

natural anthropomorphic, zoomorphic, and geometric figures. It is remarkable that numerous single signs have been found on pottery vessels of the Yangshao, Majiayao, and Dawenkou cultures. They have not yet been deciphered but may be among the prototypes of the ancient Chinese writing system.

PROSPECTS

A number of problems remain to be solved. For example, little is known about the way the Mesolithic was transformed into the Neolithic in China and how Chinese agriculture and pottery making originated. A series of gaps remain to be filled in the chronology and succession of the Neolithic cultures beyond the Huanghe Valley and the middle and lower Changjiang, and comprehensive research is needed. The evolution from Neolithic to Bronze Age and the linking of archaeological finds with the legendary Xia Dynasty remain to be investigated in depth. More complete knowledge of Neolithic China will certainly be acquired with further archaeological research.

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Old World Dice in the Protohistoric Southern United States¹

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This report examines the possibility that astragalus dice² (fig. 1), previously believed to be indigenous artifacts, were introduced to the natives of eastern North America by Europeans during the 16th century. I first

1. © 1988 by The Wenner-Gren Foundation for Anthropological Research. All rights reserved 0011-3204/88/2905-0010\$1.00. I am grateful to the following individuals for bringing astragalus dice data to my attention: Arthur E. Bogan, R. Berle Clay, Patricia E. Coats, John Connaway, John T. Dowd, E. Rush Harris, James Kellar, Dan F. Morse, Mark Seeman, Bruce D. Smith, and Lynne Peters Sullivan. Charles B. Stout aided me with the French translations. Susan Murphy kindly donated her time to assist me in the examination of the Angel site data. Ronald Weber graciously helped me to find the astragalus gaming pieces in the collections of the Field Museum of Natural History in Chicago. The Smithsonian Institution awarded me a "Short-term Visitors Grant" so that I could look at the specimens at the National Museum of Natural History. Bruce D. Smith helped in innumerable ways to ensure that my brief visit to the National Museum of Natural History was a productive one. My thanks to Susan M. Lewis, William S. Marmaduke, Mark Mehrer, Charles B. Stout, and several anonymous reviewers for their insightful comments on drafts of this report.

2. For ease of discussion, a distinction is drawn between astragalus dice and astragalus gaming pieces. The major differences between these artifacts are that dice have ground surfaces while gaming pieces do not and that some gaming pieces bear incised marks on one or more sides. Although my primary interest is in the dice, I explore the possible origins of both dice and gaming pieces.

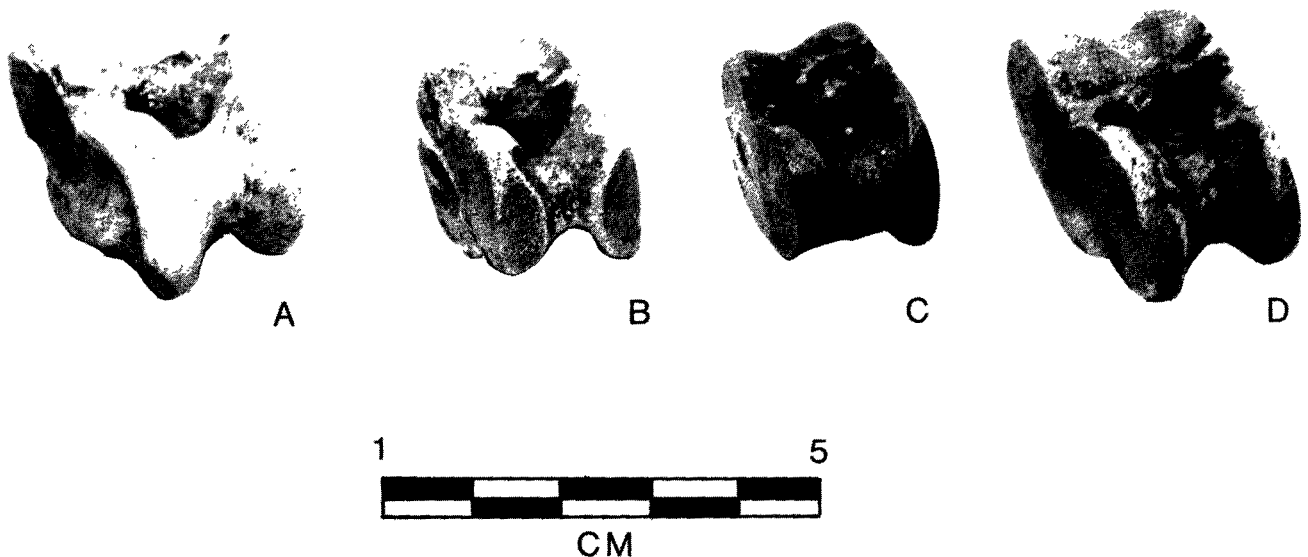


FIG. 1. White-tailed deer astragali: A, unmodified; B-D, dice from a Mississippian house basin at the Callahan-Thompson site (23-MI-71) in southeastern Missouri.

