MUSEUM OF NEW MEXICO

OFFICE OF ARCHAEOLOGICAL STUDIES

THE OLD WELL EXCAVATION

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ARCHAEOLOGY NOTES 246

SANTA FE 1998 NEW MEXICO

CONTENTS

Figures

Tables

INTRODUCTION

"The only safe place to tell a secret is down the well at midnight."--Folk saying

In June 1998, the Office of Archaeological Studies, Museum of New Mexico, was asked by John Schrader, owner of the Original Trading Post in downtown Santa Fe, to undertake the excavation of a well , LA 122584, as part of the effort to document the history of the building (Fig. 1). In mid-July, a team consisting of Dorothy Zamora and Natasha Williamson excavated a well in the basement of the building (Museum of New Mexico Project No. 41.667). This report is intended both as a stand-alone document and a chapter in the final project report. It documents the results of the excavation and the analysis of the recovered artifacts. Some 700 artifacts were analyzed.

The team wishes to thank the owners and staff of the Original Trading Post for their courtesy and assistance, which made the project possible and pleasant.

Figure 1. Well exterior.

Methodology

A well, especially in a commercial building, stretches standard excavation and analysis protocols. Within just the last thirty years, the Original Trading Post has evolved from a store trading in Indian artifacts, which also served as a supply house for silversmiths and jewelry makers, to a more upscale dress and jewelry store, though still with a large component of tourist knick-knacks. Thus, although there were numerous "Indian" artifacts in the well, there was little point in subjecting them to the

usual types of analysis. By becoming objects of commerce, the artifacts had lost their previous functions and the information that those functions impart to archaeologists. Rather than yielding information about the lives of the people who made them, they can only tell us about the store itself. However, a list of the ceramics was prepared (Appendix 1). Thus, for every artifact, we had to ask, how did it get here? Is it part of the store and its history or merely part of the inventory?

Prior to excavation, the well was used to store large bags of styrofoam peanuts and, in the past, as a midden for general trash from the shop. This debris, which continued for a depth of about 1 m, was removed and tallied. The upper levels of this fill had been removed by store employees within the preceding year. When solid dirt fill was encountered, standard excavation techniques were employed. The loose fill in the top of the well was designated Level 1. The actual excavation was Level 2, and Level 3 consisted of floor contact and the subfloor, which was tested with augering.

All excavations were accomplished with trowels and brushes, because the constricted space inside the well prevented the use of shovels. Dirt was removed in buckets by means of a double pulley rig and screened through quarter-inch screen. The well was excavated one-half at a time to enable profiles to be drawn of the stratigraphy. Two profiles were taken, one at mid-level of the loose fill, and one of the dirt area. The profile of the dirt area was not taken down to the bottom of the well, however, because the increasingly constricted space made it impossible to excavate any deeper while standing on the unexcavated balk. Two plan views were prepared of the floor and floor contact. In addition, a profile of the well itself was prepared after excavation. Soil samples were taken but have not been subjected to detailed analysis.

Although photographs were taken of the site and the excavation process, the results were not satisfactory. Especially in the beginning, there was very little light in the basement, too little to read the light meter on the camera, for instance. Later, more lights were installed and, with a different camera, better pictures were obtained.

Analysis efforts focused on the dateable artifacts: nails, glass, ceramics. The artifacts yielded information about the well and activities in the building. Unfortunately, it was not possible to establish when the well was built. As of this writing, historical research has not been completed for the building, so several intriguing questions cannot be answered here. However, it seemed evident from the excavation that the well had been cleaned out at least once.

A note on measurements is in order. Depth measurements and dimensions were taken in metric units. However, historical artifacts and dimensioned lumber are measured in the units in which they were made, i.e., feet and inches.

Setting

The well is in the middle of a room that is presently below ground level, although that was probably not always the case. Two small windows, set high in the north wall, indicate that at least part of the room was once exposed to light. Their placement is common for windows originally serving as light wells. These windows now are completely blocked.

A notched viga over the northwest window indicates some remodeling of the north wall. Another viga in the room is actually two that have been butted together with no support, also indicating remodeling. The construction sequence may be determined by a historic building survey, which is

outside the scope of this project.

The room itself is of square-cut but undressed stone masonry. The masonry walls are of varying height. The west wall is 1.84 m high, the north wall 1.84 m, and the east wall 1.86 m. It was not possible to get close enough to the south wall to take measurements. Above the masonry, various treatments have been undertaken to level the wall tops. The distance from the basement floor to the floor of the overhead room was 2.11 m. Because the overhead floor is 11 to 18 cm above the floor in the room leading to the street, it is evident that the basement is 2 m below the present sidewalk surface. The floor of the overhead room, and hence the ceiling of the basement, is of boards laid directly on the vigas. A secondary support system, consisting of two 2" x 6" boards resting on two 4" x 6" posts, was installed at some later date down the center of the room, crossing over the well itself.

The dir floor of the basement is hard packed and quite level. A layer of fine dust, sifting through the boards overhead, covers the floor and everything else in the room. A steep wooden staircase enters the room from the south side. The stairwell also shows signs of various remodeling episodes.

Was the well always in the basement? Was there access to the building exterior? These questions are especially pertinent to the uses of the well. Legend has it that the well was used for watering burros on nearby Burro Alley, which is extremely unlikely, given the present configuration of the building. Was the well at one time exposed? It seems that it must have been, as the following description of the well may make clear. If so, when was it enclosed?

RESULTS OF EXCAVATION

When fully excavated, the well was 3.4 m deep, and increasingly damp soil was encountered (Fig. 2). (The water table under Santa Fe, though dropping, is still high enough to make it necessary for large buildings with basements in the downtown area to keep sump pumps in operation.) The body of the well projects some 60 cm above the floor level. The construction is of flattish stone and some river cobbles laid in adobe mortar. Many of the stones are of igneous material. The mortar has receded into the wall, implying an erosional process, although not necessarily rain. Mortar is definitely present only in the upper part of the wall. Below ground level, it is impossible to say if mortar was present or not. Of course, it would be futile to use adobe mortar below the water line.

The well may have had an adobe coping, but in many places the upper course of stones is exposed. The upper course is missing in some places, especially on the west side, exposing the adobe mortar. Some but not all of the stones on the top of the well have blue paint on their upper surfaces. Was only one side painted, or have the rest of the stones washed clean? The adobe mortar is irregular, extending 30 cm farther down on the east side than on the west (Figs. 3-5).

A light fixture is attached to the inside of the well by means of metal conduit pipe, which enters the side of the wall just under the floor level (75 cm below top of well), turns, and runs down to the fixture, a standard white ceramic floodlight. The light must have rested very close to the bottom of the well when in operation, because the fixture was at a depth of a little over 3 m. The light fixture and the painted stones strongly suggest that at some point in its history, the well served as a tourist attraction, possibly a "wishing well." The dates of seven wheat straw pennies found in Level 2 indicate that it served this function during World War II. The earliest penny is 1921. There is also one coin dated 1937, three dated 1940, and two dated 1944. If this supposition is true, the well may have been accessible in some manner besides by coming down steep stairs into a dark basement, hardly an inducement to the average tourist.

The well was excavated to 30 cm below the end of the masonry. In the past, the sides curved into a bowl-shaped bottom. A more or less contiguous layer of pale plaster covered the bowl, and the number of artifacts recovered dropped off to almost none. A "window" 15 cm deep and 20 cm by 15 cm was excavated in the center of the well, with the same results. The soil was red granitic gravel, and larger rocks had begun to appear. Auger holes were sunk around the perimeter of the well and in the window to establish the depth of the bottom. Very few artifacts and many rocks were recovered from three auger holes, and a rock too large to excavate was struck in the center.

Level 1 was a matrix of artifacts with some dirt. Level 2 was a matrix of dirt with artifacts and exhibited some stratigraphy. Level 3 seemed to be alluvial gravel and larger rocks, with a clay or carbonate layer at the bottom. Level 1 gave information only about the store activities. Level 2 yielded some information on the well itself, and Level 3 produced the largest number of metal artifacts. Level 3 can be defined as the floor contact (± 5 cm and subfloor augering.

