function suggest that the two traditions may share a common origin. There are significant differences, such as the form variation and the decorative motifs. Thus, the two traditions are distinct, however, they overlap in many attributes, as the Hinojosa sample attests.

BAKED CLAY LUMPS

Small, irregularly shaped lumps of baked clay were recovered in moderate quantities from 41 JW 8. These lumps range from tennis ball size to pea-sized with most lumps less than golf ball size. The baked clay lumps, while irregularly shaped, are generally rounded and oval to spherical. No evidence of purposeful shaping, smoothing, or manufacture was observed. Surface colors are tan to orange to yellow and usually obscured by thin, light gray, calcareous coatings. Fresh breaks reveal the same tan-orange-yellow-colored matrix in most lumps, although a few have darker, incompletely oxidized, gray cores. A number of the baked clay objects are broken and were examined microscopically. Virtually all have a very sandy clay matrix with occasional voids, pebbles, and root impressions. No trace was observed of bone, flakes, or snails.

Baked clay lumps (objects, balls, or nodules) are very common constituents in South Texas Gulf Coastal Plain site deposits. Various explanations have been advanced to explain these lumps as Black (1978) and more recently Smith (1982) have reviewed. Both authors agree with Corbin's (1963) explanation that most baked or burned clay objects result from building an open fire on a clay-rich soil surface. The heat of the fire "bakes" the underlying clay-rich soil, thus forming small hardened lumps. Smith (1982:36) concludes: "It now seems clear that many south Texas soils contain one or more chemical compounds that respond to the heat of a fire such that the matrix is bound up and hardened. . . ." It is suggested here that the "chemical compounds" are nothing more than the various clay minerals present in most soils within the South Texas Gulf Coastal Plain. One of the properties of clay is that when heated, the water within the clay is removed, leaving a hardened durable substance, ceramic material.

Several aspects of the baked clay lumps from 41 JW 8 remain puzzling. First, the baked clay lumps appear far sandier than the typical soil matrix at the site. Second, the absence of any flakes, bone, or snail shell fragments in any of the examined lumps is surprising in view of the frequency of these materials within the soils at the site. No explanation for these inconsistencies with the site soil matrix is immediately apparent.

MODIFIED BONE AND SHELL

Each of the bone and shell items, which have been modified by cutting, grinding, smoothing, and incising to form tools or ornaments, is discussed in the following few pages. The bone items are ulna tools, a bone needle, and bone beads. Both mussel shell and marine shell were modified.

MODIFIED BONE

The modified bone from the Hinojosa site (Table 7) can be divided into four functional groups: cut bone, deer ulna tools, bird bone beads, and a bone needle. Most modified bone from the site consists of bone fragments which have random and/or patterned cut marks. Many deer and bison bones and unidentified large mammal (probably deer, antelope, or bison) bone fragments have cut marks. Most of these marks occur on long bone shaft fragments and attest to the butchering practices. The narrow, shallow cut marks were undoubtedly made by chert tools. The bones with cut marks are not individually described or quantified.

As has been mentioned, most of the larger animal bones and much of the smaller animal bones are severely fragmented. This fragmentation is assumed to have been caused by bone processing or consumption. The assumption that the highly fragmented bones found at many southern Texas archaeological sites result from marrow extraction or other types of processing and/or consumption has not been demonstrated (Gentry Steele, personal communication). Binford (1981) points out that a number of other agents such as animal scavenging, natural weathering, rodent gnawing, and ungulate tromp may also be responsible for bone fragmentation.

Ulna Tools

Four deer ulnas were found at 41 JW 8 which have been modified to form bone tools. Three of the ulnas have blunt, wide tips that form the tool bit. The remaining ulna has a long, narrow pointed tip. Similar ulna tools have been recovered from a number of other sites in southern and central Texas (Highley 1985, 1986). Deer ulnas are ideal in size and form for hand tools. Ulna tools are made by removing the distal end of the bone and shaping the ulna shaft. The rounded proximal end of the tool provides a perfect hand grip that allows considerable force to be applied by holding the tool against the heel of the palm.