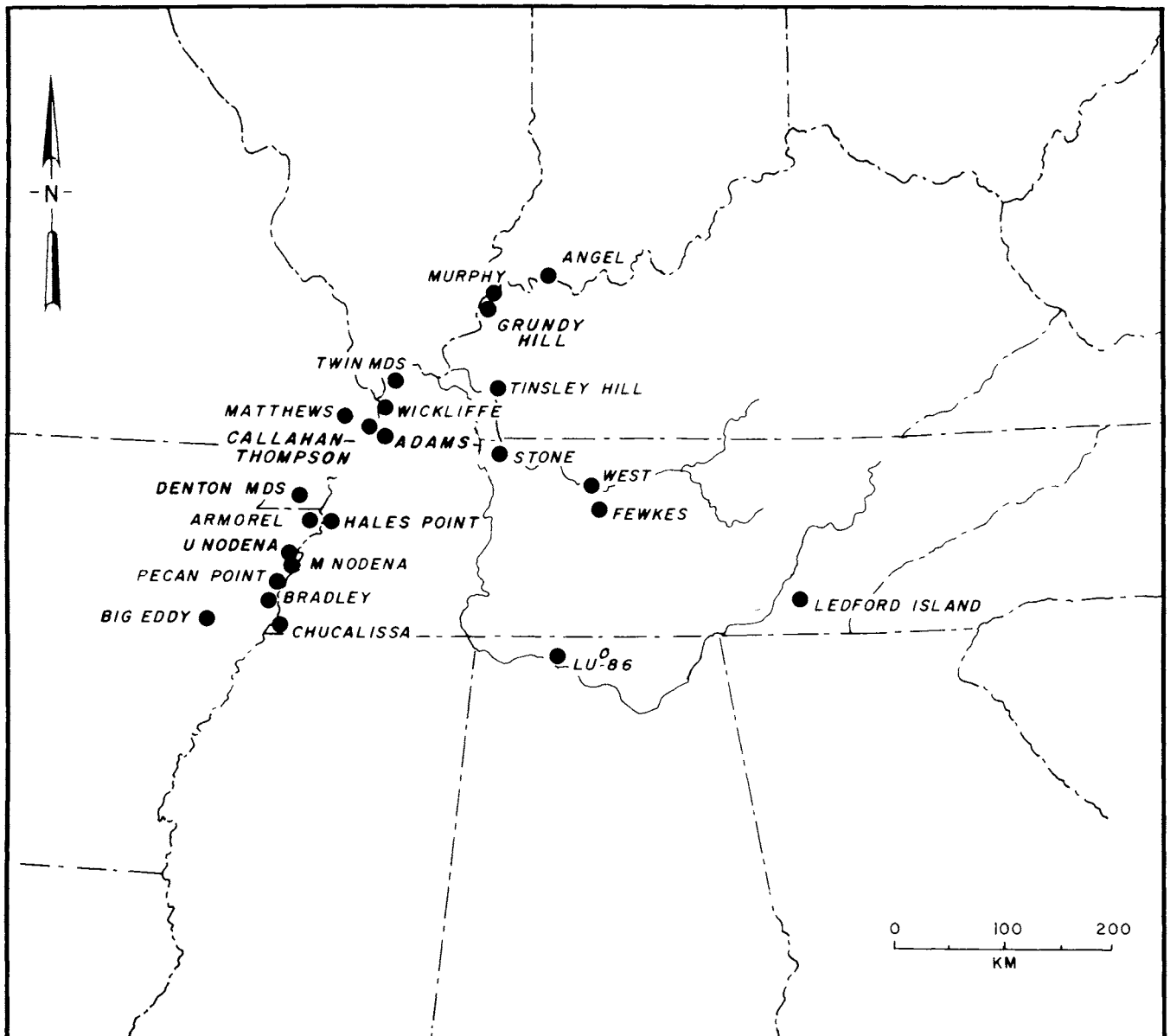


FIG. 2. *Astragalus dice* sites.

describe the narrow spatial and temporal range of astragalus dice and their distinctive cultural associations. I go on to discuss comparable artifacts from other parts of the Americas and the Old World and possible explanations for their origins, arguing in conclusion that astragalus dice and gaming pieces may be of Spanish origin throughout this hemisphere. The results of this study provide a possible archaeological horizon marker for the contact period in the mid-southern United States and tentatively establish the contemporaneity of a large number of archaeological sites in that region.

ARCHAEOLOGICAL CONTEXT

Astragalus dice are known from late prehistoric and contact-period sites in the eastern United States. The as-

tragalus, an ankle bone that supports the tibia in mammals, was made into a die by grinding flat from two to six surfaces of a large specimen taken from whitetail deer (*Odocoileus virginianus*) or, less frequently, elk (*Cervus canadensis*) or bison (*Bison bison*). The grinding further accentuated the bone's natural rectanguloid shape but left its gross natural features. Most specimens show a strong luster or polish from use.³

Astragalus dice apparently occur only in the mid-southern United States (fig. 2), where they have long

3. Most specimens examined for this study were ground on the plantar and dorsal surfaces. Roughly 30% of all dice were also ground on the distal and proximal ends, and approximately 20% were modified on the medial surfaces. Ten percent of all specimens had also been wholly or partially charred. There seems to have been no bias in the selection of right or left astragalus for dice.

been recognized as a distinctive artifact class. Most dice have come from sites in the northern Lower Mississippi Valley, the lower Ohio Valley, and the Tennessee and Cumberland Valleys. Unpublished data and private collections have yet to yield examples from outside these regions.⁴ A possible exception is Culin's (1898:830) note that Cushing "found a number of knuckle bones of deer, several showing high polish from long use, in the muck deposit explored by him" at Key Marco, a late prehistoric Calusa site in extreme southern Florida. However, neither Cushing (1897) nor Gilliland (1975), who prepared a catalogue of the available portions of Cushing's Key Marco collection, describes those specimens or their archaeological context.

