

A RECENT FIND OF JAGUAR BONES IN A TENNESSEE CAVE¹

PAUL W. PARMALEE

Illinois State Museum, Springfield

Remains of large Pleistocene felines have been found in approximately 30 widely scattered localities in North America, and their taxonomic relationships to each other and to recent forms have been evaluated by Simpson (1941b) and others. Until only recently, however, little jaguar material was available for study, but with the recovery of two partial skeletons from caves in Tennessee in 1944 and 1947 (McCrary, Kirby-Smith and Templeton, 1951), specific relationships are now more clearly understood. These authors (op. cit.) have recognized two contemporaneous fossil forms, *Panthera atrox* and *Panthera augusta*, the latter being intermediate between *P. atrox* and the modern jaguar, *Panthera onca*.

CAVE LOCATION AND DESCRIPTION

Bones of the jaguars to be described here were recovered from a 20 foot deep pit situated in the horizontal tunnel floor, approximately one-half mile in from the entrance, of Little Airplane Cave (listed as Pitchfork Cave on the U. S. Geological Survey map, Chattanooga Quadangle). This cave (St. Louis limestone of the Cumberland Plateau) is located on the southwest bank of the Tennessee River (about 100 feet above the river, opposite the northern tip of Williams Island), approximately two miles northwest of Chattanooga, Hamilton County, Tennessee. Exploration of the cave was first undertaken in December, 1957, by Mr. Richard Wilson, a student at Southern Missionary College, Collegedale, Tennessee. Subsequent visits were made in March, 1958, and in May and October, 1959; portions of a humerus were brought out on the second trip and the remaining bone material was recovered in October, 1959.

Mr. Charles K. Peacock of Chattanooga accompanied Mr. Wilson on one of the visits to the cave, and it was through the efforts of Mr. Peacock that these jaguar remains were made available to the author. I would like to express my appreciation to Mr. Peacock, Mr. Wilson, Mr. William G. Swafford, Jr., and Mr. Leo Stolpmann, owner of the cave, for permission to examine the bone material and to present the resulting data.

DESCRIPTION OF THE JAGUAR SPECIMENS

Two jaguars were represented in the bone material removed from the cave. Five sections of canine teeth and both, nearly-

¹These jaguar remains are now housed in the Frank H. McClung Museum, University of Tennessee.

complete lower M^1 constitute the only remains of one animal (Figure 1), a considerably older specimen than the second judging by the cusp wear. The skeleton of the second jaguar is more complete with portions of the skull, mandibles, vertebrae, certain limb bones and pelvis being represented. Nearly all of this material was encrusted with layers of travertine that varied from one-sixteenth inch to approximately one inch in thickness. Unavoidable damage (and breakage) resulted to a few of the bones when the discoverers attempted to dislodge the skeleton from the pit floor and later while removing the travertine. Generally, the bone was well preserved although parts of certain elements appeared chalky and were badly decomposed.

By comparison of the measurements and descriptions of these bones with those presented by McCrady, Kirby-Smith and Templeton (1951), the animal was tentatively identified as *Panthera augusta*. For verification, the remains were sent to Dr. C. Lewis Gazin, Curator of Vertebrate Paleontology, U. S. National Museum, Washington, D. C. Dr. Gazin stated (letter of Oct. 13, 1959), "The correspondence is strikingly close [to the McCrady et. al. material] in most of the elements. I find that the metatarsals are very slightly shorter — not more than 5% however — and I do not regard this as particularly significant. I would have no hesitancy in referring your specimen to the same species." I would like to express my appreciation to Dr. Gazin for examining this material.

Specimen No. 1. — As stated previously, one of the jaguars is represented only by tooth remains. These consist of both lower M^1 , portions of the upper right and lower left canines plus three other canine tooth fragments. Although the enameled cutting surfaces of these teeth are moderately well preserved, the root portions are in poor condition and it is reasonable to assume that the remaining skeleton decomposed, possibly the rate being intensified by earlier alternating wet and dry periods in the cave interior.

Specimen No. 2. — The skeleton of this adult was found in a "more-or-less" articulated position, apparently on its left side. Both femora, fibulae and scapulae, the left tibia, all of the ribs except for a few fragments) and all thoracic, lumbar, sacral, and caudal vertebrae were missing. A portion of two cervical vertebrae, a fragment of the atlas and the nearly-complete axis were the only vertebrae recovered. Except for the styloid process, the left radius was complete; only the proximal half of the right radius was found. The proximal and distal ends of both ulnae were missing although those of the right, as evidenced by new breaks, were probably lost during removal of the skeleton. With the possible exception of the left humerus, this right ulna was the only element that had been gnawed by rodents; tooth marks were evident at the distal end (break), the center of the shaft,



Figure I. The More Complete Remains of *Panthera augusta* from Little Airplane Cave, Hamilton County, Tennessee. Upper Right Corner: Teeth of Specimen No. 1. Scale $\frac{1}{2}$.

and at the semilunar notch.