Level 1

Level 1 provided no information about the well itself; it did, however, provide information on the activities of the store. A datum was established at 1.58 below the top of well by inserting a metal rod in the mortar. Work on Level 1 began at 1.64 m below the top of the well after removing some

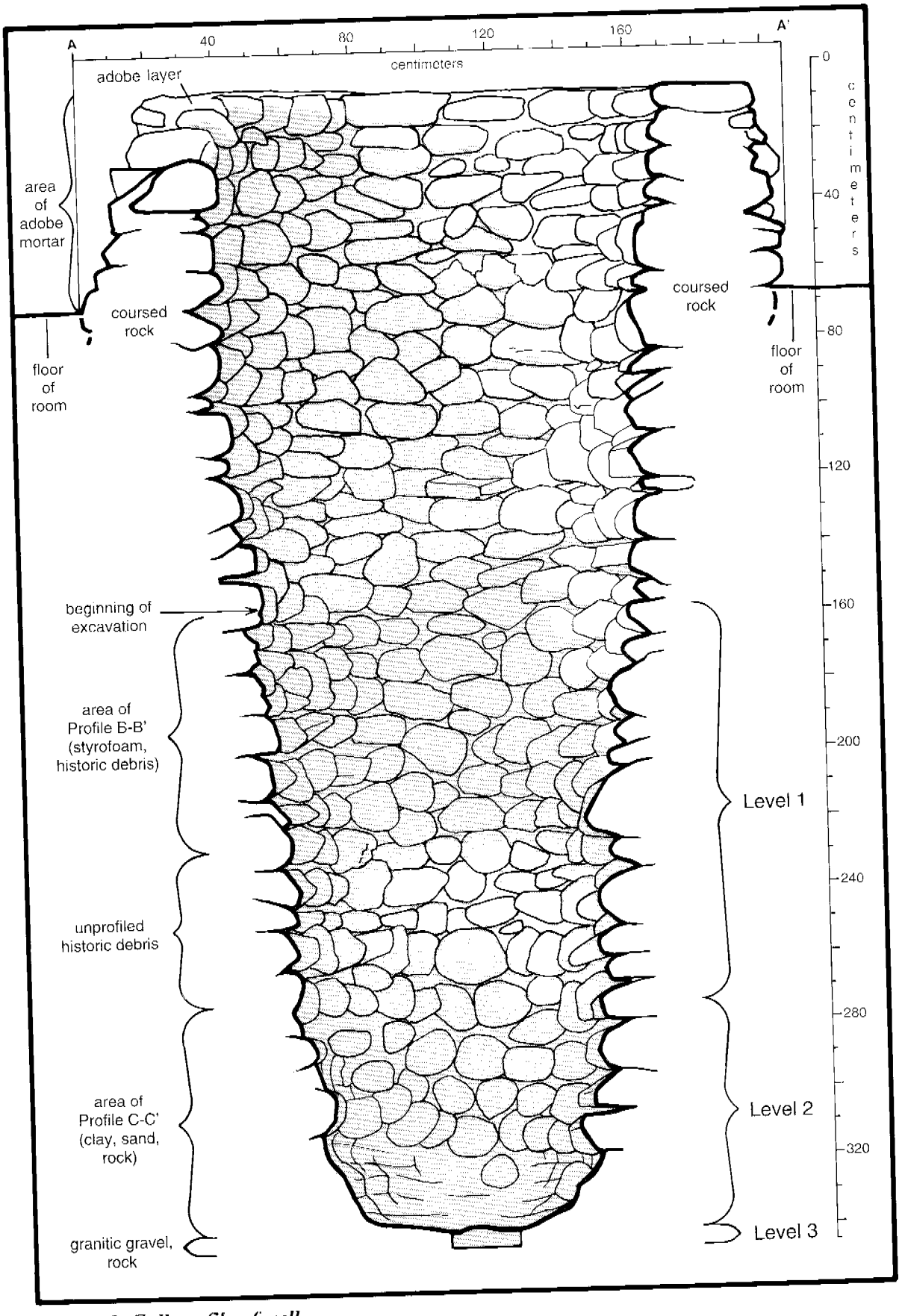

Figure 2. Full profile of well.

Figure 3. Stones and adobe mortar.

Figure 4. Stones below former water line, without mortar.

of the large, recent trash from the top of the fill. This upper layer was very loose, sinking under the weight of the excavator.

As can be seen from the profile of the west half of the well, the lower portion of Level 1 fill was a jumble of artifacts (Fig. 6). Dirt increased with depth, but it was still in a loose and disturbed state. At some point in time, a lining of cardboard and plastic sheeting was placed in the well, effectively containing most of the loose fill, although this level did continue past it.

Figure 5. Looking down into the well.

The upper layer was trash typical of a commercial establishment: pieces of old display racks, dimensional lumber (1" x 2"), ubiquitous styrofoam peanuts in various styles, shelf braces, broken light bulbs, plastic tie wire, cardboard, plastic forks and spoons, styrofoam cups, and soda cans.

Many pieces seemed related to the changing displays of the store, such as driftwood, spray paint cans and lids, rocks, and broken adobe bricks. The store keeps a supply of adobes in the basement for building displays, and when one broke, it was evidently tossed in the well. One unusual artifact in this category had a tag that read, "Mule pack $150/circa 1890." The item was of heavy canvas, probably hand stitched, with a leather top circling a wooden stick 24 inches long and around 1 inch in diameter. The canvas bag was roughly 14 inches high, 18 inches wide, and 10 inches deep. One side of the back had hand-bound lacing holes on the exterior and interior flaps, which overlapped in such a way that the holes were entirely nonfunctional. The bag may have been reworked between its functional life and its life as an "antique." Its final use, prior to deposition in the well, was as a holder for a mass of dried flowers in a fall display, according to the store's designer. Such a trajectory, from functional item to antique to decorative item to trash, exemplifies the processes at work in the well deposits.

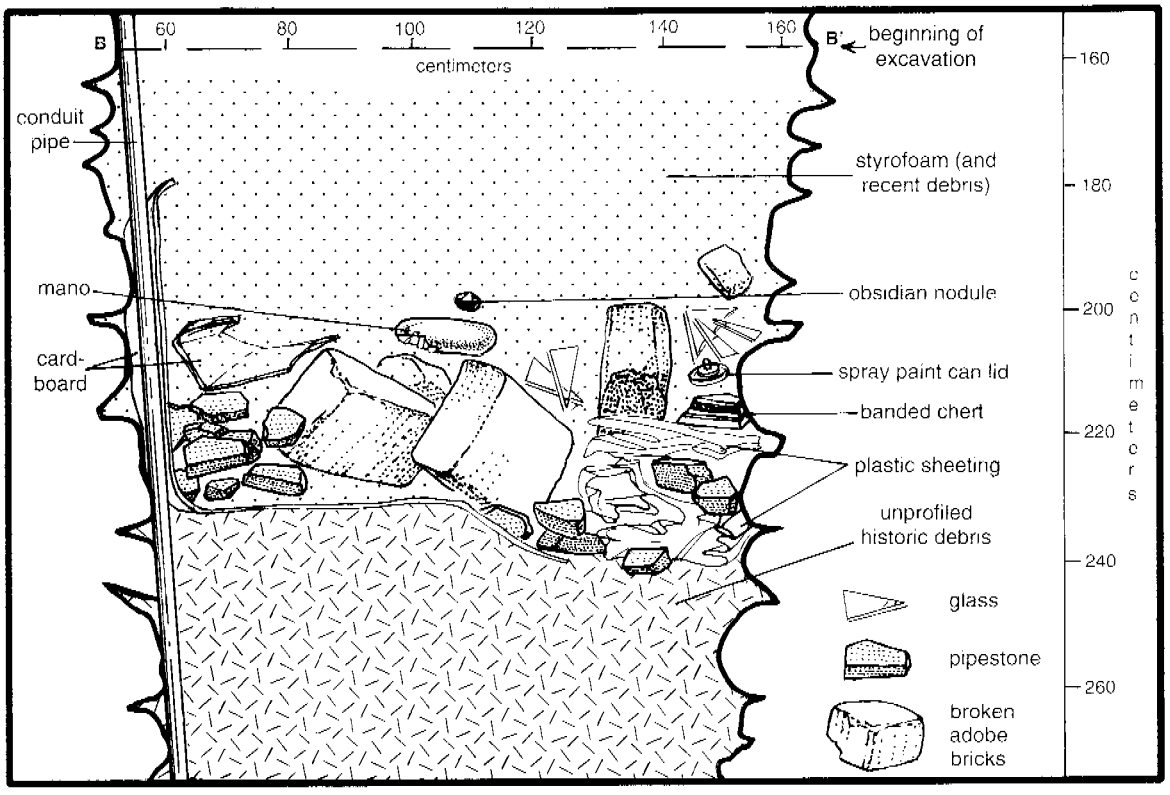

Figure 6. Profile of Level 1.