The restricted distribution of this artifact type appears to be a function of cultural factors alone. Whitetail deer were ubiquitous in the eastern United States, and elk or bison astragali, if not available locally, could have been easily acquired through trade. Similar rectanguloid dice could also have been made from wood, clay, or other bones, but such artifacts have not yet been reported.

Astragalus dice have long been recognized as artifacts of the late Mississippi period in the Lower Mississippi Valley (Griffin 1952:230; Phillips, Ford, and Griffin 1951:450). The dice reported in table 1 were found at 23 late prehistoric or protohistoric sites. At least six of those sites are Armored-phase (A.D. 1500–1700) components, and two are Nodena-phase (A.D. 1350–1650) components. There is one component each of the Mouse Creek (A.D. 1450–1600), Angel (A.D. 1050–1450 or possibly 1600), Tinsley Hill (A.D. 1300–1600), Walls (A.D. 1400–1600), and Caborn-Welborn (A.D. 1400–1700) phases. The remaining sites have major Mississippian occupations but are too little known archaeologically to warrant their assignment to recognized late Mississippi-period phases.

Historic trade material has been reported from three of these sites: Murphy, at the Wabash River mouth in southern Indiana (Adams 1949:46), Ledford Island, on the Hiwassee River in eastern Tennessee (Smith 1984:73; Lynne Peters, personal communication, 1985), and Bradley, in the Mississippi Valley north of Memphis (Moore 1911). At another, the Stone site in the Cumberland Valley of Tennessee, Coe and Fischer (1959:55, 62) identified a fabric-impressed saltpan that bore the impression of a Spanish lace of the 16th to 17th centuries A.D. Furthermore, the Pecan Point site, in northeastern Arkansas, has been tentatively identified as the town of Pacaha, which was described in the early 1540s by De Soto (Morse and Morse 1983:311; Phillips, Ford, and Griffin 1951:387). Big Eddy may have been a native town reported by the De Soto expedition along its line of march to the principal town, possibly the Parkin site, of the province of Casqui (Morse and Morse 1983:309).

Thus, there are good but nevertheless inconclusive archaeological grounds for the inference that the astragalus die is a horizon marker in the Mid-South for roughly the 16th century. Insofar as this is true, the sites listed in table 1 have contemporaneous components.

Dice have commonly been found as burial associations and, less frequently, in house basins and pit fills (table 2). Burials currently offer the major interpretive context, and few nontrivial inferences can be drawn from the spatial patterning of dice in discard contexts. The 11 Callahan-Thompson site specimens (table 1) offer an excellent example of the latter point. Those specimens were found in the fill of a Mississippi-period house basin that had been reused several times, in the wall trenches of some of the houses that had been constructed in that basin, and in refuse-filled pits associated with those structures (Lewis 1982:47). None were found together, nor were they definitely associated in a primary context with other artifacts. Little can be inferred from these data beyond the facts that the specimens were in use late in the occupation sequence and that they apparently entered the archaeological record independent of one another (i.e., they do not appear to be the remains of a single game or toy).

Astragalus dice occur as burial goods at 12 of the 19 sites for which there are contextual data. Among the 13 discrete graves represented in the collection, 11 are those of children or adolescents. There are no data on the sexes of those individuals. Specimens were also found in the graves of adult males at the Angel site, in southwestern Indiana (Black 1967:594), and at Lu⁸⁶, a multicomponent shell midden in extreme northwestern Alabama (Webb 1939:26, 33), but the investigators of those sites question the direct association of the dice with the interred individuals. Hence, there is a clear, strong archaeological association of this artifact class with children and adolescents.

There is no definite pattern to the kinds of artifacts that were included with dice as grave goods. The diversity of associated artifacts ranges from the three dice with Burial 104 at Pecan Point to the 19 pottery vessels and one die buried with a child at Big Eddy. There is also no consistency in where dice were placed in graves; they occur at the feet, knees, shoulder, and head.

Dice from graves have often been found inside bowls or jars. Culin (1898) reports that in the vicinity of Nashville, Tennessee, excavations of stone box graves often yielded astragali. He notes (p. 830) that "thirty or forty bones [astragali] were found in perhaps a hundred graves. They were always found in pots. Children's graves contained smaller pots, and the bone was smaller, evidently from a small animal. Some were worn until nearly smooth on the side, and all showed polish as though they had been carried or used a long time."