Deer ulna tools have often been interpreted as flaking tools (Highley 1985) It is obvious from the morphological differences that the blunt tip and the pointed tip ulna tools were used for different functions. The comparatively fragile nature of the delicate pointed tip tool seemingly rules out any use as a chert-knapping tool.

The pointed ulna tool (Lot 373-1; Fig. 11,a), although somewhat weathered, has several noticeable use wear patterns. Lightly polished areas occur on all of the wide, flatter portions and protruding elements of the tool. These lightly polished areas are thought to be the result of the frequent handling of the tool. Microscopic examination reveals that the distal one-third of the tool (the first 3 cm from the tip) is highly polished. The highly polished area is much more extensive and reflective than the lightly polished area found over much of the artifact. The highly polished area covers most of the surface of the shaft and is particularly obvious on the flat portion of the shaft. Under 20-40X magnification, numerous striations were observed within the polished areas of the shaft. All of the striations occur parallel to or at a slight angle to the long axis of the shaft. Many of the

TABLE 7. MODIFIED BONE DESCRIPTIONS

Lot Number	Artifact Type	Identification	Comments
113	bone needle	unidentified	polished distal fragment
373-1	ulna tool	**Odocoileus** left ulna	polished pointed tip (awl)
382-1	ulna tool	**Odocoileus** left ulna	worn blunt tip (pressure flaker)
519-1	ulna tool	**Odocoileus** right ulna	beveled blunt tip (pressure flaker)
472-1	ulna tool	**Odocoileus** right ulna	beveled blunt tip (pressure flaker)
263	bone bead	large bird long bone	highly polished; 10 mm in length
279	bone bead	large bird long bone	20 mm in length; polished
294-6	bone bead	large bird long bone	highly polished; 12 mm in length
389	bone bead	large bird long bone	7 mm in length; polished
434	bone bead	large bird long bone	12 mm in length; polished
465	bone bead	large bird long bone	10 mm in length; polished

striations seem to be shallow grooves that have been smoothed over by subsequent use. The edges of the grooves are often highly polished. The distal tip of the artifact is slightly broken. The break appears to be old (i.e., contemporaneous with artifact) and is not smoothed over or polished.

The pointed ulna tool with its highly polished shaft and the parallel striations or grooves suggests use on a soft material such as leather or plant fiber in an in and out motion. The observed wear is consistent with what would be expected from an awl or perhaps more likely, a basketry weaving tool (Kroeber 1925). Little evidence of a basketry industry has been found in southern Texas, however, this probably reflects the poor preservation conditions. The adjacent lower Pecos River area has long been known for preserved basketry and other perishable goods that are found in the dry cave deposits. Many of the plants used in the lower Pecos River area basketry such as yucca are also present in south Texas.

The three blunt tip ulna tools are almost identical in size and shape. In all three cases, the ulna shaft has been cut off, removing about 2 to 3 cm past the protruding coronoid process. Interestingly, the three blunt tip ulna tools seem to have been discarded at different stages in the tool use and reuse cycle.

All three tools have varying degrees of lightly polished areas (supposedly from handling) occurring over most of the tool. Much of the light overall polish has been destroyed by surface weathering. The weathering consists of pitting, cracking, and tiny random scratches that attest to surface exposure. Interestingly, all three tools do not have any trace of the highly polished area observed on the ulna awl.