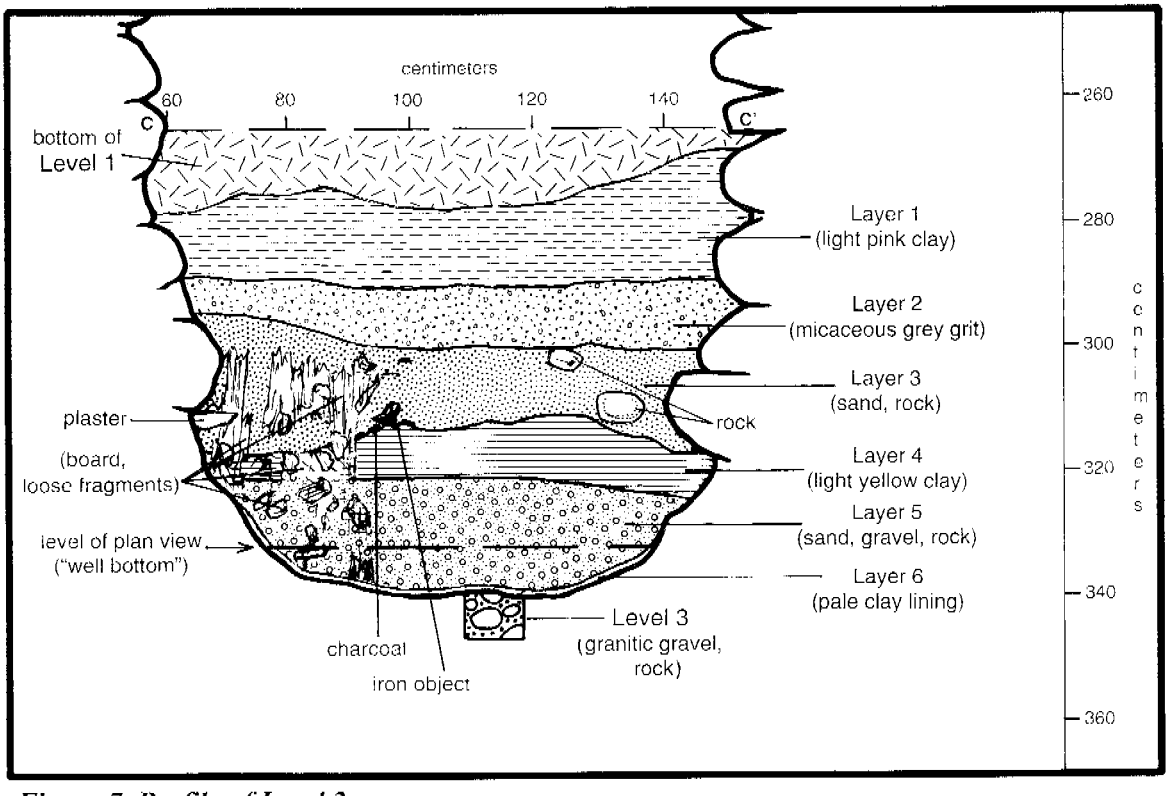

Figure 7. Profile of Level 2.

Associated articles include several purple ribbons and rosettes. The most complete of these was marked "Special Award--Alice and Don Bullock's Santa Monica Indian Ceremonial June 6-7-8 1975, Santa Monica, California," probably for a prize-winning pot or necklace.

Another class of artifact included broken or discarded inventory pieces. Most of the Native American pottery probably belongs to this class. The most common pottery had a Tewa paste, and most of the sherds were from one vessel, a Tesuque Polychrome jar. The next most common type was smudged black wares. There was also a piece of micaceous ware. Most of these sherds are probably contemporaneous with the store, implying that it was buying from living artists. The Tesuque Polychrome dates from the late nineteenth century to ca. 1930, when the style died out and was replaced by garish, "poster paint" colors, intended to catch a tourist's eye. Even these sherds, however, display a deterioration from the standards of functional pottery. While the decoration is extensive, the body of the vessel was poorly made and fired (Wilson, personal communication, August 12, 1998), to the point that the vessel could no longer support a serious function. Although similar in appearance to previous styles, it was merely a decorative object.

There were also fragments of a small Mexican ware cup, or *taza*, half of a miniature jar, and some very soft red ware pieces, perhaps from a figurine base and a flared lip vase covered in a black slip. Decoration in stepped and lightning designs was crudely scratched through the black to reveal the red.

Two other sherds deserve special mention. One was an incised corrugated, Pueblo I or II, San Juan Anasazi sherd from the Cibola-Kayenta tradition. This sherd probably arrived at the store as a sherd, rather than part of a pot. I have a dim memory from the late 1960s of large tables in the Original Trading Post filled with boxes of mineral specimens and pot sherds that could be purchased for 50 cents each. The other sherd is from the bottom of a vessel that bears an imprint of a rug, complete with fringe, on the bottom. This pot, which may be of Indian or Hispanic manufacture, has an alluvial paste with large, crushed granitic temper. The paste does not display the characteristic mica inclusions of most Rio Grande alluvial clays but in other respects conforms to that classification (Blinman, personal communication, August 7, 1998).

By far the largest bulk of artifacts was in the mineral category. At some point in time, there was an in-house jewelry operation in the store, and the debris and leftovers went into the well. About 300 pounds of rocks were removed, including 3,000 g of turquoise; 150 pounds of pipestone; 80 pounds of serpentinite, which is commonly used in making heishi; about 30 pounds of specular hematite; smaller amounts of obsidian, petrified wood, Mexican crazy lace agate, and sodalite; and about five pounds of amazonite, a gem-grade feldspar. In a small soil sample that was taken, an unfinished jet pendant and a chunk of coal, presumably of jet quality, were found.

Another set of stones probably represents artifacts offered for sale or even made on premises. These are the cherts, quartzite, and some obsidian. Notable among these is a prismatic blade core of obsidian with a slight greenish cast. Both technique and color suggest a Mexican origin.

The artifact trade is also represented by several store bags and labels: "Saskatchewan Points Canadian 40 cents," "Missouri Spear 90 cents," "Arkansas Points $1.75," "Arkansas Stone Tool 20 cents," and "Missouri Spear $1.25." There are also several stone implements, none of which were found in the bags, unfortunately. We have grave doubts as to the authenticity of several of these artifacts. One stone, shaped like a small ax or "tomahawk" head, is made of sandstone, a very unlikely material for such an implement. Another piece, shaped from micaceous schist, is also of

questionable authenticity. A piece of coarse vesicular basalt has been grooved for a maul head, but the stone is so irregular that one end is useless, and the other is at such an odd angle to the handle that solid contact with the object being hit could not have been made. One piece, made from a quartzite cobble, may have started life as a mano, then been reground into an ax. The main face is badly split, perhaps in manufacture, but does not appear to have any use-wear. There are also several flat stones shaped for handles, but they are very thin and have no sharpening of the edge whatsoever. While an unfamiliarity with the lithic technologies of Saskatchewan and Arkansas precludes stating outright that they are fakes, we put no faith in their authenticity, either.

There was a real one-hand mano and a two-hand mano (price 50 cents), as well as a stone marked "Arizona-unknown use 50 cents." It may be that the artifacts were selling so cheaply, it hardly seemed worthwhile to fabricate them. But the store was one of the early catalogue stores, selling artifacts all over the country (Batkin 1998), so the supply may have been outstripped by the demand for Indian artifacts.

The store also sold children's toy tomahawks, bow and arrow sets, and spears for more than the artifact prices. These were still being sold well into the modern era. One large rubber spearhead was found in the well.

Another component of the jewelry trade is the large amount of shell found. Some 54 whole shells were found, 35 in Level 1 and 19 at the top of Level II. There were 39 clamshell items, 10 abalone, 2 olivella, and 1each of conch and snail. There were also numerous small fragments of shell.

The size of the shell and turquoise fragments suggests that a lot of inlay work, perhaps in the Zuni style, was done on the premises. It would be interesting to know if this reflected the ethnic affiliation of the artisans or the market preference. Most of the cut turquoise is in small cabochon cuts, some still unpolished. Some, including one larger piece, still have the mastic backing for attaching them to the stick that allowed them to be brought into contact with the polishing wheel. Some are still in nugget form, while others have been cut in two. Green, light blue, and one piece of bright blue are represented in the worked pieces.

Level 2

Level 2 began at 2.60 cm below the top of the well. As can be seen from the profile of the north half of Level 2 (Fig. 7), there was a well-developed stratigraphy in the deposits, all of which were increasingly damp. The beginning of this level was well defined by a layer (Level 2, Layer 1) of light pinkish, platy clay, which quickly changed to a sandier, darker version. Unfortunately, neither this layer nor the rest of the stratigraphy occurred in the neat flat layers of water-settled sediments. This is one line of evidence that leads us to believe the well was cleaned out at least once. Also, deposits were still mixed at 2.90 cm below the top of the well (BTW). This layer, which has varying thicknesses of laminates in it, was uppermost in the well when the stones were painted, because splatters of the paint were found on top of the clay. This layer has the appearance of a jaspe plaster or calcimine paint, a lime-based paint much like whitewash that powdered colors were mixed into. The material reacts to hydrochloric acid, showing a carbonate base.