Except for portions of the lateral epicondyl and bicipital groove, the left humerus was recovered intact, but only the proximal half (minus a section of the greater tuberosity) of the right humerus was found. The right calcaneum, talus, scaphoid, cuboid, external cuneiform, metatarsals 2, 3 and 4, and their adjoining proximal phalanges, were complete. Three other prox-

imal phalanges were present, as well as sections of the left second and third metatarsals and the proximal half of the right fifth metatarsal. Four metacarpals and eight proximal phalanges, probably from this animal, were recovered on the last trip to the cave. The head and a section of the shaft of the right tibia were missing while the only segment of pelvis recovered was the main body of the (left) ischium.

Fortunately the more diagnostic parts of the mandibles and skull were recovered intact although the brain case (parietals, temporals, occipitals) was badly broken. The left side of the skull was represented by a portion of the maxillary, molar (including frontal process of zygomatic) and the zygomatic process of the temporal; also present was the canine, P³, P⁴, and the vestigial M¹. The right side consisted of the premaxillary, part of the maxillary and the molar, and included all teeth except P² (see Figure 1). Other skull fragments consisted of the auditory bullae, palatine, nasals and frontals.

The lower mandibles contained a full compliment of teeth (I¹, I², I³, C, P³, P⁴, M¹). The posterior section of the left dentary had been broken (or decomposed) immediately behind M¹ while the condyloid process and portions of the ramus of the right were missing.

DISCUSSION

Simpson (1941a) has considered, in some detail, the evidence dealing with the time of extinction of eastern jaguars and with the possibility that they did survive in eastern North America into the earliest historic times. As he has pointed out, certain historic Indian pottery designs, and descriptions and illustrations of early explorers, might possibly be referable to the jaguar (or bobcat or puma kittens?). Both the bobcat and puma were utilized by the Indians of southeastern United States (Swanton, 1946) and remains of these two cats have been recovered in midden deposits of both historic and prehistoric sites. Thus far bones of the jaguar have not been found in association with archaeological sites in eastern North America and, considering the cave situations in which they have been recovered, it is presently reasonable to conclude that these cats have been extinct for a considerable period of time.

Taxonomic relationships between the two fossil forms, *P. atrox* and *P. augusta*, and the modern jaguar are apparently quite close and all three are related cats within the subgenus *Jaguarius*. With the exception of a Mississippi record, *P. atrox* appears to have inhabited primarily western North America while its contemporary (*P. augusta*) occurred mainly in the eastern regions. Simpson (1941b) has pointed out that *Panthera* cf. *augusta* records from northwestern United States are based on dubious identifications.

As indicated previously, *P. augusta* appears to be intermediate between *P. atrox* and *P. onca*. In their discussion of two Tennessee specimens of *P. augusta*, McCrady, Kirby-Smith and Templeton (1951) state that these specimens are nearer the modern jaguar in size, in breadth of the skull at the zygomatic region, and in shortness of the ulna. They are nearer *P. atrox* "in the proportionate lengths of all the limb bones except the ulna, in the relative breadth of the muzzle and frontal region, and in the proportions of the calcaneum. It is distinct from each in having proportionately the shortest skull and the largest P⁴."

The jaguar skeleton from Little Airplane Cave represents the fourth record of *Panthera augusta* from southeastern Tennessee, all four being within approximately a 50 mile radius of one another. Recovery of these fossil cat remains are particularly noteworthy in that they suggest the presence of a former established population of jaguars in the Cumberland Plateau region.

LITERATURE CITED

- McCrady, Edward, Kirby-Smith, H. T., and Harvey Templeton. 1951. New finds of Pleistocene jaguar skeletons from Tennessee caves. *Proc. U. S. Nat. Mus.*, Vol. 101, No. 3287, pp. 497-511.
- Simpson, George G. 1941a. Discovery of jaguar bones and footprints in a cave in Tennessee. *Amer. Mus. Novit.*, No. 1131, pp. 1-12.
- 1941b. Large Pleistocene felines of North America. *Amer. Mus. Novit.*, No. 1136, pp. 1-27.
- Swanton, John R. 1946. The Indians of the Southeastern United States. *Smiths. Inst. Bur. Amer. Ethnol., Bull.* 137, 943 pp.

NEWS OF TENNESSEE SCIENCE

(continued from page 70)

versity, commander of the Caribbean Air Command, Canal Zone, and commander, Headquarters Command, USAF, in Washington. He served in North Africa and the China-Burma-India theater in World War II and received, among other decorations, the Distinguished Service Medal, Legion of Merit with two Oak Leaf clusters, and the Distinguished Flying Cross.

In the School of Engineering, Francis R. Toline has been appointed Associated Professor of Engineering. Mr. Toline received the B.S. Degree from the U.S. Naval Post Graduate School, Monterey, California and the M.S. from Massachusetts Institute of Technology. He is a former Commander in the Navy. While in the service, he had extensive research and development experience in aircraft and missile fields.

To the Chemistry Department, Dr. William J. Hart, has been added as Associate Professor, and Alvin W. Singer as Instructor. Dr. Hart served as associate professor of chemistry at Maryland State College. He was chemist for the Flintkote Corp., Rutherford, N.J., and for the Celanese Corporation of America, Summit, N.J., and technical director for the Barbizon Corporation, Scanton, Pa. He has the A.B. and M.A. from George Washington University and the Ph.D. from the University of Maryland.

(continued on page 92)