The foregoing review of archaeological data demonstrates that astragalus dice are strongly patterned in time, space, and burial context. They occur in a narrowly defined part of the Mid-South on large late prehistoric or protohistoric sites and are strongly associated with the graves of children. It is inferred that the sites containing dice were contemporaneous and were oc-

4. The delimited spatial distribution of astragalus dice is based on a thorough examination of the published literature on bone artifacts in the United States, responses to information requests that I published in archaeology society newsletters across the southern and midwestern United States (e.g., Lewis 1981), and site surveys and excavations by me and my students in western Kentucky and southeastern Missouri (e.g., Lewis 1982; Stout 1985, 1987).

TABLE I
Astragalus Dice and Their Proveniences

Site	Species Represented				Context	Comments	References
	Deer	Elk	Bison	n.a.			
Missouri							
Callahan-Thompson (23-MI-71)	11	-	-	-	House basin and pit fills	-	Lewis (1982)
Denton Mounds (23-PM-549)	-	-	-	2	Burial 6	Nodena phase	Williams (1972:106)
Matthews (23-NM-156)	-	-	-	1	Unknown	Described as a "polisher"	Walker and Adams (1946:89, 97)
Kentucky							
Tinsley Hill (15-LY-18)	1	-	-	-	Midden	Tinsley Hill phase	Clay (1961:53)
Twin Mounds (15-BA-2)	1	-	-	-	Surface	-	Murray State University surface collection
Wickliffe (15-BA-4)	7	-	1	-	Mounds E and F fill	-	Lewis (1986); Wesler, per- sonal communication, 1985
Adams (15-FU-4)	1	-	-	-	Surface	-	Lewis (1986), Stout (1985)
Grundy Hill (15-UN-5)	1	-	-	-	Burial (?)	Disk pipe and Barton Inc. vessels in col- lection	USNM Cat. Nos. 447779-447808
Indiana							
Angel (12-Vg-1)	152	7	-	-	House basin and pit fill, palisade	Angel phase	Kellar (1967:452-53)
Murphy (12-PO-1)	-	-	-	1	Burial 81	Caborn-Welborn phase	Moorehead (1906), Adams (1949:33)
Arkansas							
Armorel (3-MS-23)	4	-	-	-	Midden (?)	Armorel phase	Arthur Bogan, personal communication, 1981; Bogan (1974:11); Wil- liams (1980)
Upper Nodena (3-MS-4)	-	-	-	3	Burial	Nodena phase	Morse (1973)
Middle Nodena (3-MS-3)	-	-	-	1	Burial	Armorel phase	Bogan (1974:24), Williams (1980)
Pecan Point (3-MS-78)	9	3	3	-	Burials and midden	Armorel phase	Moore (1911:451-56); Wil- liams (1980); USNM Cat. Nos. 63047, 63047a, and 91145
Bradley (3-CT-7)	2	1	-	-	Burial 83	Armorel phase	Moore (1911:429, 431), Wil- liams (1980)
Big Eddy (3-SF-9)	-	-	-	3	Burial and surface	Armorel phase	E. Rush Harris, personal communication, 1982; Morse and Morse (1983:309); Williams (1980)
Tennessee							
Chucalissa (40-SY-1)	-	-	-	5	Unknown	Walls phase	Parmalee (1960:358)
Hales Point (no site number)	-	1	-	-	Burial 12	Armorel phase	Moore (1916:495), Williams (1980)
Stone (40-SW-23)	-	-	-	5	Midden	-	Coe and Fischer (1959)
Fewkes (40-WM-1)	2	-	-	-	Burial	-	Myer (1928:603-4)
West (40-DV-12)	1	-	-	-	Burial 34	-	Dowd (1972:36)
Ledford Island (40-BY-16)	4	-	-	-	House fill and midden	Mouse Creek phase	Madeline Kneberg, personal communication to Glenn Black, 1946; Lynne Pe- ters, personal communi- cation, 1982
Alabama							
1-Lu ⁸⁶	-	1	-	-	Burial 1	-	Webb (1939:33)

TABLE 2
Astragalus Dice Associated with Burials

Site	Age	Associated Artifacts	Placement of Dice
Denton Mounds Murphy Pecan Point	juvenile unknown	a Mississippi Plain jar, a Campbell Appliqué jar, and two dice a disk pipe, two pots, and a die	at left shoulder on right knee
Burial 13	child	three shell beads, a discoidal, and a die	—
Burial 40	child	a bottle, a bowl, a frog-effigy vessel, and a die	near head
Burial 171	juvenile	seven vessels, two bowls, each of which contained a die	—
Burial 104	child	three dice	—
Bradley	child	a bottle and a die	at neck
Big Eddy	child	five Mississippi Plain bowls, two Mississippi Plain jars, a Mississippi Plain bottle, three Mississippi Plain miniature vessels, a Parkin Punctate jar, a Carson Red-on-Buff head vase, a Bell Plain bowl, an Old Town Red shell effigy, an Old Town Red bottle, and three Old Town Red bowls (one containing one die)	near legs
Hales Point	juvenile	two projectile points, a lump of red ochre, and a die	near head
Fewkes	child	a miniature pot and two dice	one near knee, one near ankle
West	child	two bowls, one of which contained three stones, three galena pieces, and a die	near feet

cupied at least during the 16th century A.D. Dice have not been reported from demonstrably younger or older components.

