

## HOPEWELLIAN DOGS

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The old axiom, "man's best friend is his dog," is applicable to the prehistoric Indians that once occupied the North American Continent. Dog remains have been found in association with various cultural horizons, spanning nearly the entire period of occupancy; and in the eastern United States from Archaic to Mississippian times. The occurrence of *Canidae* in Hopewellian context is rare, one having been found at the Rogers site in northern Kentucky and two at the Clear Lake Village in Illinois (Haag, N.D.; Haag, 1948). It is the purpose of this paper to describe additional dog remains associated with Hopewellian skeletal material recovered from a cavern along the Scioto River Valley, just northeast of Dublin, Franklin County, Ohio.

In 1957, Mr. Phil Amorose and three companions, in search of reptile remains, examined three small limestone caverns in the walls of a cliff-lined ravine. These sites are located 400 ft east of the Scioto River, 0.8 mile from the junction of U.S. Route 33 and State Route 161, and approximately 300 ft southeast of the Wright-Holder earthwork complex, consisting of a square and two circular earthen enclosures.

All three of the caverns show considerable evidence of underground water action. Numbers 2 and 3 are miniature, but typical caves, being aligned along steeply-dipping joints, with occasional wide places or rooms and with floors and ceilings of varying elevations.

Cave Number 1 is unusual not only in its attitude but in its contents. It follows a steeply-sloping set of joints, and the original shape and size is 35 ft in sloping length, 5 to 8 ft in width, and 3 to 5 ft in sloping height. A deposit of broken and disarticulated human and animal bones completely filled the upper part of the cavern from a point 3.5 ft to 12 ft from the opening. The opening and chamber, measuring 6 by 6 ft, is ragged and somewhat broken at the sides and bottom suggesting some alterations and widening to facilitate the disposition of the skeletal remains. Despite the extensive damage to the bony parts, whether intentional of unintentional, one complete human skull was recovered.

Careful examination of the skeletal parts and fragments exhumed by Amorose revealed the remains of 13 recognizable species of animals, including the bones of 25 dogs. No attempt was made to establish the number of human individuals represented in the deposit. It should be noted, however, that the complete human skull is metrically and morphologically Hopewellian (R. S. Baby, personal observation).

The dog remains were sorted into two anatomical groups—cranial and post-cranial—carefully examined and submitted to metric analysis (Haag, 1948). The post-cranial skeleton is represented by the long bones of both front and hind legs. Bones of the spine, rib cage, pelvic and shoulder girdle are markedly absent in the series. All ages are represented from infancy to senility with the major portion of individuals in the adult age group. The immature specimens were deleted from this study because of incomplete development and/or absence of epiphyses.

There are five measurable crania in the series, only one of which yielded nearly complete measurements (Table 1). However, the range of the various fragmentary dimensions are nearly identical with Haag's Woodland series (Haag, 1948) and the Rogers site dog, and falls in the middle of the range of Haag's pooled Woodland-

TABLE 1  
*Scioto Cavern dogs, cranial and dental measurements*  
*(Measurements in millimeters)*

