Obviously, it would be partially destroyed when the mould or metal was withdrawn.

Small lumps of sand, somewhat solidified from heat and coated thinly on one side with lime, were found about this latter structure. I believe they were pieces of moulds. Mr. Boundey told me of finding a mould of this type nearby. At first he thought it was the base of a statue, but later he decided it was the core mould of a bell. While he was conducting some visitors through the mission, another party arrived and dropped a heavy rock on the object. Of course, it crumbled into small pieces. No moulds found by me were complete enough to indicate what objects had been moulded.

The heat necessary for foundry operations could have been generated in a burned brick structure some four feet southeast of the retort. It was tunnel-like in appearance with the long axis north and south. Approximate inside dimensions were: 1' 0" wide, 3' 0" high, and 7' 9" long. Just north of this structure was a few square feet of earth floor reddish in color from heat. Its level was about two feet above the floor of the furnace. In removing the ordinary fill from the floor, a trench leading from the furnace to the north side of retort was discovered. I do not know whether this was a treasure hunting trench or whether it once contained a flue for conducting heat from the furnace to the retort. It was not lined with adobe or fired brick, nor did it show indisputable signs of heat. However, two bricks appeared to be in place as a roof at one point. Perhaps a brick lining had been removed by vandals. I have no theory about the few square feet of reddish floor.

REPORT ON TUMACACORI EXCAVATION (CONT.)

In operation, I believe a bellows playing on a charcoal fire in the furnace would drive enough heat through some sort of conduit to melt copper placed in the retort. The retort would be tapped at the outlet of southwest side, and the molten metal would flow into moulds placed in the structure below outlet.

Because of the churned condition of the soil due to treasure hunting activity, there was no means of accurately dating the foundry operations. As the retort lay in part above the wall of Room 17, it is evident they were subsequent to the abandonment of this room. This points to a late date. Further, it is doubtful that the Spanish Fathers would care to have a foundry so intimately associated with the church. I suspect the foundry postdates the abandonment of Tumacacori by the Spaniards.

CONCLUSION

The principal objective of the project was obtained in that the National Park Service now has maps of most of the walls and structures just below the surface. In the future it will be unnecessary to locate drainage ditches, pipe lines, adobe pits, etc., where they will do irreparable damage to the ruins. Further, rumors of buried treasure should die after 919 man-days were employed in excavation without finding material of five dollars value.

The almost total absence of worth while artifacts plus the greatly damaged structure remains, both resulting from unhampered treasure hunting over a long period of years, prevented the forming of many definite conclusions of archeological nature. However, differences in plaster types aided in many instances.

One series of rooms, 46 to 53, could be distinguished from the others by the use of whitewash topped with red stain. At a later date, during the last period of building activity by Spaniards, thick plaster applied with a trowel was characteristic of the rooms around the patio while plain whitewash was characteristic of the less important rooms about the plaza.

The present church carries a distinctive covering on the outside where groups of brown and black pieces of brick have been imbedded at regular intervals in the lime plaster. At an earlier period the building had been plastered both inside and out with a somewhat similar covering in which the spots were red in color and were irregularly arranged. This latter type was found inside Room 18, the sanctuary and the sacristy, and indicates that all were in use at the same time. It was found behind a pilaster which serves in part to uphold the dome over the sanctuary, so evidently the church has been remodeled with the roof changed and Rooms 17 and 18 abandoned.

Quite definitely, most plaster was applied evenly in a workmanlike

REPORT ON TUMACACORI EXCAVATION (CONT.)

manner. The crudely applied plaster of Rooms 13 and 14 may be attributed to the native families who have lived there into the 20th Century.

The different types of plaster were not always associated with a special type of floor. On the north side of the patio, some rooms had floors of plaster on boulders, while others had brick floors laid in a herringbone pattern. Room 15 on the west side of the patio had a checker-board floor of square bricks. The only room plastered with the red stained whitewash, 48, possessed a plaster floor.

Of particular interest were the problematical structures which were not positively identified as to purpose. Their identification must await further research at other sites less damaged by vandals. Nothing was ascertained regarding the date of the structures; and all could postdate the abandonment of Tumacacori by the Spaniards.

One thing quite obvious on the map of the ruins is that the area of Tumacacori National Monument is too small. The lime kiln is some fifty feet beyond the north boundary; several acres of the small orchard lay north and east of the Monument; while the south wall of the Monument was built across the series of rooms which formed the west side of the plaza. Just south of these latter rooms was the brick kiln (identified by Mr. Frank Pinkley at the time he restored the roof to the church in 1921), while southwest of this kiln is a ditch which applied water to the village.

Probably household water was procured from shallow wells, but none were discovered. Also, the rumored tunnel at Tumacacori was not located.



