III. RESEARCH METHODS

A variety of field, laboratory, and analytical techniques were employed during the current research project. Descriptions of and references to many of the techniques can be found in standard archaeological texts, such as Hester, Heizer, and Graham (1975), Fladmark (1978), and Hole and Heizer (1973) to name but a few. In this section, the specific techniques used during the current project are discussed in enough detail to clearly describe how the data were obtained, processed, and analyzed. In some cases the research methods actually used during the project are contrasted with the planned methods outlined in the proposal. In these cases the reasons for deviation from the proposal are discussed.

FIELD METHODS

The research methods employed at 41 JW 8 during the 1981 season vary somewhat from the planned methods discussed in the proposal. Some changes resulted from the year delay in beginning the field season and the expenses involved in negotiating access. Other changes were caused by unexpected field conditions and problems in relocating the 1975 grid system, as will be discussed.

EXCAVATION CONTROLS

When field work began in early October 1981, the site had undergone a number of changes since the 1975 testing. As mentioned, the property had been divided into several smaller tracts, some of which were newly fenced. The fencing and new property lines led to several of the changes affecting the site. In 1975, an old road leading from the ruins of the Amargosa Stage Stop east of the site (Fig. 1) could still be driven. By 1981, the road was fenced off in several places, heavily overgrown, and washed out on the hillside east of the site. Heavy secondary growth had covered the road adjacent to the site and had extended some 3-5 m out from the fence line (shown parallel to the 1981 main baseline in Fig. 1) into the plowed field. Thus, one of the first tasks undertaken at the site was to clear the undergrowth.

The brush clearing was accomplished with machetes, a chain saw, and a heavy duty Green Machine® equipped with a brush blade. The Green Machine® proved to be a very effective tool for clearing most of the mesquite, whitebrush, huisache, briar, and other brush species. The old road (herein referred to somewhat euphemistically as the "wagon trail") was recleared along with the edge of the field and the fence corner area where the 1975 datum was located. In addition, several east-west transects were cleared between the field and the bluff edge.

After the site was recleared, a search was begun for the 1975 datums and excavation units. This was complicated by two factors: (1) the 1975 alidade map did not accurately tie-in the 1975 grid system with identifiable landmarks; and (2) the primary 1975 site datum was a wooden stake. As is apparent in Figure 1, the fence line running the length of the site has