Catalog number	1	2	3	4	5	
Occipital length	1	164.0	—	—	161.0	—
Basal length	2	148.5	—	—	145.5	—
Condyllo-basal length	3	155.0	—	—	152.0	—
Palatal length	4	83.0	—	—	79.5	—
Width at M <sub>1</sub>	5	56.0	53.0	—	52.5	55.0
Width at canines	6	26.0	—	—	—	—
Width at mastoids	7	59.0	55.0	56.5	58.5	—
Width occipital condyles	8	33.0	—	30.0	34.5	—
Width zygomatic arch	9	—	—	—	—	—
Nasal length	10	50.5	—	—	—	—
Occiput-nasion length	11	93.5	88.0	85.0	86.5	—
Orbit-alveolus I <sub>1</sub>	12	72.0	—	—	70.0	—
Supraorbital width	13	44.0	—	38.0	39.0	—
Interorbital width	14	35.0	32.0	28.5	30.0	30.5
Cranial height	15	—	—	—	—	—
Least cranial width	16	33.0	31.0	33.5	29.0	—
Maximum cranial width	17	53.0	51.5	47.0	53.0	—
Meatus-alveolus I <sub>1</sub>	18	129.5	—	—	—	126.0
Alveolus I <sub>1</sub> -M <sub>2</sub>	19	84.0	—	—	—	—
Alveolus C-M <sub>2</sub>	20	70.5	—	—	—	—
Alveolus P <sub>1</sub> -M <sub>2</sub>	21	—	52.0	—	56.5	59.0
Alveolus P <sub>2</sub> -M <sub>2</sub>	22	41.0	45.5	—	50.0	50.0
Alveolus M <sub>1</sub> -M <sub>2</sub>	23	17.0	13.0	—	17.0	17.0
Length carnassial M <sub>1</sub>	24	17.0	15.0	—	18.0	17.5

TABLE 2.  
*Scioto cavern dogs, dental measurements*

Catalog number	Alveolus I <sub>1</sub> -M <sub>3</sub>	Alveolus C-M <sub>3</sub>	Alveolus P <sub>1</sub> -M <sub>3</sub>	Alveolus P <sub>2</sub> -M <sub>3</sub>	Alveolus P <sub>3</sub> -M <sub>3</sub>	Alveolus P <sub>4</sub> -M <sub>3</sub>	Alveolus M <sub>1</sub> -M <sub>3</sub>	Length carnassial M <sub>1</sub>	Condyllo-symphysis length	Bicondylar width
	25	26	27	28	29	30	31	32	33	34
1.	87.0	82.0	68.0	61.0	52.0	42.5	33.0	20.0	—	—
2.	85.5	78.0	63.5	54.0	44.0	—	33.0	20.0	—	—
3.	—	—	—	63.0	53.0	43.0	33.0	19.5	—	—
4.	—	—	58.0	—	47.5	37.5	28.0	18.0	—	—
5.	80.0	75.0	—	60.0	52.0	41.0	32.0	19.0	103.0	66.0
6.	84.5	79.0	66.0	60.5	—	43.0	32.0	20.0	113.0	70.0
7.	85.0	79.0	—	62.0	51.5	41.0	31.0	19.0	116.0	77.5
8.	81.0	75.5	—	59.0	49.0	—	30.0	18.0	110.0	75.0
9.	85.0	80.5	62.0	61.0	—	—	31.0	19.5	117.5	72.0
10.	76.0	72.0	59.5	55.5	48.0	37.0	28.0	18.5	105.5	—
11.	88.0	85.5	—	63.0	53.0	—	33.0	20.0	—	—
No.	9	9	6	10	9	7	11	11	6	5
Range	76.0	72.0	58.0	54.0	44.0	37.0	28.0	18.0	103.0	66.0
	87.0	85.0	68.0	63.0	53.0	43.0	33.0	20.0	117.5	77.5
Mean	83.5	78.5	63.5	59.9	50.0	40.7	31.4	19.2	110.6	72.1

Mississippi series. Similarly, the dental measurements of the upper jaw are in the middle of the range for Woodland dogs (Table 1).

Mandibles of eleven individuals are represented, seven of which are complete, i.e. both left and right half, and four are incomplete or fragmentary. Measurements are tabulated on Table 2. The mean of the measurements is quite near the mean of the Woodland series and tends to fall near the lower end of the pooled Woodland-Mississippi series. The bi-condylar width and particularly the condylo-symphysis length tends to be shorter than the mean of the Woodland dogs.

