

## Worked Deer Astragali from the Angel Site

ROBERT W. LORENSON, Indiana University

---

At last year's meeting Glenn A. Black called attention to the worked deer astragali found at the Angel Site, in Vanderburgh County (1). The present paper is a restatement of what he said, plus the results of tests I made with the astragali at Mr. Black's suggestion.

The worked astragali are ankle bones from the deer and wapiti which have been cut and ground into rectangular shapes. One hundred and thirteen of these have been found at the Angel Site. Four of them were made from the astragali of the wapiti or elk (*Cervus canadensis*), while the rest come from the Virginia deer (*Odocoileus virginianus*).

During historical times the Pomo Indians of California made dice out of the ankle bones of deer, (2) while the Papago Indians of Arizona did likewise with the ankle bones of bison. (3) The worked astragali found at the Angel Site were probably used for the same purpose.

Astragali dice are also found in Middle Mississippi sites, in Tennessee (4) and Arkansas (5). The Indiana Historical Society has a specimen from the Mouth of the Wabash Site, (6) and a possible specimen is reported from the Wheeler Basin in northern Alabama (7).

It was suspected that some of the dice from the Angel Site were cut so that one side—the pitted side—would land uppermost more often than the others. It was to see whether this suspicion would be borne out that I undertook tests on some of these astragali. I chose seven dice that showed varying degrees of alteration and made two hundred throws with each one of them. I threw them as in the following description of the dice game called *tanwan*, played by the Papago Indians:

"The game 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, as 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." (3)

Although the dice have six faces, the two ends were not considered in my figures since they came up only very infrequently on but two of the seven dice. Therefore, I considered 25% the norm for one of the other four faces to come up. An average of the seven cut dice showed that the pitted side came up most often, 30.4% of the time, or 5.4% above the norm. The flat side opposite occurred 2.3% above the norm, and the other two sides 3% to 4.7% below the norm. The more worked a die was the closer did it conform to the norm.

I then made similar tests with five astragali which showed no evidence of being altered. The pitted side was 15.9% above the norm, the flat side opposite was 7.3% above, and the other two sides were 10.2% and 13% below the norm.

Even though the pitted sides of the worked astragali came up more than thirty per cent of the time, the pitted sides of the unworked astragali came up more than ten per cent more often. Therefore, it would seem as if the inhabitants of the Angel Site did not make a conscious effort to make dishonest dice for use in their games.

### Bibliography

1. Black, Glenn A. *Some Rare or New Middle Mississippi Traits*. Manuscript.
2. Culin, Stewart. *Bur. Am. Eth.*, 24th An. Rep. Washington, 1907, p. 135.
3. *Id.*, p. 148.
4. Letter from Madeline Kneberg to Glenn A. Black, June, 1946.
5. Letter from Harry J. Lemley to Glenn A. Black, July, 1946.
6. Cut bison astragalus found with Burial 81 by Cliff Anderson at Mouth of the Wabash Site. I.H.S. Catalogue No. 38/162 and Andover Catalogue No. 15186.
7. Webb, William S. *Bur. Am. Eth.*, Bull. 122. Washington, 1939, p. 33.