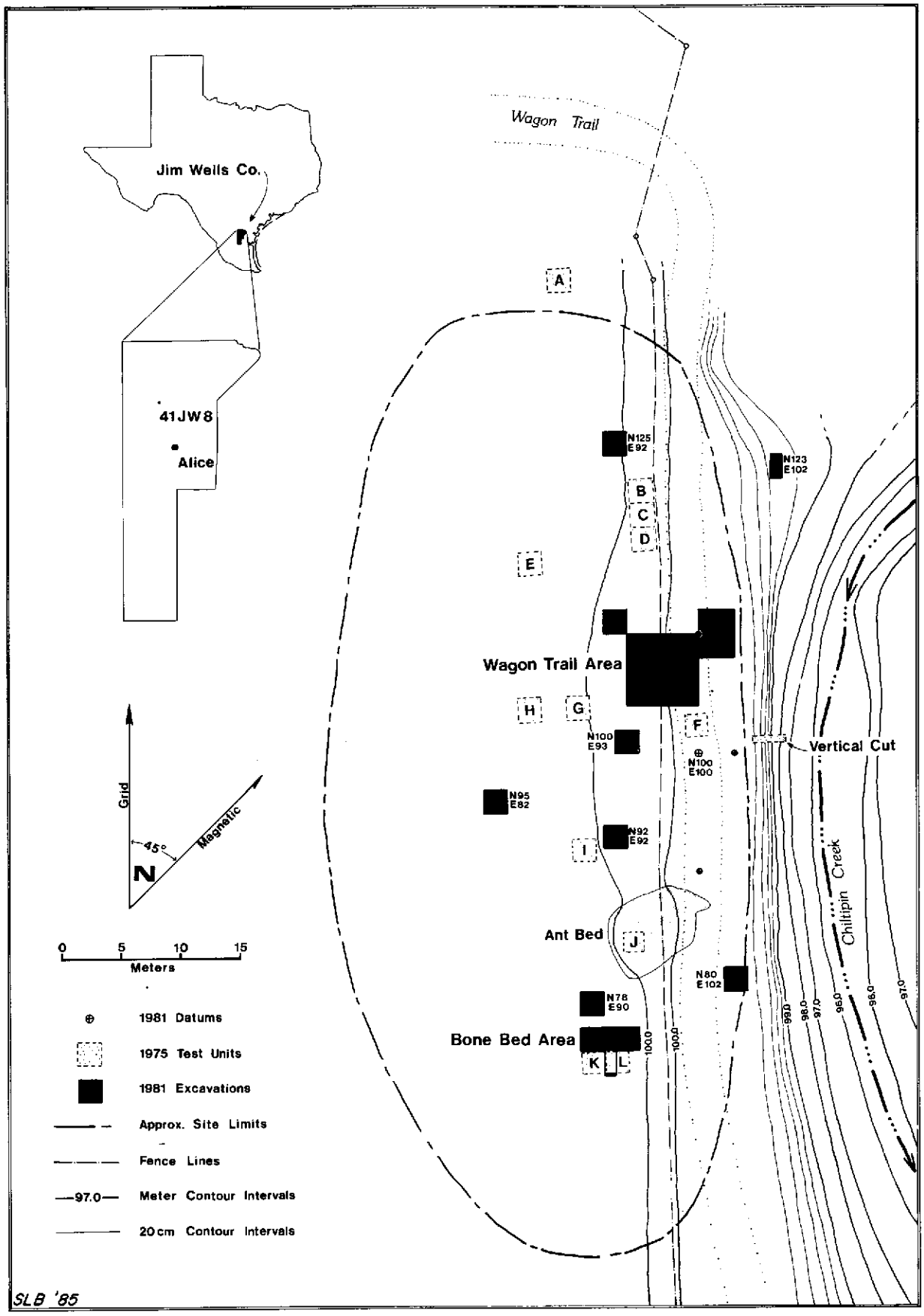

Figure 1. **Site Map of 41 JW 8.**

several angles and corners. Only one corner was shown on the 1975 field map, and it was not identified. All the 1975 grid stakes, including the datum, were wooden with the exception of one iron rebar driven into the northeast corner of Unit L. This iron rebar was not located until several months into the field season.

The 1981 field crew made measurements from various fence corners and used shovel scraping techniques in an unsuccessful attempt to relocate various 1975 grid points and excavation units. The 1975 excavation units had apparently been thoroughly backfilled as no trace could be found of any of the 12 units. Field plowing, brush regrowth, and erosion subsequent to 1975 effectively concealed the 1975 testing. Although several of the 1975 test units were ultimately relocated, we were forced to establish a new grid system in 1981. It was decided that the old roadbed offered a safer location for the 1981 datums since the road could no longer be traveled, and it was inside the fence lines and thus protected from agricultural disturbance.

The main horizontal datum (N100 E100) was established near the center of the wagon trail about 2.5 m east of the fence (Fig. 1). The main datum consisted of a 20-inch long steel rebar (concrete reinforcing rod) one inch in diameter set into a bell-shaped concrete anchor inscribed with the site number and the grid coordinates. Backup datums were established at N110 E100, N100 E103, and N90 E100. The backup datums were also steel rebars set into concrete. A cross was filed into the top of each rebar to indicate the precise grid point. All grid stakes were set by using a transit and steel tapes.

The vertical datum was established by driving a 20d nail into an anaqua tree on the bluff edge. The elevation of the nail was arbitrarily designated as 100.00 m above datum. Prior to setting up the vertical datum, a number of excavation units were completed using line level measurements from a string tied at ground level in the southwest corner of each unit. The actual elevation of these grid stakes was later established using the transit. All elevations mentioned in the text refer to the vertical datum unless specified as below the surface.

The grid system was a metric grid with an arbitrary center point of N100 E100. Each excavation unit was given the coordinates of the southwest corner. Thus, any point within a given unit could be referenced by measuring the distance east and west of the southwest corner. For example, an artifact given the coordinates N104.35 E98.75 was found 35 cm north and 75 cm east of N104 E98, the reference corner of the excavation unit. The site grid system was established parallel to the wagon trail and to the fence line running the length of the site for ease of operation. Grid north was actually oriented some 45° west of magnetic north. Cardinal directions indicated in the text are based on grid north unless specified otherwise, such as "to the magnetic north."