The second layer (Level 2, Layer 2) was described in the field as micaceous gray grit. Microscopic examination of the soil sample from this layer showed much very fine charcoal mixed with soil (Toll, personal communication, August 14, 1998). A few small lenses of this material also

appeared in the layer above. Below the gray layer was a layer (Level 2, Layer 3) of sand and rocks up to fist size. A hole about 20 cm across appeared in the southeast quadrant of this layer, near the light fixture and extending to the bottom of the well. This hole may have been a result of excavations when the light was installed, because the entire area surrounding the light seemed to be more disturbed than the rest of the fill. Alternately, a timber, for example, may have been removed at a later date. This layer had wood, charcoal, and other artifacts in it. Below that was another layer of pale clay (Level 2, Layer 4), followed by another layer of sand and gravel (Level 2, Layer 5), and a final thin layer (Level 2, Layer 6) of pale clay covering the bottom, which was bowl shaped.

Beginning in Level 2, Layer 3, a board was discovered against the west wall, standing vertically. The board was left in place as long as it would stand, which was nearly to the bottom of Layer 5. This board is the largest remnant of what appears to have been a wooden liner in the water-bearing level of the well. Deagan (1983:57) describes a common well construction in Spanish colonial Saint Augustine, Florida, that consisted of a barrel buried in the ground, or two barrels stacked one on top of the other. The barrel served to keep the excavation from caving in and also kept the water clearer. Here the latter function would certainly have been desirable. There was also evidence of a wooden floor in the well (Level 3).

The bottom had become an egg-shaped ovoid, no more than 85 cm wide in any direction. At 1 m above the bottom, the width was 95 cm each way. At 2 m, the well was 112 by 102 cm and 132 by 122-130 cm at the top, depending on which rock the measurement was taken.

Wood and charcoal fragments were found throughout the fill of Level 2, including a piece of round wood in the south wall at 3.05 cm BTW. The gray layer may represent some sort of ash layer floated to the top. Ash in soil will migrate downward and form a layer if sufficient water is applied from above. It seems reasonable that, with water from below, ash might rise through the deposit and make a layer on top. Indeed, the sample was caked enough to show a slight stratigraphy within the layer itself, with the purest gray on top of the layer, and increasingly mixed with fine sand downward. Charcoal can also be used as a purifying agent for water, although ash would not be the form used.

The three layers of pale clay deserve some discussion as well. The soil sample from the lowest level is definitely white. This layer reacts strongly to hydrochloric acid and may represent the carbonates common in Santa Fe water. One speculation on the development of the stratigraphy is that a clay layer was put on top of the natural sediments to keep down the sand pulled up by the bucket. As the well silted in, another treatment may have been necessary. The topmost clay layer may have been an effort to control the charcoal-laden layer just below. Alternately, the top layer may result from dumping a plasterlike material in the well. While it may seem strange to put plaster down a well, there are several good reasons for doing so. Unused wells are often employed for trash disposal, or it may have been desirable to seal the well and keep down the musty odor arising from the well. Alternately, if the well were still in operation, which is doubtful, it may have been necessary to seal the charcoal-bearing layer. One artifact, a quarter of a disc of soft, ceramiclike material with a three-dimensional design on one side, has a paste body very similar to the clay layer in color and texture. If several similar artifacts, or the material they were made of, were dumped in the well and dissolved, it might make a layer similar to the deposit.

Three dateable artifacts were found in this level. The first was three-quarters of a large soap dish that bore a stamped "HOTEL" mark on the base. Many firms made hotel ware, a double-thick, heavy form of undecorated white ware. The name is most commonly associated with Homer Laughlin, but Laughlin seems to have used a monogram with the HOTEL mark on hotel ware manufactured around

the turn of the century. This mark may have been inked instead of stamped or incised. Later hotel ware bore an inked design with the company name. The unaccompanied HOTEL, in the same font as this specimen, was used by Burford Brothers, another East Liverpool, Ohio, pottery, which was in business from 1879 to 1904 (Lehner 1988; Dean 1984). It is unclear from the illustrations if the Burford mark was inked or incised, although the latter is likely.

A related artifact is a wooden brush back, probably from a scrub brush, the bristles of which had been held in place with U-shaped iron staples. The brush is of a size that would have been used on floors.

The other two dateable artifacts were shell casings. These were made by the Winchester Repeating Arms Co. and are center fire cartridges (WRA-WCF). They were measurable at both rim and base; length was not available because both had been damaged prior to deposition. However, the base and rim measurements were entirely adequate for identification. Rim diameter on both was .516 inch, and the base was .467 inch. The last digit in cartridge measurements is not considered critical; that is, a slight variation in the third decimal place is normal. The only cartridge listed within acceptable allowances (Barnes 1985) is the .44-40 Extra Long, at .515 inch and .468 inch. No other obsolete cartridge is close. The .444 Marlin, a cartridge introduced in 1964, has similar measurements but a different rim style.

WRA-WCF cartridges are often called Model 1873, but that refers to the switch from the Henry Rifle to the Winchester that the company made at that time. The original load for the Model 1873 was a .44-40 (Barnes 1985:81). The .44 Long center fire was introduced in 1875-76 for the J. M. Marlin Ballard Sporting Rifle. The original cartridge was unpopular and was quickly replaced by the various Winchester center fires. In 1908, Marble Arms Co. introduced the Game Getter, a double-barreled, over-and-under pistol with a removable buttstock. The top barrel was chambered for the .22, and the lower, smoothbore barrel used a .44 shot cartridge with a load of 40 grains of black powder, hence the name. The .44-40 Extra Long appears to have been the .44-40 shot case with a conical bullet instead of shot (Barnes 1985:118-119). Barnes appears somewhat dubious of this conclusion, however.

Barnes gives no information on the end date of the various .44 cartridges, and a version is still available today, but with different dimensions: .471 inches and .525 inches. While the .471 might be within manufacturing tolerances to the .467 of the specimen from the well, the .525 is not. No American rifle has been chambered for the .44-40 since 1937, and no pistol has been made for it since 1942, but ammunitions are manufactured long after the last weapon is turned out.

Thus, although .44-40 cartridges date back to 1873, these specimens are unlikely to be that old. If they are indeed .44-40 Extra Longs, they probably date no earlier than 1908. However, since they were found in the fill well above Level 3, they cannot date the well itself.

Two other unusual artifacts found in the lower layers of Level 2 are a large valve handle of solid iron, and an octagonal housing, also iron. It might be supposed that the housing goes with the valve wheel, since the one fits over the center of the other, but the housing is octagonal, and the valve handle wheel is six spoked, dividing into twelve near the rim. Nor do valve handles usually have covers, and this one is not large enough to have covered the entire handle and render it safe from unauthorized use. When first found, I hoped the wheel would prove to be part of the water-return system, i.e., a pulley device, but the rim is very round, with no groove into which a rope or chain could seat. Such a valve would be an extreme case of over-engineering if it were a part of the well.

It is more likely to have been part of the city water system, perhaps a shut-off valve. Such cross valves, as they are called in the 1897 Sears Roebuck catalogue (Israel 1968:54), were usually of brass and sized for pipe from 1/4 inch to 3 inches in diameter. This one seems to be for a pipe somewhat greater than 1 inch in diameter. The pipe is in the hub of the wheel, a device 2.6 inches in diameter, while the overall diameter is 8 inches. The device weighs almost 8 pounds.

The housing has a 5.13 inches diameter with a 2.03 inch interior opening, and it is about 2 inches high. It appears melted on the surface, as do several other metal artifacts. This melted surface is probably from the japanning, a thick layer of black enamel paint, that was a common finish on turn-of-the-century iron artifacts.

Two buttons, both white, were found in Level 2. One was a four-hole, fused porcelain, and one was a two-hole, molded plastic that still had thread and cloth fibers from a purple and tan, probably plaid shirt. Both could be shirt buttons, and both, surprisingly, have similar date ranges.

Fused porcelain or "china" buttons, which are often confused with milk glass, are made by a process patented by a Mr. Prosser in 1840, in which dry powders were molded and then fired, or by a French process in which milk was used as a binder. By 1850, the French process, because it was about half the cost of the Prosser patent, had achieved market dominance, a position maintained until the advent of cheap plastics in the early twentieth century (Pool 1991). They were used for "cheap dresses and underwear." Production of the Prosser process began in the United States in 1841.

Plastic buttons began in the late 1840s with the invention of vulcanized rubber. It must be remembered that plastics can be of natural or synthetic origin. Composition buttons made from organic plastics were produced as early as 1875. After 1925 they are classed with modern plastics. Synthetic plastics began in 1865 with the development of Parkesin, which was quickly followed by celluloid in 1869. Casein, invented in 1890, was not introduced to the United States until 1919. Bakelite, the first synthetic plastic, was invented in 1909. Celluloid was finally replaced by modern plastics after World War II (Pool 1991).