Eight humeri, seven right and one left, are present (Table 3). The length of the humeri is practically identical to the mean of the Woodland series and falls in the lower part of the Woodland range. The diameter of the humeral head and transverse diameter of the Woodland series tends to be larger, implying

TABLE 3  
*Scioto cavern dogs, post-cranial measurements*

Catalog number	Humerus length	Diameter humerus head	Transverse diameter	Catalog number	Radius	Catalog number	Ulna	Ulnar notch	Catalog number	Femur	Catalog number	Tibia
	35	36	37		38		39	40		41		42
1	123.0	31.0	21.0	17	132.0	9	167.0	142.0	1	140.0	?	136.0
2	121.5	27.5	—	18	128.0				2	139.0	23	131.0
3	124.0	—	—	19	124.0				3	137.0	26	138.0
4	128.0	34.0	23.0	22	140.0				22	137.5	27	139.0
5	116.5	30.5	—	20	133.0				35	143.5	24	143.5
5 <sup>1</sup>	126.5	—	—	21	122.5				30	136.0	28	141.0
8	128.5	35.0	23.0						4	144.0	8?	136.0
10	131.0	33.5	23.0						36-5	139.5		
									6-7	143.0		
									33-8	148.0		
No.	8	6	4		6					10		7
Range	116.5 134.0	27.5 35.0	21.0 23.0		122.0 140.0					136.0 148.0		132.0 143.5
Mean	124.8	31.9	22.5		129.8					140.7		137.7

that the latter were slightly heavier animals. Both series are considerably smaller than the Rogers site dog.

Six radii were examined and found to be slightly above the mean of the Woodland series and fall in the middle of the range. These are also slightly above the mean of the pooled Woodland-Mississippi series. Again, the radius of the Rogers dog was considerably larger than both the Scioto Cavern series and those described by Haag.

From a total of eight ulnae, only one was measurable (Table 3). The length, 167.0 mm, is well above the mean of the Woodland series and in the middle of the range. The same can be said of the pooled Woodland-Mississippi series.

The Scioto Cavern dogs are metrically and morphologically of a Woodland variety. Since they consistently fall below the mean of the pooled Woodland-

Mississippi series, they are more closely related to smaller Archaic shell-heap dogs from Kentucky and Alabama. This relationship is even more significant since Haag's pooled Woodland-Mississippi is ". . . actually not a very good group for comparison, since they contain dogs from a considerable time range." (Haag, personal communication, 1962). Physically, the evidence from this study implies the members of this rather homogenous group were small and not quite as heavy