EXCAVATION TECHNIQUES

The size of the excavation units at 41 JW 8 varied from 1 m^2 to 2 m^2. Most of the excavation focused on 2-m^2 recording units which were excavated in 1-m^2 quadrants or cells. Provenience was maintained in all excavations to the

1-m unit and 10-cm level. The purpose of the 2-m^2 recording units was to cut down on the amount of paper work involved. These 2-m^2 recording units were referenced by the grid coordinates of the southwest corner of the entire 2-m^2 unit followed by the quad designation. The quads were labeled SW, SE, NE, and NW in reference to their location with respect to the grid system and the 2-m^2 unit. This practice was conceived as a method to reduce errors introduced by keeping track of the specific grid coordinates of each quad. In retrospect, the quad designations probably introduced just as many errors (confusing NE with NW, for example) and created extra work in the laboratory converting the quad designations back to grid coordinates. Throughout this report all proveniences are given as grid coordinates of the southwest corner of a given unit. Unless followed by "(2 m)" all proveniences refer to the southwest corner of a 1-m^2 unit or to a specific location if centimeters are given.

The standard excavation unit-level was 10 cm in thickness and measured 1 m^2 (0.1 cubic meter of deposit). This was varied only in Level 1 of some units. For example, if a 2-m^2 recording unit was placed on an uneven surface, all quads were taken down to the same elevation in Level 1. Thus, if the surface varied from 99.89 in the northwest corner of the recording unit to 99.80 in the southwest corner, Level 1 ended at 99.70 in all quads. In some cases with artificially high humps such as along the fence line, in the plowed field (ridges and furrows), or near the 1975 units (old backfill piles) the raised portion was either shoveled off or included in Level 1.

All excavated soil was passed through 1/4-inch mesh hardware cloth. All artifactual material except as noted below was collected. The proposal called for the use of 1/8-inch mesh. Initial attempts to use 1/8-inch mesh proved extremely time consuming due to the heavy clay deposits in the grid eastern sections of the site (in the plowed field) and due to the exceptionally high frequencies of cultural materials in all excavation units within the main site area. Many excavation levels would have literally required hours to pick out the cultural material recovered on 1/8-inch mesh. The only practical alternative would have been water screening; however, we lacked a source of water. The subsequent loss of data by the use of 1/4-inch mesh was compensated by the collection of various soil and matrix samples as discussed later.

All bone, chert, burned rock, marine shell, prehistoric ceramics, ground stone, and historic refuse (metal, glass, etc.) retained on 1/4-inch mesh or recovered **in situ** were collected. All freshwater mussel umbos or intact valves were collected; unmodified fragments were not. Land snails presented a problem as they occurred in exceptionally large quantities in most areas of the site. No land snail fragments were collected. Whole identifiable land and water snails were collected only from designated "snail pits," with the exception of **Rabdotus** snails. **Rabdotus** snails are believed to be a primary food resource and were collected in all excavations.

The actual excavation technique varied according to location. The upper levels of most units were excavated using shovels. Sharpshooter shovels were often used as were flat shovels and cutoff round point shovels ("cutting shovels"). Each type of shovel had a specific use. Sharpshooter shovels were useful for maintaining a vertical face and removing a 10-cm-thick cut at

a time. Square and cutting shovels were used to shovel scrape (schnitt) and to level off floors. In areas with intact features or undisturbed deposits (such as the main excavation block), all excavation was done with trowels or finer digging instruments, such as dental tools, bamboo splints, and brushes. In areas with unknown deposits, the first quad unit-level in a 2-m^2 unit was usually dug with a trowel. If the deposits appeared disturbed, the remaining quads at the same level were shovel dug. Thus, the disturbed deposits were quickly excavated, while the intact deposits were dug very slowly and carefully.