It is not known what type of plastic this button is made of. It appears similar to modern, post-1945 plastic, but the thread, while the same diameter as modern thread, has a tighter twist. This button was sewn on with five loops through two holes, one loop perpendicular to the first set and four loops through the parallel set of holes. Unlike a modern machine-sewn button, where the thread is not fastened in any way and usually unravels, this button was pulled from the fabric with thread intact. The button is also much scratched and chipped.

Level 3

A plan drawing (Fig. 8) was made of floor contact $\pm$ 5 cm. Many of the larger artifacts were embedded in the floor. Here was where most of the information about the well derived. Also at about this level, the masonry gave way to soil, indicating we were below the man-made part of the structure.

One of the objects on the floor was a length of chain with an eye at one end. Another was a jointed hanger, shown in the 1897 Sears, Roebuck catalogue (Israel 1968) as ideal for attaching to overhead wooden beams, when chain was not desirable. The device had an eye bolt on one end that screwed into the wood, and the rest of the device was made of straight rods with eyes on the end, like

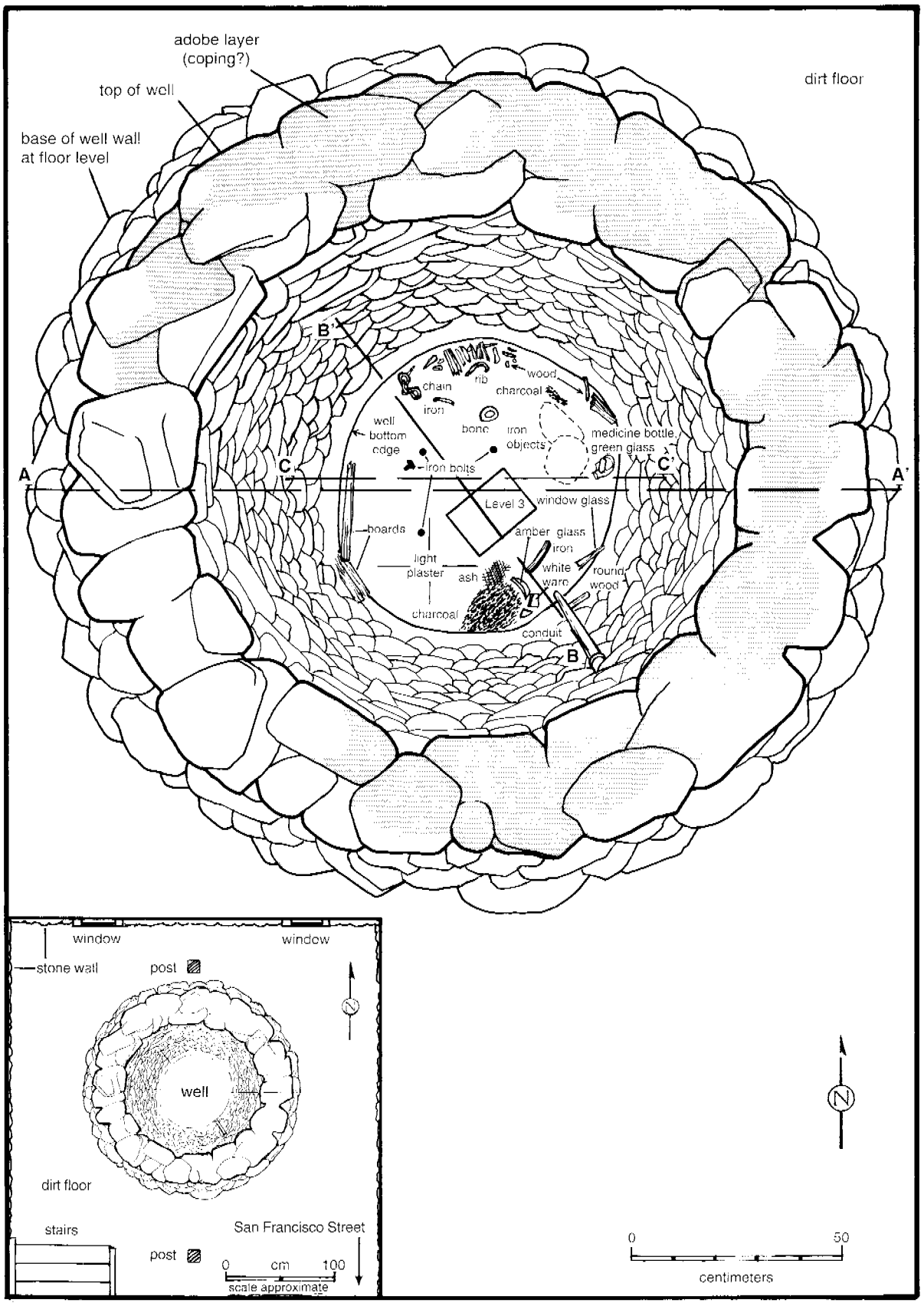

Figure 8. Plan view of well, including bottom of Level 2.

a very long chain. Both these devices could have been part of the water-return system.

Foremost among the iron objects on the floor were three bolts set vertically in the center of the floor. These bolts were 3 to almost 6 inches long. Another bolt of similar appearance was not set vertically. We may have broken it off in excavation, or it may have already come loose. These bolts were 24 cm (9.45 inches) apart and began about 3.31 cm BTW. These probably represent a wooden floor that was in the well at one time. Otherwise, it may be part of the roof that fell in, but it would have had to fall 3 m without turning and land hard enough to embed the bolts in the granitic sand and gravel at the bottom of the well. The varying length of the bolts would prevent that.

Several other iron objects were found in floor contact, but many had turned to rust powder, leaving only a stain on the floor. A large area of rust and iron bits was found in the northeast quadrant.

Rotted wood and wood fragments were found around at least three-fourths of the circumference of the well, indicating that other boards may have been present. A concentration of charcoal and ash was found in the southwest quadrant.

A medicine bottle base was found against the wall at 3.10 cm BTW, and under it, at 3.35 cm BTW, a green bottle base and body fragment. These artifacts will be discussed in the following section. A sherd of another hotel ware soap dish was also found at 3.31 cm BTW. (These measurements may properly belong to Level 2, but Level 3 is an arbitrary division based on floor contact, and it must be remembered that the floor is curving. Also, the height of the rock on the top of the well has a great deal to do with the resulting measurement.) The soap dish, though very similar to the Burford Bros. specimen, came from a different mold.

At 3.35 to 3.39 BTW, the lowest clay layer was encountered, curving into a well-defined bowl shape. It did not completely cover the bottom, however. Small holes where the natural soil showed through indicated to us that the well was cleaned out down to this level.

At this point, a 20 by 15 cm "window" was dug to 3.45 cm BTW to verify the bottom. This window was sterile of artifacts. Augering was then conducted around the perimeter and within the window, the results of which are given in Table 1.

The larger number of artifact classes in Auger Hole 4 reflects the generally disturbed state of the deposits around the light fixture. The iron fragments in Auger Hold 3 may have been on the surface, but they were not visible until the dirt was screened. Also, all the artifacts came from the curving sides, not the true bottom. The crucial object is the large rock in the center, which might have destabilized the whole structure if it had been removed.

Table 1. Auger results, LA 122584

Auger Hole	Location	Depth (cm)	Result
1	East	40	Sterile
2	North	50	Glass, wood, and bone fragments
3	South west	35	Rock and iron fragments
4	South	28	Charcoal flecks, one milk glass sherd, and plaster
5	Center (in window)	8	Sterile. A large rock covers entire hole.

ARTIFACTS

Bone

Bone was common in the fill of Level 1 (n=32) and Level 2 (n–42). A complete list is found in Appendix 2. Most of the assemblage of the two levels is comparable, with two exceptions, discussed below. It is possible that some of this material was also used in inlay work or to make bone beads. Some of it, especially the chicken bones and T-bone, may also represent lunches as well. The presence of phalanges and other foot elements, especially in Level 1, also indicates some other agent of deposition than employee lunches. Some of the bone has been sun-bleached and checked, indicating it was picked up on the surface long after death. Six bones were gnawed by a carnivore, also indicating old bone. One bone was gnawed by a rodent, which could have happened before or after deposition. Several were sawn in two dimensions or even three, perhaps indicating preparation of the fragments for further work. Some were also broken by impact. Seventeen bones exhibited saw marks. The use of saws instead of axes for butchering is very much a post-1850 trait. Only two bones exhibited definite impact fractures, a technique more common in prehistorical or colonial times.