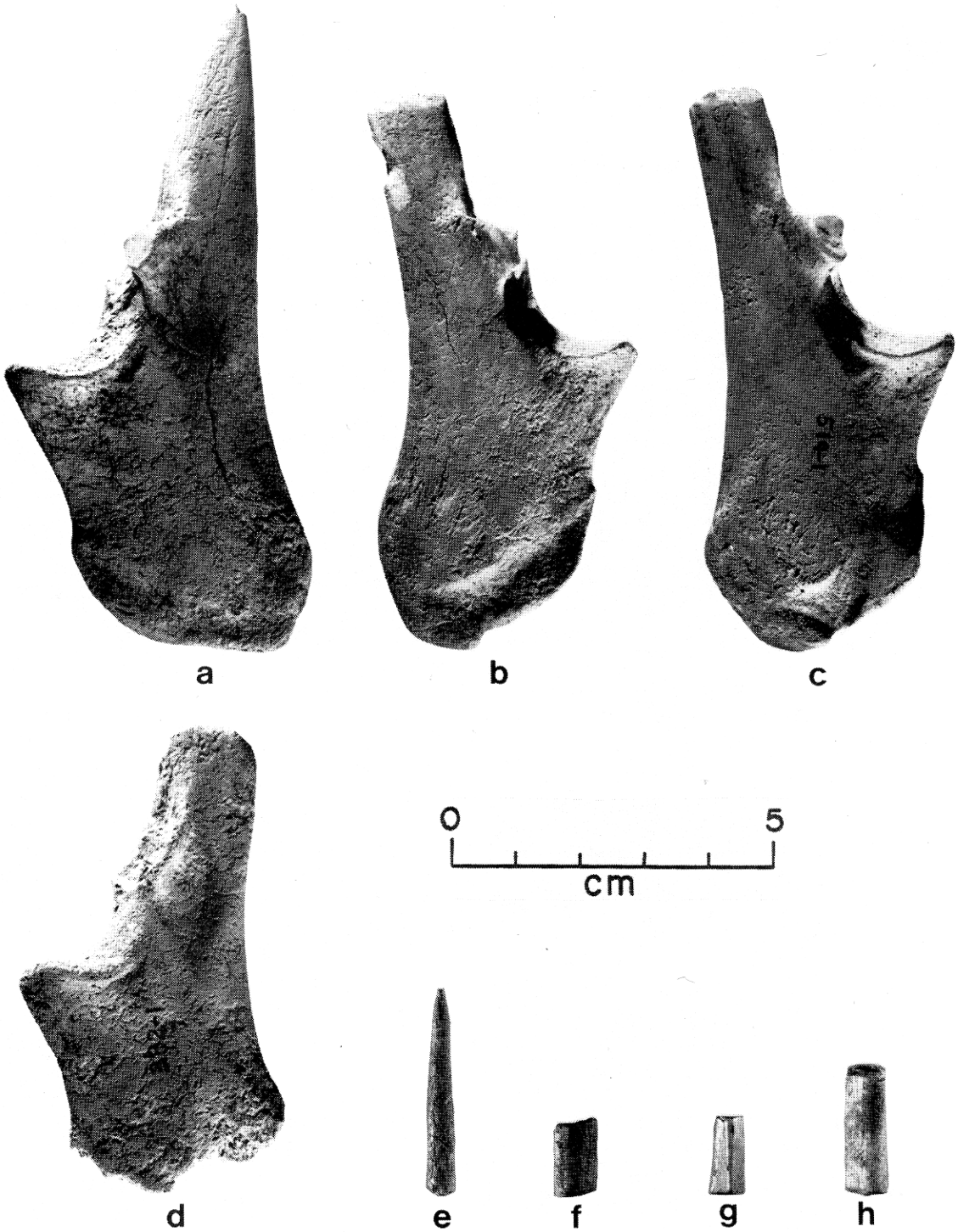

Figure 11. **Modified Bone Artifacts.** a-d, deer ulna tools; e, bone needle; f-h, bird bone beads. Lot numbers: a, 373-1; b, 472-1; c, 519-1; d, 382-1; e, 113; f, 434; g, 294-6; h, 279.

The best-preserved blunt tip ulna tool (Lot 519-1; Fig. 11,c) has a tip with very little use wear. This tool, like the others, has a working edge or bit formed by removing the distal section of the ulna shaft and forming a narrow beveled bit that has been squared-off perpendicular to the long axis of the shaft. The edge was created by abrading two opposing facets to form a beveled edge not unlike a modern cold chisel in shape. The beveled facets of this tool are covered with striations perpendicular to the long axis of the tool. This suggests the edge was beveled by firmly grasping the tool and using a side to side motion on a coarse abrasive surface (sandstone abraders?). The tool bit appears little worn except for a small area in the center of the bit that is irregularly rounded. This tool is interpreted as a resharpened tool that was only slightly used after the last resharpening episode.