An effort was made in all trowel-dug excavations in areas with intact deposits to expose as much material as possible **in situ**. Exposed materials were pedestaled and left in place while the surrounding area around them was excavated. In cases of isolated materials not associated with a feature or living surface only the pedestaled items considered significant were mapped. For example, a **Perdiz** point would have been mapped in place while a single burned rock would not have been mapped. In the case of artifacts associated with a feature or living surface the crew attempted to leave as much as possible in place until it could be plotted in place. In practice one often had to make decisions as to what was left pedestaled and what was removed. In many areas the cultural materials were so numerous that plotting all the materials that could have been left in place was simply impossible. Emphasis on what to leave was always placed on clustered material, identifiable tools, identifiable bone, prehistoric sherds, and unusual artifacts. Small burned rocks, unmodified flakes and chips, and bone and snail fragments occurred in very high frequencies and were rarely pedestaled.

Particular emphasis was placed on faunal recovery. All identifiable bones (whole bones or bones with articular ends) were either pedestaled or collected as soon as they were observed. This was done to improve the recovery of identifiable bone. Because of this emphasis, many small bones were recovered that would have otherwise passed through 1/4-inch mesh or been crushed during the screening process. When concentrations of microfauna were observed in features or on living surfaces, a matrix sample was collected for flotation and fine screening in the laboratory.

Emphasis was also placed on charcoal recovery. Charcoal from undisturbed deposits was collected in aluminum foil pouches. Particular care was taken with concentrated charcoal deposits from cultural features. Feature charcoal was collected with clean forceps, with minimal handling. Additional charcoal was collected from the level excavations. In some areas of the site considerable quantities of scattered chunk charcoal was present. This scattered charcoal was collected by hand and placed in small aluminum pouches within the unit-level bags. The scattered charcoal was collected only for the purpose of wood species identification, hence we only attempted to collect a sample of the well-preserved charcoal chunks rather than the entire amount of pulverized charcoal present.

RECORDING TECHNIQUES

A variety of records were maintained during the 1981 season at 41 JW 8, for example, level notes, a field journal, survey notes, feature notes, plan and

profile drawings, a site map, and sample inventories. These records provide a permanent chronicle of the excavations.

The level and feature notes were written in paragraph style on loose leaf paper and kept in a three-ring binder. This method of keeping field notes was used over preprinted forms for several reasons. Preprinted forms are most appropriate for use with inexperienced crews or on a site excavated over a long period of time to maintain consistency. In the 1981 season the crew was very experienced, the site deposits were comparatively uniform, and the field season was relatively short. Paragraph style notes can be written more quickly with an emphasis on what actually needs to be recorded. A similar approach was taken during Phase III of the Nueces River Project (Grant Hall, personal communication).

The daily field journal was kept primarily by the author. The journal recorded the daily events of the field season: crew members present, weather, visitors, excavation progress, field observations, changes in methodology, and problems encountered. The field journal was kept in the field notebook along with the survey notes and various other records. The survey notes largely consist of a daily record of the transit H.I. (height of instrument). The survey notes also discuss minor problems with using several different transits. For example, the transit used to set up the grid system was off slightly when used to turn 90°. Fortunately a better transit was used to set the back-up datums.

Record photography was done with 35 mm and 120 mm cameras. All photographs were recorded in the field notebook. Plan and profile drawings were done at several consistent scales on grid paper or film. Detailed drawings were made of the features. All materials recorded **in situ** were plotted on one of the plan maps. Plotted items from each unit-level were given a sequential item number. Each unit-level was numbered separately as the items were recorded and bagged. The plotted items were placed in small individual bags within the level bag. The provenience was maintained in the laboratory by adding a hyphenated number to the lot number.

Inventories were kept of features, soil samples, and charcoal samples (only those that could be potentially used for radiocarbon assay). The cultural features from the entire site were given a sequential number as they were formally designated a feature. Some clusters were not formally recorded as a feature in the field but were later given a feature number in the laboratory. The charcoal and soil sample inventories recorded the specific provenience details of each sample.

A plane table and alidade map of the site was made during the final weeks of the field season. Care was taken to avoid the mistakes made on the 1975 plane table map. The fence lines and corners were carefully shot in as were all excavation units and site datums. Topographic information was recorded for most of the site area. Some difficulty was encountered mapping the heavily vegetated steep bluff slope area. Figure 1 is based on the 1981 site plane table map (actually done in January 1982).