Species include turkey, chicken, a large dog or wolf, sheep/goat, cow/bison, and other unidentifiable artiodactyls. Sheep and goat, and cow and bison, are often indistinguishable, especially in fragmentary form. It was in species that the two levels differed most. Rabbit bone, both cottontail and jackrabbit, occurred only in Level 2. Three pieces of rabbit bone-- a phalange, a proximal ulna and a vertebra fragment, were recovered. I am not sure what to make of this particular assemblage of parts, but rabbit was a minor part of many people's diet through the first half of the twentieth century.

Human bone occurs only in Level 1. Eleven pieces were found in the lowest part of Level 1. Four skull fragments from at least one individual, a tibia shaft, and four right femur shafts and two left femur shafts, representing at least three individuals, were present (Akins, personal communication, August 13, 1998). The odd thing about the assemblage is its uniformity. All the long bone portions are within 40 mm of each other in length. One outlier is 160 mm long. Otherwise, the measurements fall within 30 mm of each other. The outlier is a paler color than the rest of the bone, perhaps implying a different taphonomy before deposition in the well.

Such an occurrence deserves at least some effort at explanation, but there are no good ones. Possibly at some time in the distant past, the store had purchased grave goods, which may indeed account for the skull fragments. However, Akins pointed out that the muscular development on the proximal femurs is unlike that of prehistoric populations. The particular muscular development suggests post-contact activities, such as horseback riding.

Why the bones ended up in the well is still an open question. Were they found near the well or imported from another location? If they were nearby, whose were they? Were they buried on San Francisco Street? Why? Are the bones old enough to be from victims of the Pueblo Revolt? The last question is probably answerable with C-14 studies. DNA studies might shed some light on ethnic origin. Both types of tests are outside the scope of work of this project, however.

Sub-trochanter measurements can throw light on the ethnic affinity of bones. Two of the shafts had the appropriate area present. Specimen 1 measured 36.96 mm medial-lateral and 24.94 mm anterior-posterior. Specimen 2 measured 33.93 mm medial-lateral and 24.24 mm anterior-posterior.

Unfortunately, not enough work has been done with sub-trochanter measurements to consult a standard reference and establish ethnic identity easily. We offer the measurements for the benefit of future researchers who may be interested in the question.

Metal

Metal artifacts held several categories of interest, including the previously mentioned pennies. The farther down in the well, the greater the rust or corrosion encountered, but a very little scraping was often enough to identify the iron artifacts. Brass and copper were cleaned with Sparex, a commercial anticorrosion agent. Very few pieces of these metals were found. Most of the copper was in the form of wire, possibly a part of the jewelry-making process. Another several pieces were from the same artifact, which may be a small bell-shaped housing. It is 1 to 2 inches in diameter and has two scribed lines running around the circumference. The only brass were the cartridges and a brass button like affair of three-piece construction, the function of which was not identifiable. It first appeared to be most of a manila envelope fastener, but after cleaning, that idea had to be discarded.

Nails

Nails make a rough sort of chronometric diagnostic artifact (Nelson 1968). The technological change from cut plate to drawn wire as the basis of nail manufacture, which occurred about 1890, was a benchmark for construction. Simplistically, a structure exhibiting no drawn nails larger than brads was constructed before 1890; a wooden structure with no cut nails was constructed after 1890. Certainly, drawn nails began appearing before 1890, but between 1885 and 1890, the production of drawn nails exploded, with a corresponding drop in cut nail production. Cut nails, because of their superior holding power, continue to be used as masonry nails and for other specialized construction.

Cut nails hold their shape better than wire nails under the extremes of rusting. However, even when the nails have passed beyond the point where identification based on shape is possible, they can be separated on the basis of the characteristic disintegration pattern of the two types. Cut nails tend to split in parallel delaminations, whereas wire nails "dissolve" in a radial pattern. Occasionally, when the rust is too far advanced for even that technique to be of use, the nail was broken and the residual shape examined in the exposed cross section.

The well had 74 nails that could be identified with a reasonable degree of certainty as cut or drawn and another 12 fasteners, some of which are bolts. Many of the nails have wood fragments still adhering, suggesting that the artifact disintegrated in situ. Some nails also have what may be mortar fragments, but which could be accretions instead. Of the 74 identifiable as nails, 34 were probably cut, and 40 were probably wire, at least 5 of which exhibited burning. This ratio was even closer in Level 3, 33 to 34. The cut nails ranged from 1 inch to 3 inches. The wire nails were longer, up to 5 inches. Since the nails were too rusted to make identification of type (e.g., common or box) possible, pennyweights were not assigned.

Several scenarios are suggested by the nail division. Either the well's superstructure was initially created around 1890 (which says nothing about when the well itself was dug), or it was built before 1890 and rebuilt after 1890. A third possibility is that the wire nails were used to make the wooden part of the superstructure, and the cut nails used for attaching it to the masonry. The latter seems unlikely, because there are more cut nails than would seem necessary. Also, nails longer than 1 to 3 inches should have been used. Nor does the masonry show signs of having any nails in it. Another

possibility is that the cut nails were in discarded plaster dumped in the well. Identical nails are today found protruding from the plaster on the outside of the building. The jaspe-type plaster found in the well might bolster this line of reasoning. The assumption that the wire nails, at least, actually had something to do with the well is supported by the in situ disintegration of the artifact, which was put together with the wire nails. The burning, which also shows up on other metal artifacts, seems to be confined to the wire nails, indicating a post-turn-of-the-century episode.

Twelve pieces of strap iron ranging from .615 to .92 inch wide were found in Level 3. These could be taken as evidence for a barrel bottom to the well, but I am unconvinced they are from the same artifact or that any of those artifacts were barrels. Barrels of the 1870s and 1880s were often of impressive dimensions and strapped with stout iron, but that iron should retain some curvature as long as the artifact has structural integrity. Only one of these, the thinnest, was curved, and one was angled.

Sixty-four pieces of plate iron were also found, most of which seems to be split from a cast iron artifact. Only one piece, perhaps from a stove, had any integrity. It was rectangular and had a reinforced corner and a stepped back edge. Burning was evident on some of these artifacts.

Glass

Glass was divided into two major categories: flat glass and other artifacts. Most of the second category is bottle glass, with a few fragments of lighting fixtures, both bulbs and globes, and from electrical and kerosene lights. Some two dozen or more artifacts are represented in the collection. Window glass and bottles have potential for dating.

Window Glass

Window glass has been shown by numerous researchers (Chance and Chance 1976; Teague and Shenk 1977; Roenke 1978; Moir 1982; Schoen 1990; White 1990) to have varied in thickness through the nineteenth century. Using sites of known age and occupation, researchers have produced correlations of thickness and age that have been found useful in New Mexico as well. The source of supply and the method of transportation both have an impact on the glass thickness. In addition, one has to be alert to the possibility of recycled glass from earlier structures. The glass in the well cannot date the well, of course, but it may give some clues to construction sequences of the surrounding buildings.

Various statistical methods have been used to calibrate window glass: means, medians, and modes, represented by the midpoint of the classes. The mean, used here, seems to be as useful as any for small samples (Teague and Shenk 1977) and for regression analysis (Schoen 1990; Moir 1982).

In keeping with the standard practice of glass researchers, each sherd was measured three times, and the three averaged to produce the measurement for that sherd. Color (edge-on) was also monitored, showing four variations. A blue tint was more closely associated with the thinner glass, and green shades with the thicker. This alone would imply different glass formulas and suppliers through time. A total of 135 pieces of glass were measured. Two were discarded because the range between the measurements was greater than one one-hundredth (implying they were not a true flat glass), leaving a sample of 133. The mean was .090 inch, with a range of .064 inch. The thinnest was .050 inch, and the thickest was .114 inch. The median falls on the mean of .090, but the primary

mode is slightly thinner, .085 inch. In fact, almost 74 percent of the sample falls between .080 and .109 inch. Seven classes were noted from .050-.059 up to .110-.119, also the standard breakdown. All classes had specimens present. Of course, the longer a place is inhabited, the greater the range of glass thickness, as panes are broken and replaced over the years.

There are several methods for converting the thickness to a date, and all will be explored here. Not enough work has been done to firmly establish regional variations, although there does appear to be some. Chance and Chance (1976) give a primary mode of .085, a construction date range of 1855-1885, and a mode of .095--a range of 1870-1900. Roenke (1978) would give a post-1850 initial construction to the entire assemblage, with a mode of .085 inch representing the range of 1855-1885, thus agreeing with Chance and Chance (1976). There was evidently a 15 year overlap between 1870 and 1885, when both .085 and .095 inch glass was available (White 1990), and this might be the best estimate of when the building was built. Teague and Shenk (1977) found the Harmony Borax Works glass to have a primary mode of .095 inch in 1883-1888 but concluded that for small samples in one context, the mean was probably a better indicator.