The second blunt tip ulna tool (Lot 472-1; Fig. 11,b) appears very similar to the first except for the smooth nature of the beveled facets and the much greater amount of visible wear. The beveled facets of this artifact are smooth and show no striations. This suggests that a finer abrasive surface was used to bevel the edge. The beveled bit edge is worn and rounded by use. When viewed on end, the bit has a series of damaged areas that cover most of the beveled edge. Two of these damaged areas are narrow and almost V-shaped, like a cut. These cuts are perpendicular to the edge when viewed on end. The other damaged areas are more rounded and irregular. The damage is greatest on the edge of the tool but extends up to 1 mm away from the edge on both beveled facets.

The third specimen (Lot 382-1; Fig. 11,d) is more weathered and more worn by use than the first two tools. The beveled facets are barely visible and seem to be well smoothed like the second specimen. The bit edge is heavily worn and severely rounded by use. The beveled edge is now quite blunt. The worn bit edge is irregularly rounded and crushed by use. Several indistinct cut marks are partially obscured by adjacent rounding. The edge damage is equal on both faces and is confined to a narrow band within a millimeter of the edge. When viewed from the side, the edge damage is most pronounced on the upper two-thirds of the bit (up being toward the notch and process). No use polish was observed.

The three blunt tip ulna tools have wear patterns that are very consistent with use as pressure flaking or notching tools. Modern flintknappers usually have bone, antler, or copper tools with almost identical bit edges. The finely flaked **Perdiz** arrow points found at 41 JW 8 would have required a pressure flaking tool very similar to the blunt tip ulna tools. The principal reason modern flintknappers often use copper instead of bone or antler is that pressure flaking with a bone or antler tool quickly wears down the desired sharp edge, necessitating tool resharpening. It is suggested that all of the blunt tip ulna tools at the Hinojosa site had longer shafts when first made. Edge damage forced the flintknappers to frequently resharpen the tool. The beveled edges could be quickly resharpened by edge abrading. The sandstone abraders found at the site would have been well suited for the task.

Bone Needle

The bone needle (Lot 113; Fig. 11,e) is a small bone splinter which has been smoothed to form a slender, rounded object not unlike a toothpick. It is 3.3 cm in length (broken) and has a maximum diameter of 4 mm. The artifact is somewhat weathered but has highly polished traces in some areas. Many obvious scratch marks were observed perpendicular to the long axis of the needle. On close inspection, these proved to be rodent gnaw marks that occurred in paired clusters. It is suggested that this artifact was used on some type of relatively soft material (leather or plant fiber) in some type of sewing function. The remnants of the highly polished areas attest to repeated use. Similar tools have been found in southern, central, and southwestern Texas. The complete tool would have most likely had a rounded proximal end with a small hole drilled to thread the fiber or leather strand.

Bone Beads

Seven bird bone beads (Fig. 10,f-h) were found at 41 JW 8. All are made from a thin, hollow long bone shaft that appears to be a leg bone from a turkey-sized bird. All seven are similarly made and are of approximately the same diameter, 5-7 mm. They range in length from 7 mm to 20 mm (7, 10, 10, 12, 12, 12, and 20 mm). All appear to have been made by the groove and snap method. Four beads are only partially smoothed on the snapped edges, hence showing the construction technique. The remaining three have very well smoothed and polished ends. All the bone beads have polished areas ranging from lightly polished that may just be the result of handling to highly polished that appear to be purposeful.

All seven bone beads were found in the Wagon Trail Area and could represent a single broken bone bead necklace. Very similar bone beads were recovered in very large quantities from a burial found at the Arroyo de los Muertos site near Laredo (McGraw 1983). The burial, of a young woman and her infant, had hundreds of bone beads that were present as grave offerings. Most of these beads were arranged as necklaces and bracelets, although some loose beads were found away from the wrist and neck region of the burial suggesting that some beads were sewn on the clothes of the deceased. The Laredo burial is not well dated; however, it is thought to be Late Prehistoric in age. Bird bone beads have been found at many Late Prehistoric sites in southern Texas, such as several of the Zavala County sites (Hester and Hill 1975:14), 41 LK 201 (Highley 1986), and 41 MC 296 (Hall, Hester, and Black 1986:334).