SOIL SAMPLING

The proposal called for the collection and subsequent analysis of soil samples for several purposes, including flotation, soils chemistry, phytolith analysis, and pollen analysis. Samples for these purposes were collected by several methods: feature matrix sampling, axial interval sampling, and column sampling. In addition to sampling the excavation areas, two off-site "noise pits" were excavated.

Matrix samples were taken from all formally recorded cultural features as well as from several areas that appeared to have high concentrations of microfauna or charred materials. All matrix samples were collected in heavy salt bags (triple layered with moisture seal). An effort was made to collect at least 20,000 cc of matrix for each sample so that a consistent-sized flotation sample could later be processed.

The axial interval sampling was an experimental approach to feature interpretation detailed in the proposal. As proposed, the axial interval sampling was conducted only in situations when intact features were encountered and recognized while most of the surrounding unit-levels were still intact. Axial interval sampling involved superimposing a grid oriented on cardinal directions over the approximate midpoint of the feature in question. Small (75 cc) samples were then taken at consistent intervals along the grid lines. The idealized sampling interval was 10 cm within a feature and 50 cm outside the feature. The length of the axial vectors varied depending on location and size of the excavation block. All axial interval samples were collected with sterilized phosphate-free equipment. Each sample was collected from a carefully cleaned surface and placed in a sterile phosphate-free glass vial. The sample removal equipment (a small, sharp trowel) and the glass vials were sterilized and cleaned with dilute hydrochloric acid (HCL) and distilled water.

Column samples were collected from a number of locations within the site. Two consistent volume sample (CVS) columns were collected in the main excavation block as the excavations progressed. Additional column samples were collected from the profiles of completed excavation units, including N80 E102 (2 m), N78 E90 (2 m), and N123 E106 (1 x 2 m) as well as the noise pits. Each column consisted of a series of samples taken from the least disturbed profile of a given excavation unit. These were collected after the profile had been divided into stratigraphic zones and illustrated. During sample collection, the wall sections were cut back with a sharp trowel to expose a fresh face. Samples were collected from the middle of each zone except in cases where the zone was extremely thick. Thick zones were divided into upper and lower sections. From each zone or half a zone, a matrix sample, phosphate sample, and a sediment sample (for grain-size analysis) were collected.

Two background noise pits were excavated well away from the site area. "Noise Pit South" (NPS) was a 1-m^2 unit excavated south of the site on the edge of the creek bluff at approximately grid point N17 E104. The only trace of prehistoric occupation recovered was a couple of small chert flakes. A second background pit, the "Wheat Field Noise Pit" (WFNP), was excavated east of the main site area in the middle of the plowed field at approximately grid

point N89 E37. No trace of prehistoric occupation was recovered. Both noise pits were shovel excavated in 10-cm levels. Each unit was screened, and all bone, rock, and snails were collected. Column samples were collected from each pit profile upon completion of the excavation. The purpose of these off-site pits was to provide a control sample of screen recovery, microfauna, and botanical remains (flotation) as well as soils chemistry. Theoretically, the difference in recovered materials between the noise pits and the site excavations could be attributed to the prehistoric occupation.

CHRONOLOGICAL OUTLINE OF THE 1981-1982 SEASON

October 1981: In early October the final details of the land access negotiations were completed with Eva Jimenez. On October 12, the CAR crew arrived in Alice to begin work. During the first week the site was cleared, the 1975 excavations were searched for in vain, a new grid system was established, and the excavation of additional test units was begun. The test units (2 m^2) were partially in response to the proposal specifications and partially due to the failure to accurately relocate the 1975 work. A cold front moved through south Texas on October 22 dumping several inches of rain in the site area. Wet conditions did not allow a return to the site until October 28. By the end of the month, two 2-m units had been completed, and two others had been opened.

November 1981: Considerable progress was made during the month of November as ideal conditions prevailed (cool and dry). By November 13, eight test units had been completed (all 2-m units except one 1 x 2 m). With the exception of one unit, no intact features or living surfaces had been found. Most units evidenced disturbances caused by plowing, field leveling, and bioturbation. The approximate area of the "bone bed" appeared to be taken over by a very large leaf cutter ant bed complex.