Moir (1982) and Schoen (1990) came up with a regression analysis of means that produced formulas for deducing initial construction dates. Moir was working in the South, and Schoen on the Plains, so there are some differences, which Schoen believes to be caused by different suppliers and the different functions of the sites. Schoen's work has proven the more reliable in northern New Mexico, perhaps because the glass was bought from the same supply houses that sold glass in the Plains sites. However, an acceptable standard deviation for New Mexico has not yet been determined. Schoen (1990) himself used an estimated standard error of 4.1 to 6.2 years. Using Schoen's formula, a date of 1879.8 is derived for initial construction, which would not be too far off, judging by the available historic maps of the area. Moir's formula gives a date of 1904.7, too late.

The present site of the Original Trading Post was actually first run as a curio store by Louis Fisher, who arrived in Santa Fe in 1877 or 1878 as a dealer in wool, pelts, and hides. In 1883 he moved to the Burro Alley and San Francisco Street location as a curio dealer (Batkin 1998). Thus, a construction date of 1879-1880 seems to be entirely compatible.

What is interesting here is the left hand tail of the distribution. Eighteen pieces (13.5 percent) were less than .075 inch thick, implying a fairly early construction, between 1850 and 1860. Interestingly, these dates reflect the American entry into Santa Fe and the increasing use of window glass. In point of fact, the Urrutia map of 1776 shows this part of the block to still be fields, although most of the rest of the facade of San Francisco to the Plaza was in place. By the time of Gilmer's map (1846), the west end of the block was in place, but with a large open space just east of it, about in the location of the store. By 1883, the Sanborn map shows the open space in the facade filled in, although courtyards remain open at least until the turn of the century. Some courtyards are still open in the block. The window glass indicated a fairly steady level of remodeling throughout the next several decades.

Bottle Glass

Bottle glass is also time-diagnostic, because manufacturing techniques changed sharply several times during the nineteenth and early twentieth centuries. No whole bottles were found in the well. The bottle sherds will be discussed by color, which is also a diagnostic feature of bottles. One caveat: It is almost axiomatic among archaeologists that "purple" glass represents 1880 to 1920, but no purple glass was found in the well, for the simple reason that the purple color is a function of

exposure of manganese-clarified clear glass to sunlight. Obviously, no bottle glass put into the well around the time of use would ever see sunlight again. However, the absence of purple glass is also a mild reassurance that the artifacts were *not* deposited long after use, as old bottles intended for sale, then broken.

The shards were sorted by color, thickness, quality, patina, and any other distinguishing characteristics, such as bubbles, surface finish, etc.

Green Glass

Green glass is represented by pieces of bottles, as determined by a careful examination of color and other characteristics, such as swirl patterns in the patina, or their absence. Two of the bottles are a yellow green but have entirely different patina patterns. It is barely possible that they are the same artifact, however. One is base shards, and one is the finish and neck and associated shards. One of the bottles exhibited a bluer green, and one was the very dark green commonly called black glass. Only one shard of this very thick and obviously old glass was found. Black glass was employed "mostly for alcoholic beverages . . . and mineral water, prior to ca. 1870" (Fike 1987:13). Two very small shards are a dark teal green, implying another artifact, though not necessarily a bottle.

The only finish in the green glass was formed by a technique called applied lip, but more correctly known as "laid-on ring," which was common after 1840 (Rock 1980). After the late 1870s, a separate, hotter "glory hole" was added to the furnaces that permitted the laid-on ring to be applied so smoothly that the seam is undetectable (Baugher-Perlin 1982). This specimen has an easily detectable juncture, so may be dated pre-1880, although the persistence of earlier technology in some manufactories always clouds the dating of a single artifact. It is better to look at the assemblage as a whole. Along that line, the base in the assemblage has no heel or other visible seams, so it may be from a dip mold. There are two concentric level changes in the base, culminating in a raised dot in the center. This dot appears to be too smooth to have come from a pontil, and dip molds may have been fashioned with a hole in the base, although it may have been done to prevent vacuum forming. No literature consulted discusses the dot. Another bottle body that curves down to the base, although the actual base is missing, also exhibits no heel mold seams or body seams.

The first base closely resembles a bottle described in Wilson (1981:106) as a bulk ink bottle. Wilson's specimen, described as transparent green glass, exhibits the same swirls in the glass as the specimen from the well. He also describes a raised dot in the center of the base. Unfortunately, he does not specify what technique created the dot. The bottle was dated by context to 1880-1890. It would certainly make sense for a store to have a bulk ink bottle on the premises. These bottles had a pour spout formed in the finish, which strengthens the supposition that the green glass finish described above was not part of this bottle.

Aqua Glass

Aqua glass is represented by two specimens, a small thin bottle (three or four shards) and a larger specimen of five shards. This is the neck and shoulder area of what is probably a quart beer bottle. Aqua glass was common in beer bottles in the 1870s and 1880s. There were several breweries in Santa Fe from 1860 to 1900, but all of them recycled any bottles that came their way, so even if this bottle were intact enough to identify, it could not be definitely tied to the local economy.

Amber Glass

Amber glass was represented by six different artifacts, based on color and thickness. These two attributes are problematical at best, because any bottle may contain great variation in thickness, which can influence color greatly, as well. None of the pieces were diagnostic in any way; all are body or shoulder shards. One is a sliver of modern, dark brown beer bottle glass. The largest shard is a golden color and of beer-bottle size. The three shoulder shards belong to at least two different containers. The only neck/shoulder shard is of a pale honey color that may well be selenium glass, ca. 1915 or 1920 to 1993. It is of a size that suggests canning jars, which were made in selenium glass.

Clear Glass

Clear glass was the category with the most artifacts, including the only bottle with a maker's mark, the letter S enclosed in a diamond. Unfortunately, this mark, with its variations, is unidentifiable by maker or user (Toulouse 1971:455). The diamond on this specimen is elongated in the horizontal axis. Toulouse shows the elongated diamond with two Ss and a smaller diamond with one S. Other variations are SO or SB in the diamond. There is some speculation that the marks indicate pre-1920 usage by a company known as Swindell Brothers. The Swindell Brothers were sons of a glass blower who went into business for themselves in 1869. The firm lasted until 1959, so even if the identification were valid, it would help very little in dating the well. The bottle is a form of panel bottle that enjoyed its greatest popularity from 1865 to 1915. The bottle is of a type of half-oval base that is known as the Philadelphia Oval (Fike 1987; Wilson 1981), although Fike also gives the alternative name Buffalo Oval. It is very likely a medicine bottle, although extracts, flavorings, and even perfumes came in "medicine" bottles.

Another clear glass bottle was also present. It is represented by two shards, a rounded shoulder, and the neck and finish of a small bottle, probably a medicine bottle. The neck and finish, which is that called "patent," was usually used for cork-closure medicine bottles. The neck and finish were created by a lipping tool, which erased the seam half way up the neck. This bottle probably dates between 1870 and 1920, although the lipping tool was first patented in the United States in 1856 (Rock 1980). These shards cannot be part of the "diamond S" bottle because the seam on this specimen is raised and very prominent, whereas the other bottle had no seam at all on the middle of the shoulder. The seams were concealed in the paneling on the edges of the shoulder.

One of the most interesting shards among the clear glass is the complete neck and shoulder of what may be a glue bottle. The lip is sheared, that is, simply cut from the blowpipe with no other treatment. This was the standard bottle finish prior to 1840, when applied lip technology began, although it lasted long after, evidently. The lip of this artifact is slightly off-level from the molded body, and the seam continues on up the neck. Then it is either fire-polished off or run through a lipping tool. Why this artifact should need such an antique finish is unclear. It may be that the shape is traditional to the contents. This artifact has two rings on the neck, one round, one elongated on the upper side, that fitted a body that sloped out at about on the same angle as the elongated ring. My first thought was that it might be an inkwell, but no inkwell seems to have had more than one ring under the neck. Wilson (1981:92-93) shows two glue bottles of the same shape, with sheared lip and two rings. One of his specimens is aqua, the other clear. The latter appears identical to the present specimen, down to the off-level lip. Both were dated by context to 1880-90. Of course, either a glue bottle or an inkwell would be appropriate to a commercial establishment.

Three shards represented at least two tumblers, but the most interesting nonbottle glass was from the lighting fixtures. In addition to the standard kerosene lamp chimney rim, there were several "innards" of light bulbs, two of which were still in the bases, another of which had come loose from the base. Several very thin glass shards also were painted with what can only be described as blue poster paint. This paint seems to match the color of the stones on top of the well, and spatters of a blue paint were also found at the top of Level 2, implying the artifact was painted on the spot. The glass is of a weight to be Christmas ornaments, but the paint is too crude. It may have been a light bulb that was hand painted for display purposes. It would be too convenient if it were the bulb from the well, but the paint is very fugitive, washing off easily.