COMPARABLE ASTRAGALUS ARTIFACTS

Ground dice are apparently unique among known astragalus artifacts. I have not found descriptions of analogous specimens in the ethnographic literature, nor do they appear to be known from the archaeological record outside of the mid-southern United States. However, similar artifacts do occur as elements of ring-and-pin games and as gaming pieces in "taba" games.

The ring-and-pin game is of considerable antiquity in the Americas. It consists of a long pin or skewer, the base of which is attached by a string to a ring or cup. The object of the game is to flip the ring up in the air and then catch it on the pin (Culin 1907). Ground, polished, and drilled astragali are one of many kinds of rings known from North American ethnography. Modified astragali may have also been part of South American ring-and-pin games, but the data on games are too sparse to confirm this possibility. Elsasser (1978:202) illustrates an astragalus ring-and-pin set made by the Wailaki of northwestern California. Each ring was drilled through the natural depression in the dorsal surface of the astragalus and then ground and polished to its final form. Similar astragalus rings have been reported from archaeological contexts in the eastern United States. Lewis and Kneberg (1957:45, 47), for example, illustrate a drilled and ground deer astragalus, comparable to the Wailaki specimens, which was collected from Early Woodland context at the Camp Creek site in eastern Tennessee.

The ground and polished faces of astragalus dice are broadly similar to those of astragalus rings, but it is un-

likely that the dice are merely undrilled rings. The shape of the completed die, its use-polish patterns, and the sheer quantity of those artifacts relative to the rings suggest that the dice represent a distinct artifact class.

The other common astragalus artifact, referred to here as "taba," has a patchy distribution throughout the Americas. A taba gaming piece is always the astragalus of a ruminant. Bison, deer, llama, and cow taba have been recorded. Unlike the astragalus dice noted above, taba show no modifications other than use polish and, rarely, incised marks on one or more sides.

Taba is a Spanish word for astragalus and astragalus games (Zero, de Toro y Gómez, and Isaza 1905:104). Rivet (1925:397-98) gives a good discussion of the possible etymology of the name. "Taba" is used here to refer generically to several closely allied astragalus games that are of great antiquity throughout much of the Old World. These games appear to have been ubiquitous throughout the Mediterranean region. For example, they were played by the Romans and the Greeks, and their popularity was commemorated in murals, sculpture, and other art (Becq de Fouquières 1873:325-56; Schmidt 1977:44-56; Väterlein 1976). Representations of taba games in Grecian and Roman art often depict young women playing with several gaming pieces (Robert 1897:fig. 1). That taba games have also long been a common children's pastime in the Mediterranean region is perhaps best expressed by Seneca, the Roman philosopher, who noted in the 1st century A.D. that children covet knuckles (i.e., taba), nuts, and small change⁵ (Bassore 1958:82).

Rodrigo Caro (1978:179-90), writing in the early 17th century, gives an excellent overview of Spanish

5. "illis talorum nucumve et aeris minuti avaritia est." See also Väterlein (1976:34).

taba games and their history and methods of play. The children's games often employ only one gaming piece, while four are commonly used in the games played by adults (Cooper 1949:513). In the versions that were current in the early 17th century (and were apparently one-taba games), the dorsal, plantar, and medial sides of an astragalus were assigned values that ranged from the simple opposition of win and lose to the more complex structure of *rey*, in which the sides became king, bailiff, hangman, and gallows (Caro 1978:189–90).

The taba games played in the Americas employ one astragalus. According to Culin (1907:148), the version of taba played by the Papago in Arizona

is played by two persons, who sit facing each other, four or five feet apart. The bone is twirled into the air out of the thumb and forefinger, the back of the hand being held upward. The position in which it falls on the ground controls the count in the game. So long as the player succeeds in throwing the pitted side, or cow hoof, so it is called, upward he retains possession of the bone, and with each throw wins one bean from a prearranged number equally divided between the players. The sides do not count in the play, and the thrower may play again and again without forfeiting the bone until he throws the flat side, opposite the cow hoof, upward, when the bone goes to his opponent to throw, with the same conditions. The winning of the entire number of an opponent's counters constitutes a game won.

In the Argentine Gaucho version of the game, "the taba is thrown a certain distance, and it is then ascertained whether the concave or the convex side of the bone has come uppermost. If the former, then, the thrower has won the stake, if the opposite, he loses" (Rosen 1924:248). The method of play recalls several Spanish taba game versions.

According to Cooper (1949:513), in South America the taba game "is in use among some of the Peruvian, Bolivian, and Argentine Quechua, some of the Chaco Indians and the Chiriguano and Chane, and the Araucanians, as it is among the Gauchos of Argentina and the upper classes of the Argentine provinces." Cooper (p. 512) also infers that the taba game in the New World is ultimately of Spanish origin. The data support this inference, but mention must also be made of the argument for its native invention.

Decades ago, Boman (1908) and Rivet (1925), among others, noted the similarity between the word *taba* and *tauva*, meaning "four" in Quechua. They also drew attention to the fact that there were four major playing surfaces on a taba gaming piece and that the name for the game could have just as easily come from a Quechua term as a Spanish one. Roman (1908), working in northern Argentina, added fuel to this argument by finding isolated astragali in the possibly pre-Spanish graves of native children. Nevertheless, in the early decades of this century, the general feeling among researchers was one of keeping an open mind about the possible native origin of the game while remaining skeptical that it was anything other than a Spanish introduction.