MODIFIED SHELL

A small number of modified shell artifacts were found at the Hinojosa site. Seven fragments are freshwater mussel shell, and 15 marine shell fragments have been modified by cutting, grooving, and/or grinding. All appear to be fragments of shell tools, ornaments, or ornament manufacturing debris.

Shaped Mussel Shell

A number of mussel shell fragments that were recovered from the site appear to have been shaped by cutting and/or grinding. Many of these, upon close examination, appear to be fortuitously broken fragments that have a regular shape. Seven fragments have definite evidence of modification. Undoubtedly other shaped fragments were present but not identified. Five of the seven fragments have angular shapes that tend to be rectanguloid in outline. The other two fragments have oval outlines. With the exception of two irregular, angular fragments, these mussel shell pieces appear to represent shell ornament blanks that were never finished. The edges of most were formed by the use of a very sharp instrument (probably a flake) to cut the shell. Some of the edges appear to have been completely cut while others seem to be only partially cut and then snapped. Several of the fragments have smooth edges that appear to have been ground down. The absence of suspension holes and the unfinished look of these seven fragments suggest that they represent ornament blanks that were never completed.

The specimen from Lot 60 (Fig. 12,b) is a thick, oval fragment with smoothed edges. It is 21 x 24 mm.

The specimen from Lot 69 is a small, rectangular fragment with cut and smoothed edges. It is 13 x 14 mm.

The specimen from Lot 295 (Fig. 12,a) is a small, rectangular fragment that has been cut on three edges. It is 11 x 13 mm.

The two specimens from Lot 255 are small, irregular fragments with angular cut edges. They are 6 x 9 mm and 9 x 14 mm.

The specimen from Lot 280 is a square fragment with cut and ground edges. It is 7 x 9 mm.

The specimen from Lot 522-2 (Fig. 12,c) is a large, oval fragment with ground edges. This mussel shell may have been chipped. It measures 21 x 44 mm.

Incised Mussel Shell

Two mussel shell artifacts were found in association with Feature 7, the living surface documented in the southern portion of the site. One (Lot 354-2; Fig. 12,d) is a beautifully made pendant. The pendant is triangular and smoothed on all three edges with a biconically drilled suspension hole (3 mm in diameter). It is made from the edge section of a large, old mussel that must have been collected from a major river such as the Nueces River (Harold Murray, personal communication). It is 22 x 38.5 mm. On the interior face a geometric design is incised. The design consists of a double-incised line extending down from the edge of the suspension hole to the curving edge near the bottom. Two parallel-incised lines, spaced 7 mm apart, are perpendicular to the first line, extending from the double line to one edge of the artifact. Five smaller parallel-incised lines, spaced 1 to 2 mm apart, are between the larger parallel lines, dividing the space into six tiny panels. The entire design looks something like an upside down flagpole and flag.

Another incised fragment (Lot 343-4; Fig. 12,e) is made of thin mussel shell. Its outline shape is irregularly angular. The edges are cut, and it is 12 x 18 mm. A series of six parallel-incised lines, spaced 1.5 to 3 mm apart, covers the interior surface. One corner of the artifact is broken off along an incised line. The function of this artifact is not known.

Marine Shell

Nineteen marine shell fragments were recovered from 41 JW 8, including two fragments found in 1975 (Hester 1977:Fig. 7). Most of these fragments are either ornament or tool fragments or manufacturing debris. Table 8 lists the proveniences (lot numbers) and identification of each fragment. The identifications were made by Gentry Steele. Most fragments (such as Fig. 12,f,g) are small pieces which have chipped or irregularly broken edges and are thought to be debris resulting from the manufacture of shell ornaments or tools. These will not be described in detail. The specimens that are definitely tools or ornaments are described.

The specimen (Fig. 12,h) from Lot 51, recovered in 1975, is a fragment of a discoidal bead. Hester (1977) identified this as a conch fragment; Steele identified it as a Bivalvia fragment. The projected outline diameter is about 20 mm. The suspension hole is biconically drilled and is about 3.5 mm in diameter.