An exceptional unit, N106 E98 (2 m), evidenced three discrete bone clusters (Features 2A, 2B, and 3). Based on these promising features, 2-m units were added on the grid north and south sides of the first unit. By the month's end a row of 1-m units had been added along the grid west side of the three 2-m units. The resulting 6- x 3-m unit was dubbed the "Wagon Trail Area" (WTA).

Dr. Hester was able to pinpoint the location of the 1975 "vertical cut" during a visit to the site on November 24. Using this as a reference point the crew was able to more precisely locate the "bone bed" area. This area still lay close to the large leaf cutter ant bed complex. On November 30, the crew began excavation of a 1- x 4-m trench (four 1-m units) designed to bisect Unit L from the 1975 testing.

December 1981: The excavations were concentrated in two areas in December, the "wagon trail" area and the "bone bed" area. The 1- x 4-m trench bisected Unit L from 1975 (iron stake found beneath the surface). Unfortunately, little or no evidence was found of the "bone bed," leading the crew to suspect that this feature was very localized and almost completely excavated in 1975. An isolated "living surface" (Feature 7) was recorded in this area. The crew attempted to expand the trench grid east and west, unfortunately

large portions to the east were extensively disturbed by the leaf cutter ants. After removing Feature 7, finding no trace of the "bone bed," and encountering the ants, the decision was made to terminate excavations in the area.

The WTA 6- x 3-m block was expanded to the west to form a 6 m^2. The west half of this area was excavated in 1-m units to the level of Feature 6, a large hearth feature centered in Unit N106 E97. Feature 6 was a complicated "hearth" or cooking feature with an irregular rock cluster, an adjacent pit filled with charcoal and ash, several lobes of baked clay extending out from the pit, a snail cluster, and numerous artifacts and faunal materials all in tight association.

On December 16, three television crews from San Antonio and Corpus Christi, newspaper reporters from Alice and Corpus Christi, and News and Information representatives from UTSA visited the site. The media and field crew were cooperative; a number of largely factual news stories resulted, providing good publicity for the project and the various agencies involved.

A 2-m unit was begun adjacent to the grid northeast corner of the WTA in order to examine the immediate creek bank area. A two week break was taken at the end of December for the holidays.

January 1982: Field work was completed during the first two weeks of January. The crew worked long and hard under some extreme conditions (subfreezing with wind chill factors below 10°F) to complete the excavations. The northeast corner of the WTA was expanded to a 4- x 3-m area to expose two cultural features, a charcoal cluster (Feature 8) and a bone cluster (Feature 9). The 4- x 3-m area was completed on the last day of the field season.

Major activities during the final two weeks included plane table mapping, soil column collecting, noise pit excavation, profile illustration, and the installation of additional backup datums. Late in the afternoon on January 15, a backhoe was used to backfill the excavation units. Modern beverage containers and white caliche were used to mark the corners and edges of the excavation units in case archaeologists return to 41 JW 8.

LABORATORY AND ANALYTICAL METHODS

The data recovered from 41 JW 8 during the 1981-1982 project were processed at the archaeological laboratory of the CAR-UTSA. All materials were assigned a provenience or lot number, cleaned, and inventoried during the initial processing phase which ran concurrent with the field work. During the subsequent data analysis phase all materials were reexamined and placed in the final analytical categories used in this report. The CAR-UTSA will be the curator of all data collected from 41 JW 8.

INITIAL PROCESSING

Most of the initial laboratory processing took place as the field season progressed. Completed material bags were brought into the laboratory at the end of each week. Accompanying the bags was an inventory sheet with the provenience information and whether or not the provenience had been closed out (i.e., the unit-level was finished). The bags were crosschecked with the inventory and a lot number card index. Occasional inconsistencies such as coordinate errors or duplicate level numbers were rectified when the crew returned the following week.

Each separate provenience was assigned a sequential lot number, beginning with 56 (the first 55 numbers had been assigned in 1975). Duplicate index cards were filled out for each lot number (Appendix 2). One set of cards was organized by lot number, while the other was arranged by provenience (smallest north coordinate to largest, smallest east coordinate to largest). This card system has been used in several large projects at the CAR and was found to be an efficient way of keeping track of provenience data. The lot numbers were also placed on each field bag.