Rafael Karstén appears to have been the only strong proponent of the native-origin argument. Karstén (1930:6; 1931:6) felt that taba was a bastardized version of *huairu*, a ceremonial game of Inca origin that was played at the funerals of adults. The *huairu* gaming piece was a cut, polished, and stamped llama cannon bone. Taba was played in a similar context in some parts of South America, and Karstén reasoned that it might have come about in some communities as the keeping of llamas became less common in the course of the historic era. His arguments fail in the face of evidence that supports the introduction of the taba game by the Spanish, including (1) ethnographic evidence that the Chaco Indians learned the game in the sugar mills (Nordenskiöld 1910:430; 1912:190), (2) the occurrence of the game in other parts of Latin America that were far removed from the sphere of Incan influence, and (3) the antiquity of the game in Spain and throughout the Mediterranean region.

Lumholtz (1902:278) noted that a taba game was played by the Tarahumara and the Mexicans of northern Mexico. The game recorded by Culin among the Papago was called *tanwan*, a term likely to have been derived from the Spanish *taba* along with the game itself. Boman (1908:362) adds further support to this inference by noting that the rules for the Papago game differ from the rules for taba as it is played in Argentina and Bolivia only in the manner in which one holds the gaming piece for a toss. Culin (1907:135–36) also records a deer astragalus used as a gaming piece by the Pomo in the Ukiah Valley of California but gives no details about the game.

DISCUSSION

The survey of comparable astragalus artifacts shows that the Mid-South astragalus dice share several significant contextual similarities with Spanish taba gaming pieces. Archaeological data and the documented occurrence of several Spanish expeditions into the North American interior in the 16th century suggest the possibility that taba or a similar astragalus-based game was introduced to the natives of the southeastern United States by the Spanish. Several lines of evidence tend to support this argument.

First, astragalus dice and gaming pieces are found only late in the archaeological record of the Americas and even then only in regions that were explored or colonized by the Spanish. None are known from northeastern North America, the central and northern Plains, or the Northwest, all regions that were extensively explored and colonized by England, France, or the United States.⁶

Second, all of the astragalus dice that are unequivocally associated with individuals were found in the graves of children. Those dice occurred as single speci-

6. Astragalus-based games were, however, known in those countries during the colonial period. There was the game of "five stones" in England (Bartlett 1969:20) and "osselets" in France (Becc de Fouquières 1873:325–56). Given the cultural heritage of Euro-Americans, the United States undoubtedly possessed similar games.

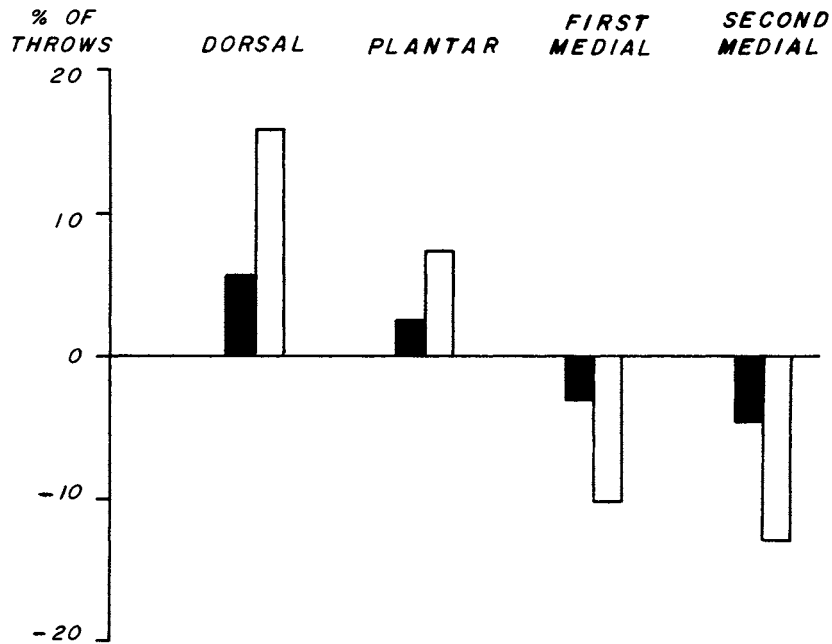


FIG. 3. Frequency of throw outcomes for four surfaces of unmodified astragali (white bars) and astragalus dice (black bars) (data compiled from Lorenson 1947).

mens in 7 of 11 graves. This pattern recalls versions of the *taba* game which, when played by children, require only one gaming piece. Given the growing evidence that the primary and secondary effects of introduced European diseases triggered widespread decimation of native populations in many parts of the Americas (see Ramenofsky 1982), it may also be more than mere coincidence that those children died. It is an intriguing but entirely speculative possibility.

Third, astragalus dice games in the Americas are played with the bones of ruminants, as in the Old World. This similarity, if it occurred by itself, would be unremarkable and could easily have been due to chance alone. Given the other similarities described above, it achieves greater significance.