The specimen from Lot 55, also recovered in 1975 (Fig. 12,i), is a rectangular fragment of a ribbed marine shell. Hester (1977) identified it as a **Dinocardium** fragment; Steele identified it as a **Laevicardium** fragment. Several of the edges have cut marks but are otherwise rough.

One Lot 56 fragment (Fig. 12,k) is a piece of a large **Laevicardium** shell. Most of the edges are irregularly broken, however, one edge is heavily smoothed and rounded. This edge is the outer shell edge but appears to have been used for some sort of scraping function.

Another Lot 56 fragment (Fig. 12,l) is a conch (**Busycon**) body whorl section. The tip is rounded and smoothed. It is faceted and polished by use.

The specimen (Fig. 12,i) from Lot 131 is a hinge section of a **Callista** that has been smoothed and polished by use.

HISTORIC ARTIFACTS

A number of historic artifacts were recovered from the upper excavation levels at 41 JW 8. Most of these artifacts represent the 20th-century ranching and farming occupation of the area. A few historic items may date to the mid-19th-century. All historic artifacts recovered from the site clearly postdate the prehistoric occupation and are considered to be of very minor importance.

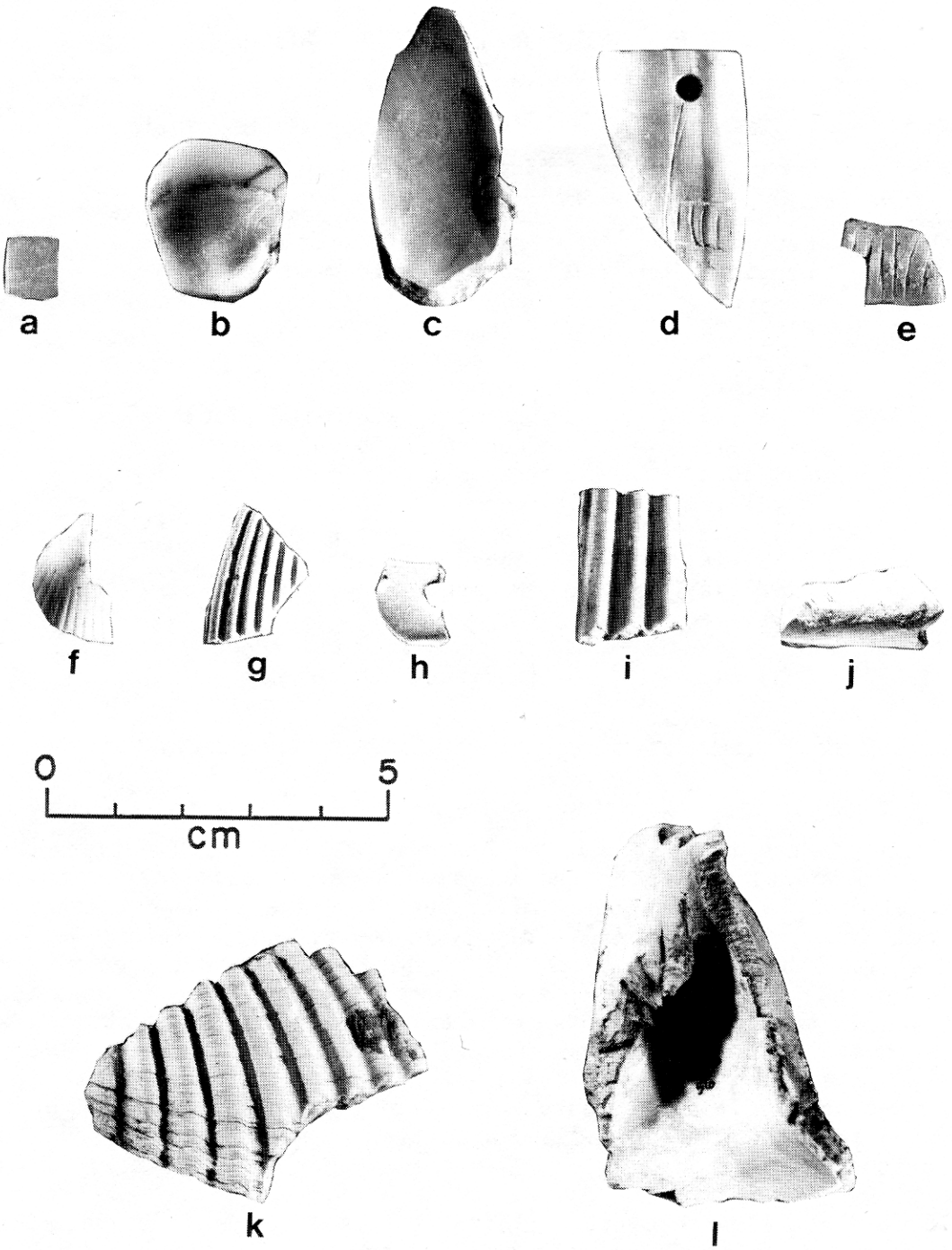

Figure 12. **Modified Shell Artifacts.** a-c, cut mussel shell; d, mussel shell pendant; e, incised mussel shell; f,g, marine shell fragments, h, marine shell bead; i-l, marine shell. Lot numbers: a, 295; b, 60; c, 522-2; d, 354-2; e, 343-4, f, 333; g, 56; h, 51; i, 55; j, 131; k, 56; l, 56.

TABLE 8. MARINE SHELL IDENTIFICATIONS

Lot Number	Taxon	Material Description
51 (1975)	Bivalvia	fragment, bead section
55 (1975)	**Laevicardium**	fragment with cut edge
56	**Laevicardium**	fragment with smoothed edge
56	**Busycon**	body whorl fragment, smoothed and polished
56	Bivalvia	fragment with cut edge
71	Bivalvia	2 fragments
61	**Callista**	2 hinge fragments
98	Bivalvia	fragment, weathered smooth edge
120	Bivalvia	fragment with cut edges
121	**Callista**	fragment with cut edge
131	Bivalvia	fragment with cut edges
131	**Callista**	hinge fragment, smoothed
176	Bivalvia	ribbed fragment
311	Bivalvia	fragment
333	Bivalvia	fragment
339	Bivalvia	fragment with cut edges