Discussion

The problem of dating the well is a knotty one. We cannot be sure any artifact in the well is actually connected with the well itself, although Level 3 artifacts are most confidently placed here, followed, with even more caution, by Level 2 artifacts. Yet certain facts stand out. No artifact can be placed earlier in time than 1875, and at least one artifact has an end date (manufacturing) of 1904. The bottles may represent the earliest artifact class and can confidently be placed in the 1875 to 1890 range, with the exception of the black glass, which may be a decade earlier. (Black glass is certainly older than that, but bottle glass is exceedingly rare in colonial contexts.) Although a few unidentifiable bottle body shards are probably modern, it should be emphasized that no bottle with modern characteristics was found. The Levels 2 and 3 white ware ceramics also support an 1880-1900 context. The Burford dish had to have been made before the company went out of business in 1904, but could have ended up in the well many years later.

While the team is convinced the well was cleaned out previous to our efforts, it seems unlikely that *all* evidence of an earlier era would have been removed. The only artifact found in a place that might suggest that it was part of the mortar was a clear bottle neck, of an age comparable to that of the rest of the bottle glass. The well seems to be contemporary with the building, which dates ca. 1880, though it may well stand on slightly earlier foundations.

Archaeology always seems to generate as many or more questions than it answers, so it seems appropriate to close with a few research questions that cannot be answered by the limited archaeology. When was the courtyard enclosed and why was it so far below present street level? Granted that there are 2 m of fill in the downtown area now, how did the facade of the building stay the same all these years? Ca. 1880 photographs make clear that it has, but the well is lower than the building. Did the terrain slope sharply at the back of the block at one time? Was there already an accumulation of fill when the store was built? Was the area of the courtyard leveled before the well was dug? When did the well go dry?

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APPENDIX J: NATIVE CERAMICS

FS#	Period	Type	Treatment	Paste/Temper	Number/Vessel
2	historic	Tesuque	polychrome	Tewa	8
	historic		polychrome	Tewa	2
	historic		unpainted, polished	Tewa	8/same
		utility	black smudged		4
		utility	plain	micaceous	1
3	historic	black	extremely polished		17
		utility	black smudged		12
	prehistoric	utility	corrugated	sand	2
	prehistoric	utility?	Plain	sand	1
	unknown		pinched		1/bowl
	historic	Tesuque	polychrome	Tewa	6
	historic		polychrome	Tewa	3
			red slip; unpainted		6
			unpainted	Tewa	11
	historic		unpainted	basalt	1
Total					83

APPENDIX 2: BONE

FS 3: 0-49 cm below the Modern Fill; 2.28 m below Top of Wall

Human Bone

1-2. adult R femur shaft; 2 pieces, old break; 75% of shaft
3. adult R femur shaft; proximal shaft; about 40% of shaft
4. adult R femur shaft; distal shaft; about 45% of shaft
5. adult R femur shaft; distal shaft; about 35% of shaft
6. adult L femur shaft; proximal shaft; about 30% of shaft
7. adult L femur shaft; midshaft; 2 pieces, fresh break; about 40% of shaft
8. adult R tibia shaft; anterior shaft; about 15% of shaft
9. adult L parietal; about 40% of parietal
10. adult R and L parietal; small fragment from along suture; probably the same individual as 9
11. adult L occipital; small fragment; about 25% of occipital

Bird

12. large bird, probably turkey (*Meleagris gallopavo*), phalanx 2; complete
13. Cf. chicken (*Gallus gallus*) L tibia, proximal and 60% of shaft; immature but full size large bird; probably modern (greasy)
14. chicken left femur shaft fragment; mature; 40% of shaft

Carnivore

15-17 large canid (cf. *Canis* sp.) maxilla fragments; very immature but large, wolf or large breed of dog

Sheep/Goat

18. sheep or goat (*Ovis/Capra*) right zygomat fragment; mature with a small amount of burning; 40% of maxilla
19 sheep or goat right tibia; proximal fragment; mature 15% of proximal end and shaft

Bos/Bison

20. size of bison (*Bison bison*) right distal metatarsal with 15% of shaft; mature; impact fractures shaft end
21. large cow or bison (*Bos taurus* or *Bison bison*) complete phalanx 3; not quite mature
22. cf. cow or bison left astragalus fragment; mature, sun bleached checked
23. cow or bison thoracic vertebra; left lateral midsection; mature; sawn in three dimensions, anterior, posterior, and lateral
24. cow mandible; mature, right midsection

Unknowns

25. large artiodactyl (cow, bison, horse, elk) long bone midshaft fragment; mature; sawn in two

dimensions
26. large artiodactyl long bone shaft fragment; mature; impact fractures
27. large artiodactyl distal rib; mature or near mature; sawn off perpendicular to shaft
28. large artiodactyl flat bone fragment; mature; carnivore gnawed; sawn in two dimensions
29. large artiodactyl molar or premolar, probably mandibular, tooth enamel fragment
30.medium to large mammal plat bone fragment; mature; small piece; sun bleached and checked

North Half, 2.70 to 3.39 m

Bird

1. Chicken synsacrum; mature; 70% complete

Large Bird or Small to Medium Mammal

2. long bone shaft, ends missing; very immature

Sheep/Goat

3. sheep or goat left distal epiphysis; full size but immature; complete epiphysis
4. sheep or goat left proximal humerus; mature; carnivore gnawed; 70% of proximal end and small amount of shaft
5. cf. sheep or goat cervical vertebra; immature but near full size; right lateral portion; saw cuts in two dimensions
6. cf. sheep or goat cervical vertebra; immature but near full size; left lateral portion; saw? cut in one dimension
7. sheep or goat right rib; mature; proximal and 70% of shaft
8. size of domestic sheep or goat; left rig shaft fragment; mature; cut and snapped on both ends

Bos/Bison

9. cow or bison left lateral lumbar vertebra fragment; mature sawn anterior, posterior and possibly lateral
10. cow or bison left distal ulna; immature but full size

Unknowns

11. large artiodactyl long bone (probably femur) shaft fragment; mature; sawn at both ends, thin slice
12. large artiodactyl rib shaft fragment; mature; < 10% of shaft; carnivore gnawed
13. medium to large artiodactyl (large sheep or goat to small cow size) flat bone; immature; sawn?

14. small to medium artiodactyl (sheep or goat to deer in size) left scapula fragment; immature
15. small to medium artiodactyl long bone shaft fragment; mature; carnivore gnawed

South Half 2.60 to 3.10 m

Bird

1. chicken left humerus; full size but not quite mature; mostly complete with rodent gnawing on ends
2. chicken right radius; full size but not quite mature; mostly complete, slight damage distal
3. chicken right tibiotarsus shaft; immature; 40% of shaft
4. chicken right humerus; mature 90% of shaft; scorched

Sheep/Goat

5. sheep or goat sacrum; full size but not quite mature; 70% of first sacral vertebra; right wing cut or sawn off
6. sheep or goat cervical vertebra; mature; right lateral portion
7. sheep or goat left ischium; mature or near mature; carnivore gnawed inferior; saw cut through acetabulum
8. size of sheep or goat rib shaft fragment; 15% of shaft; sawn or cut one end, cut and snap on the other

Rabbits

9. cottontail (*Sylvilagus cf. audubonii*) right proximal ulna and half of the shaft; mature
10. jackrabbit (*Lepus californicus*) right metatarsal 4; most of shaft -- ends damaged; immature
11. cf. jack rabbit lumbar vertebra fragment; immature; transverse process fragment

Bos/Bison

12. size of bison distal L femur; immature; medial portion
13. cow right navicular cuboid; mature; about 35-40% complete; sawn in half lateral
14. cow right proximal femur shaft fragment (slice); not yet mature; saw cuts both ends, perpendicular to shaft
15. cow left distal femur shaft fragment (slice); not yet mature; saw cuts both ends, perpendicular to shaft
16. cf. cow left rib shaft fragment; not yet mature; about 30% of shaft; carnivore gnawed

Unknowns

17-20. large artiodactyl long bone shaft fragments (slices); not yet mature; saw cuts both ends, perpendicular to shaft
21-22. large artiodactyl rib shaft fragment; mature; carnivore gnawed
23. large artiodactyl rib shaft fragment; mature?; small piece (20 cm) with saw cuts both ends, perpendicular to shaft
24. large mammal flat bone fragment; mature
25. large bird or small mammal long bone shaft fragment
26. fossil, probably artiodactyl end of a long bone, proximal metapodial-like