Several questions now arise. If the Mid-South astragalus dice were derived from Spanish *taba* games, then why were the bones ground to a cuboid shape there and nowhere else? To speculate, it is possible that the Mid-South dice were initially derived from local material culture by using astragali that had been cut and ground to serve as rings for the ring-and-pin game. Those aspects of the modified astragali used for rings might have been incorporated into the native interpretation of a *taba* game.

Alternatively, the grinding may have been done to change the odds affecting the outcome of a die throw. Lorenson (1947) counted the outcomes of 200 throws each of modified and unmodified astragali from the Angel site. The results of his experiment, plotted in figure 3, show that the outcome of a throw of an unmodified astragalus is biased strongly toward the dorsal side of the die and against the second medial side. The

effect of the grinding on the odds can also be seen—it tends to make the game, regardless of how it was played, more equitable by randomizing the outcomes. Since the American versions of *taba* count the dorsal side of the bone as either “no points” when one needs points to win or as a loss of one’s turn, the Mid-South dice create an easier game by reducing the odds that a given throw will turn up the dorsal surface.

The ethnographic record also shows that games of chance, like dice, are often associated with divination or other religious activities (Roberts, Arth, and Bush 1959:599, 601–3). Could the ground dice have simply been used for divination by Native Americans in the Mid-South? Possibly, but this would fail to explain why so many dice should occur at some sites but not at others, why the archaeological context tends to be either in a child’s grave or in household refuse, and why they occur only during a brief interval of archaeological time. These factors tend to argue against the use of astragalus dice for divination except perhaps in the same sense that a roll of the dice tests whether or not one is lucky.

CONCLUSIONS

More than a century ago, Tylor (1880:23–29; 1896:57–67) argued that games may be useful instruments for detecting instances of culture contact (Avedon and Sutton-Smith 1979:55). He explored the similarities between the Aztec board game of *patolli* and the Hindu *pachisi* as a case study and concluded that these complex games shared too many features to be explained by anything other than pre-Columbian contacts between members of the two cultures. His argument remained well-

accepted until the 1950s, when Erasmus (1950) gave the problem a thorough review. Drawing on Goldenweiser's (1913) principle of limited possibilities, Erasmus pointed out that apparent convergences like *patolli* and *pachisi* may occur readily in the absence of culture contacts simply through the inherent limitations on board-game variations. He implied that material-culture similarities between two or more far-removed cultures tend to be compelling only if there are few inherent constraints on the design, form, or organization of the items being compared.

This report has examined another example of culture contact in which a game may have played a role. However, in contrast to the situation in Tylor's example, the culture contact is well documented. The problem has been to assess the likelihood that astragalus dice originated directly or indirectly from this contact.

The strong association of dice with the burials of children and their limited spatial and temporal distribution appear to be firmly established and are unlikely to change much with further research. The inferences about the relationship of astragalus dice and *taba* games are also suggestive but will require extensive testing. The most efficient test would be the demonstration that astragalus dice also occur in older assemblages in the Mid-South. Needless to say, a few specimens from the well-controlled excavation of a Middle Woodland house or burial would resolve the question of indigenous origin or diffusion. Such specimens have not been forthcoming.

At first glance, it also seems reasonable to expect that one could examine faunal remains from early Spanish sites in the southeastern United States to identify astragali that show use polish, ground sides, or discard contexts that may be consistent with the archaeological patterning described for Native American astragalus dice and the European *taba* games. When I first began this study, I was not surprised that *taba* gaming pieces had not been reported from 16th-century Spanish sites in the Southeast, since few such sites are known and have been investigated. I was, however, struck by the fact that *taba* had not been reported from Spanish colonial sites in the Southeast. My surprise passed upon learning something of the archaeology of those communities.

For example, the largest body of published archaeological data for early Spanish occupations in the eastern United States is from an 18th-century context at St. Augustine, a city on the Atlantic coast of Florida that was founded in 1565. It is a component in which, in the absence of detailed archaeological understanding of the colony, one might expect to find evidence of *taba* games, were they present. However, archaeological evidence and the historical record temper one's view of St. Augustine—even after more than a century of existence, it was a harsh, poverty-stricken military colony (*viz.*, TePaske 1965). As Reitz and Cumbaa (1983) point out in their discussion of the faunal remains from the 18th-century component, deer were costly and their use as food "associated with a gentleman's status, as . . . in Europe" (p. 183); common Old World ruminants such as sheep and cattle did not adapt well to the Florida environment (p.

158); official communications from the colony spoke of eating dogs and cats (p. 152); and the economy was inextricably tied to Spain. While one must recognize that arguments from negative evidence are inherently weak, it seems clear that colonial St. Augustine is hardly a setting in which one might expect the odd ruminant astragalus to show up as a gaming piece.⁷ Thus, this is not a test that can be readily assessed from available data; it must await the results of further investigations of early Spanish sites in the Southeast.

Finally, an ethnohistorical account of the aboriginal astragalus dice game in the Mid-South, how it was played, and by whom would be another potentially strong source of support. Unfortunately, such an account is unlikely to be found, since there are very few ethnohistorical data for the regions in which astragalus dice occur. Examinations of the ethnohistorical records for adjacent regions have yielded many descriptions of dice games, but they are unlike *taba* and do not require the use of counters or pieces that are comparable to astragalus dice.