The field bags were then emptied, and most of the cultural material was washed. Several artifact types were not initially washed. For example, beveled knife fragments were not washed until they could be checked under magnification for organic residue (cf. Holloway and Shafer 1979). The faunal material included many small and fragile bones, hence the initial washing amounted to little more than rinsing.

Once cleaned the cultural materials from each unit-level bag were divided into major material categories and counted and/or weighed. In many past CAR projects, cultural materials were inventoried as they were cleaned and then reinventoried as they were analyzed. This was often due to lack of experience on the part of the initial processor and lack of agreement between the processor and the analyst concerning the desired analytical categories. This duplication of effort was largely avoided by using experienced personnel and using the 1975 materials to decide on many analytical categories prior to beginning the 1981 field season. Unmodified debitage, burned rock, snails, and historic materials were sorted and placed in final analytical categories as they were inventoried. These materials were placed in labeled plastic bags and stored for posterity (burned rock was counted, weighed, and discarded). Other artifact types such as bifaces, projectile points, and ceramics were divided into simple inventory categories (complete versus incomplete, rim sherd versus body sherd, etc.) and stored for further analysis.

All soil and charcoal samples were assigned a lot number and allowed to dry if damp. They were then inventoried and set aside for further processing. Faunal materials were weighed and set aside for final processing and identification. The initial processing system allowed the laboratory personnel to keep up with the field crew until the final part of the field season when large volumes of material were brought in every week.

DATA ANALYSIS

Upon completion of the field work and initial laboratory processing phases a data analysis phase was begun. This phase took several years to complete and resulted in this report. Special studies were conducted by consultants on the faunal data, botanical remains, radiocarbon assays, pollen, phytoliths, and mussel shells. The consultant reports are presented in Section VII. Additional analyses were done on various data categories by the author and are discussed in detail elsewhere in this report.

The data pertinent to the special studies done by the project consultants were delivered or mailed to the appropriate expert after complete inventory. In most cases only a sample of the available data could be analyzed by each consultant due to fiscal limitations.

LABORATORY RECORDS

All data recovered during the field season and amassed during the subsequent analysis are permanently curated at the CAR-UTSA laboratory. The materials, notes, and illustrations are filed in various locations in the laboratory. The following is a list of the types of records and data that were collected and a brief description of how they are maintained. All project records are available for examination by qualified researchers.

Cultural Material: All materials are stored in boxes according to the final analytical category as detailed in this report. Within each box the materials are stored either in plastic bags or other appropriate containers. The materials that were sorted into final analytical categories during the initial processing, such as unmodified debitage, are stored in lot bags by major category (i.e., all flakes and chips from a single lot are bagged together). All the materials that were further examined are stored within the final artifact grouping (i.e., by alphanumeric code) in appropriate containers. This allows researchers interested in a specific artifact type to quickly locate the materials of interest for comparative analysis.

Lot Number Index: The lot numbers are maintained on a card system as discussed earlier. These are kept in a cardboard index box.

Inventory Sheets: A separate inventory sheet was maintained for each provenience. Each sheet shows the initial processing material breakdown. These sheets were done in large format (18- x 24-inch gridded sheets). This size proved awkward. Regular 8-1/2 x 11-inch sheets (several if necessary) are recommended. These sheets are stored with the illustrations.

Field Notes, Field Journal, Field Inventories, Level Notes, etc.: The Field Notebook is maintained in a blue three-ring binder in the project files.

Data Sheets: The data sheets show the counts by provenience of the final analytical categories. These forms were filled out during the analysis and used to make distribution studies and to compile the final provenience data (Appendix 1).

Plotted Item Sheets: These forms were used to compile the provenience data and final analytical category for each artifact or item plotted in place.

Field Photographs: The field photographs, black and white prints, and color slides were carefully identified based on the field photograph logs.

Illustrations: All field plan maps, profile drawings, and plane table maps are stored in a map cabinet in the laboratory along with rough draft copies of the final illustrations. Final illustrations and the original of this manuscript are stored under lock and key in a separate location.

Project Files: All other notes, correspondence, and records of the 1981-1982 41 JW 8 project are stored in the CAR-UTSA laboratory.