345	**Callista**	fragment with cut edge

Metal artifacts are the bulk of the historic materials. Twentieth-century metal items consist of plain wire fragments, barbed wire fragments, fence staples, wire nails, .22 caliber rimfire cartridge shells, sheet metal fragments, bottle caps, screws, an electric connector, and aluminum foil. The only metal item that may date to the 19th century is a hand-forged singletree center clip and hook. This device was commonly used in the 19th century to connect wagons to the horse's traces. It seems appropriate that this wagon part was recovered from the "Wagon Trail Area" (Lot 266).

A few 20th-century glass fragments were recovered. These consist of clear window pane fragments; clear and brown bottle fragments; and a small, white 4-hole button.

A bone button was also recovered. This artifact is 17 mm in diameter and is about 2 mm thick. The front face has a circular central recess 8 mm in diameter with five cylindrically drilled holes. Bone buttons in Texas generally predate the Civil War (Anne Fox, personal communication).

A small number of historic ceramics were also recovered from 41 JW 8. Four sherds of a crudely made stoneware were found. These range in thickness from 8 to 12 mm. The red exterior is poorly smoothed and partially covered with a light gray to black burnished slip. The core and interior surface are a uniform gray color. Based on the surface finish and curvature, these sherds probably represent fragments of a large water jug (Anne Fox, personal communication). Similar ceramics have been found in early historic contexts (mid

19th-century or earlier) in the Falcon Reservoir area (collection on file, CAR). Two small fragments of a lead-glazed earthenware were found. These represent Mexican-made ceramics dating to after 1850 (Anne Fox, personal communication). One small stoneware sherd with a burnished gray exterior was also recovered.

The singletree center clip and hook, bone button, and stoneware and earthenware ceramics probably represent a mid-19th-century occupation in the site area. These items can most likely be attributed to the initial construction of the nearby Amargosa Stage Stop which was built sometime prior to 1876.