In conclusion, the major implication of the delineated archaeological patterning of astragalus dice is that the indirect cultural effects of the Spanish expeditions were possibly felt farther north in the mid-continent than hitherto supposed. This also serves to establish a basic rough contemporaneity between sites at which the dice have been found and opens the door to an examination of several research questions.

First, it draws into question the so-called vacant-quarter hypothesis. Proponents of this hypothesis argue that much of the lower Ohio Valley and the northern Lower Mississippi Valley (south to about the Missouri Bootheel) were essentially abandoned by native populations well before the 16th century A.D. (Morse and Morse 1983; Williams 1980, 1982, 1985). However, many of the major native town sites in northeastern Arkansas (e.g., Bradley, Big Eddy, Middle and Upper Nodena, and Pecan Point), which the vacant-quarter proponents generally agree were occupied during the Spanish expeditions, also contain astragalus dice and other artifact classes in late contexts that are directly comparable with contexts in which astragalus dice have been found in western Kentucky and southeastern Missouri. Since, regardless of their origin, astragalus dice are demonstrably no older than the late Mississippi period, those sites were all roughly contemporaneous. Therefore, it would seem that the vacant quarter could scarcely have been "vacant," "depopulated," or "abandoned." Elsewhere I have presented additional reservations about the vacant-quarter hypothesis that are based on other lines of evidence (Lewis 1987, 1988). If the hypothesis is indeed false, the late prehistory of a sizable portion of the mid-continent will have to be reassessed.

Second, this study suggests that the material evidence of the earliest Europeans in the mid-continent may include identifiable items of native manufacture that are

7. The colony was not without games and gambling (e.g., Shephard 1983:94, A; TePaske 1965).

the products of contacts with Europeans. Most studies of the earliest European contact situations in the interior United States, such as the De Soto expedition of 1539–43, depend on the presence or absence of foreign (i.e., European) materials in aboriginal sites as proof of contact between Europeans and Native Americans (e.g., Brain 1975, Smith 1976). The case of the astragalus die suggests that more evidence may exist than is currently considered in those studies and that this evidence may add significantly to the scientific understanding of the effects of those contacts.

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Andean World View: Hierarchy or Reciprocity, Regulation or Control?¹

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Intense reexamination of basic propositions regarding Andean man in recent years has focused on his percep-

tion of himself and his world. Earlier work had been based on the exaggerations of Inca noble informants trying to awe their Spanish conquerors with the ideal image of a heliocentric authoritarianism. This image has changed in the course of the last three decades of ethnohistorical research, a period in which everything that had been accepted as axiomatic about the Incas has been subjected to reappraisal.

The earliest social science research on the Andes, beginning with Prescott (1847), von Tschudi (1891), Larra-bure y Unanue (1893), and Markham (1912), among others, concentrated on identifying and elucidating the nature of Andean institutions. It was concerned only incidentally with cognition; von Tschudi's probing of Andean concepts derived from his linguistic studies was the exception. There followed 65 years of basically historical and compilatory sociological research based upon the Spanish chronicles and a few more or less accessible ethnohistoric sources. This period produced the classic if outdated syntheses of Karstén (1949), Baudin (1928, 1942), Means (1931), Cunow (1937), and Métraux (1960) and the landmark open-ended overview of Rowe (1946).

The sociologist-historian approach did produce certain breakthroughs in the area of cognition. Tello (1923) showed an early appreciation for new types of sources, revealing Andean man's world view by publishing Rodrigo Hernández Príncipe and using an array of Andean and tropical South American myths to support his pioneering diachronic interpretations of pre-Hispanic Andean iconography/cosmology. The Avila-transcribed ca. 1598 document *Hombres y dioses de Huarochiri* (Argüedas 1967), virtually the only document of Andean man's belief system in an Andean tongue, was translated into German by Trimborn (1939). Guamán Poma de Ayala's 1614 manuscript was made available by Paul Rivet in a facsimile edition (1936) the Quechua of which was subsequently translated by Posnansky (1944) and Bustos-Galvez (1955) and has finally been adequately rendered by Urioste (1980).

Only after 1945 was strictly anthropological (field ethnographic) research undertaken. Luis Valcarcel and Jorge Muelle trained the first Peruvian ethnographers: Oscar Núñez del Prado, Gabriel Escobar Moscoso, José and Rosalía Matos, and Fernando Fuenzalida. The first North American ones to work in the Andes were John Gillin, Bernard Mishkin, Weston La Barre, and Harry Tschopik. These researchers provided the phenomenological work of the sociologist-historian with a basis in empirical fact and made some attempt to see in contemporary rural Andean man the continuity of the synthesized Inca tradition. Though little attention was paid to Andean man's perception of himself and his institutions, Escobar Moscoso (1967), reporting the results of an anthropological survey of the indigenous population of seven departments of southern Peru, offered a state-of-the-art summary of Quechua cognition that pointed to the new directions research was already taking in citing Argüedas's early work.

La Barre applied the "culture-and-personality" approach of his day to the data from his combined field and library research on the Aymara speech community.