TABLE 4  
*Mean values*

No.	Measurement	Scioto cavern	Woodland (Haag)	Woodland Miss. (Haag)	Rogers (Haag)	Kentucky shell heap	Alabama shell heap
1	Occipital length	163.1	—	165.5	(163.0)	153.9	160.3
2	Basal length	147.0	—	148.0	(145.0)	138.5	142.9
3	Condylar-basal length	153.5	—	155.8	156.0	145.6	150.7
4	Palatal length	81.2	82.5	81.2	—	74.8	78.5
5	Width at M <sub>1</sub>	54.1	56.6	56.6	58.5	53.9	55.2
6	Width at canines	26.0	29.6	31.3	—	30.3	30.8
7	Width at mastoids	57.2	59.6	62.2	61.3	55.2	57.1
8	Width at occipital condyles	32.5	32.1	33.2	36.0	31.3	32.3
9	Width zygomatic arch	—	—	97.5	94.0	87.9	87.7
10	Nasal length	50.5*	—	58.8	—	46.8	50.6
11	Occiput-nasal	88.25	94.2	93.4	88.4	85.7	90.0
12	Orbit-alveolus I <sub>1</sub>	71.0	68.5	67.8	(62.0)	65.1	68.2
13	Supra-orbital	40.3	42.8	43.8	43.2	40.5	42.5
14	Inter-orbital	31.1	31.8	32.6	31.8	29.1	30.5
15	Cranial height	—	55.9	55.9	54.0	53.3	54.8
16	Least cranial width	31.6	31.8	33.0	35.5	31.5	32.0
17	Maximum cranial width	51.1	52.9	54.0	57.4	51.6	52.3
18	Meatus-alveolus I <sub>1</sub>	127.7	—	133.4	—	125.3	129.5
19	Alveolus I <sub>1</sub> -M <sub>2</sub>	84.0	82.8	83.2	—	80.0	82.4
20	Alveolus C-M <sub>2</sub>	70.2	68.4	69.2	—	66.8	68.4
21	Alveolus P <sub>1</sub> -M <sub>2</sub>	59.0	54.7	56.2	—	55.8	56.7
22	Alveolus P <sub>2</sub> -M <sub>2</sub>	50.0	49.3	50.5	—	49.7	50.3
23	Alveolus M <sub>1</sub> -M <sub>2</sub>	17.0	15.5	15.8	—	15.8	15.7
24	Length carnassial P <sub>4</sub>	17.5	16.2	16.6	—	16.1	16.1
25	Alveolus I <sub>1</sub> -M <sub>3</sub>	83.5	85.6	86.2	—	80.6	82.5
26	Alveolus C-M <sub>3</sub>	78.5	78.4	79.7	—	75.5	77.3
27	Alveolus P <sub>1</sub> -M <sub>3</sub>	63.5	67.3	67.4	—	62.8	64.0
28	Alveolus P <sub>2</sub> -M <sub>3</sub>	59.9	60.3	62.0	—	58.8	60.0
29	Alveolus P <sub>3</sub> -M <sub>3</sub>	50.0	52.0	53.1	—	50.6	51.1
30	Alveolus P <sub>4</sub> -M <sub>3</sub>	40.7	40.7	42.1	—	40.4	40.6
31	Alveolus M <sub>1</sub> -M <sub>3</sub>	31.4	30.6	31.7	—	30.4	30.2
32	Length carnassial M <sub>1</sub>	19.2	18.8	19.3	—	18.6	18.7
33	Condylar-symphysis length	110.8	119.4	118.7	—	108.9	114.2
34	Bicondylar width	72.1	73.9	76.9	—	72.5	72.6
35	Humerus	124.87	125.2	126.7	140.0	118.0	123.9
36	Diameter humerus head	31.9	33.4	34.1	—	32.6	33.3
37	Trans. diameter	22.5	24.5	25.3	—	23.9	24.4
38	Radius	129.8	124.8	127.8	144.0	115.8	121.2
39	Ulna	167.0	153.9	153.9	—	143.3	149.6
40	Ulnar notch	142.0	131.0	131.1	—	121.3	127.2
41	Femur	140.75	139.6	139.0	157.0	129.3	135.9
42	Tibia	137.7	129.6	133.2	156.0	127.5	134.4
43	Bac length	—	—	—	—	69.6	77.0
44	Bac width	—	—	—	—	9.0	9.2

\*Measurement of a single bone or single dimension.

as the Woodland dogs described by Haag, and have shorter muzzles, similar to those of the Archaic dogs of Kentucky and Alabama (Table 4). This last fact is proved by the consistently smaller condylo-symphysis length, i.e. maximum length of mandible, and bicondylar width of the mandibles found in this series in comparison to that of Haag's. However, the Scioto Cavern dogs had longer legs than did the Archaic dogs (Table 4). That the measurements of the dogs fall below those of the Rogers site dog, also a Hopewellian specimen, can be explained because the latter is a ". . . somewhat disharmonic medium-sized dog of small head and long legs." (Haag, N.D.). While the cultural provenience is somewhat tenuous, these dogs can be associated with Hopewell, if not directly with the Wright-Holder site, because of the burial method employed, i.e. fragments of unburned broken bones buried on and covered with limestone slabs. This burial method was found in the stone mound in the square enclosure of the Wright-Holder works, a Hopewellian site, excavated by Shetrone in 1921 (1924) and re-examined by the Ohio Historical Society in 1961. The presence in the cave of a human skull, morphologically and metrically Hopewellian further substantiates this conclusion.

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