NOTES ON CERTAIN GROUSE OF THE PLEISTOCENE

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In the Ozark region of northwestern Arkansas in the spring of 1903, Mr. Waldo Conard, while searching for the site of an old lead mine, found a deposit of bones, some of which were sent to the American Museum of Natural History. Dr. Barnum Brown on behalf of that institution visited the area in the fall of 1903, and again in 1904, securing several hundred specimens. In his report (Brown, 1908) he identified 41 species of mammals, of which he named 19 as extinct species or subspecies new to science. Ten others were identified to genus or species, and in addition there was mention of amphibians, lizards, snakes and various bones of birds. Among the latter he listed the Turkey (*Meleagris gallopavo*) with a query. The location, near the northern boundary of Newton County, was on a hill at 1030 feet elevation, a mile north of the Buffalo River, 4 miles west of the settlement known as Willcockson, and 15 miles south of the town of Harrison in Boone County.

Some of the bird material later came to R. W. Shufeldt, who (1913, pp. 299–301) verified Brown's identification of the fragmentary material of the Turkey, and made additional rambling remarks under three headings, one marked "*Bonasa umbellus*?," and the other two headed "Bird (indetermined)," with reference under each to illustrations from photographs published in accompanying plates. The supposed grouse bones were allocated tentatively, as he stated that he had no skeleton material of the Ruffed Grouse available for comparison. In final comment (*loc. cit.*, p. 300) he said, "If subsequently found to be another species of either *Bonasa* or *Lagopus*, I would suggest the specific name of *ceres*." The records, except for the Turkey, have remained in this uncertain state until now.

Recently John E. Guilday of the Carnegie Museum, through Dr. Kenneth C. Parkes of that institution, has requested assistance in the identification of grouse bones from a Pleistocene deposit in western Pennsylvania. To provide this information it has been desirable to make a firm determination of the earlier Arkansas grouse material, since the bones from Pennsylvania were similar in size. The Arkansas specimens, in the American Museum of Natural History, have been made available to me through the kindness of Dr. Edwin H. Colbert and Mrs. Rachel H. Nichols. Shufeldt's material proves to represent an extinct species of Prairie Chicken, as indicated in the following allocation and discussion.

Tympanuchus ceres (Shufeldt)

Bonasa or *Lagopus* . . . . . *ceres* Shufeldt, Bull. Amer. Mus. Nat. Hist., vol. 32, art. 16, August 4, 1913, p. 300, Pl. 55, figs. 18–20, Pl. 56, figs. 45–72.

Pleistocene (Conard Fissure): Four miles west of Willcockson, and one mile north of Buffalo River, northern Newton County, Arkansas.

Type.—Amer. Mus. of Nat. Hist., Dept. of Vert. Paleo. no. 12392.

Characters.—Generally similar to the modern Lesser Paririe Chicken (*Tympanuchus pallidicinctus* [Ridgway]), but somewhat smaller; bill broader and somewhat stronger, as indicated by a fragmentary premaxilla; coracoid shorter but with shaft equally strong; scapula more slender; wing relatively smaller, as demonstrated by the individual elements as follows: humerus smaller, with head less bulbous, external condyle relatively smaller, entepicondyle slightly shorter, and opening for the pneumatic foramen a little smaller; ulna and radius definitely shorter, indicating a smaller middle segment of the wing; carpometacarpus slightly shorter and somewhat more slender; leg similar in length, but with the individual elements of femur, tibiotarsus and tarsometatarsus somewhat more slender.

Measurements.—Following are pertinent measurements of complete elements of the skeleton, with similar data from two male and two female skeletons of *Tympanuchus pallidicinctus* for comparison. The modern Heath Hen (*Tympanuchus cupido cupido*) and the Greater Prairie Chicken (*Tympanuchus cupido pinnatus* [Brewster]) are decidedly larger.

Total lengths	Tympanuchus ceres	Tympanuchus pallidicinctus
Coracoid	45.2	45.3–48.8
Humerus	59.7–60.5	61.2–67.5
Ulna	55.9–56.3	58.3–65.6
Radius	47.7–50.2	53.2–58.6
Carpometacarpus	33.1–34.7	34.7–41.0
Femur (approximate)	65.0–66.8	62.0–67.0
Tibiotarsus	85.5–87.2	80.3–89.8
Tarsometatarsus	44.9–45.4	42.8–47.2

Remarks.—A part of the sternum comprising the anterior end of the carina is too fragmentary to afford useful comparison. The scapula lacks the distal end of the blade. The greatest interest is found in the limb bones, as it is in these that the details attributed to specific difference are indicated. The wing elements have been described sufficiently above. In the leg the femur, represented by six specimens, all nearly complete, shows no differences from modern *Tympanuchus pallidicinctus* in form. The tibiotarsus has the condyles relatively smaller, but the measurements of total length, in the three specimens sufficiently complete to afford these data, fall within the limits shown by the two sexes of the living bird. The same is true in the total length of the two complete tarsometatarsi, but the fossil bones are more slender than those of the living species.

In summary, the skeletal elements indicate a bird slightly less in size than the modern Lesser Prairie Chicken, marked by heavier bill, and shorter, smaller wings, that stood about as tall as its living relative, but with more slender legs. It appears to have been of related origin with *T. pallidicinctus*, but not directly in the evolutionary line of that species.

Dr. Brown in his original account (1908, p. 159) located the Conard Fissure site as "four miles west of Willcockson." This is shown as a country settlement on the Harrison topographical sheet of 1905 of the U. S. Geological Survey, and is marked in some of the older atlases. It is not a post office, and is not found on newer maps.

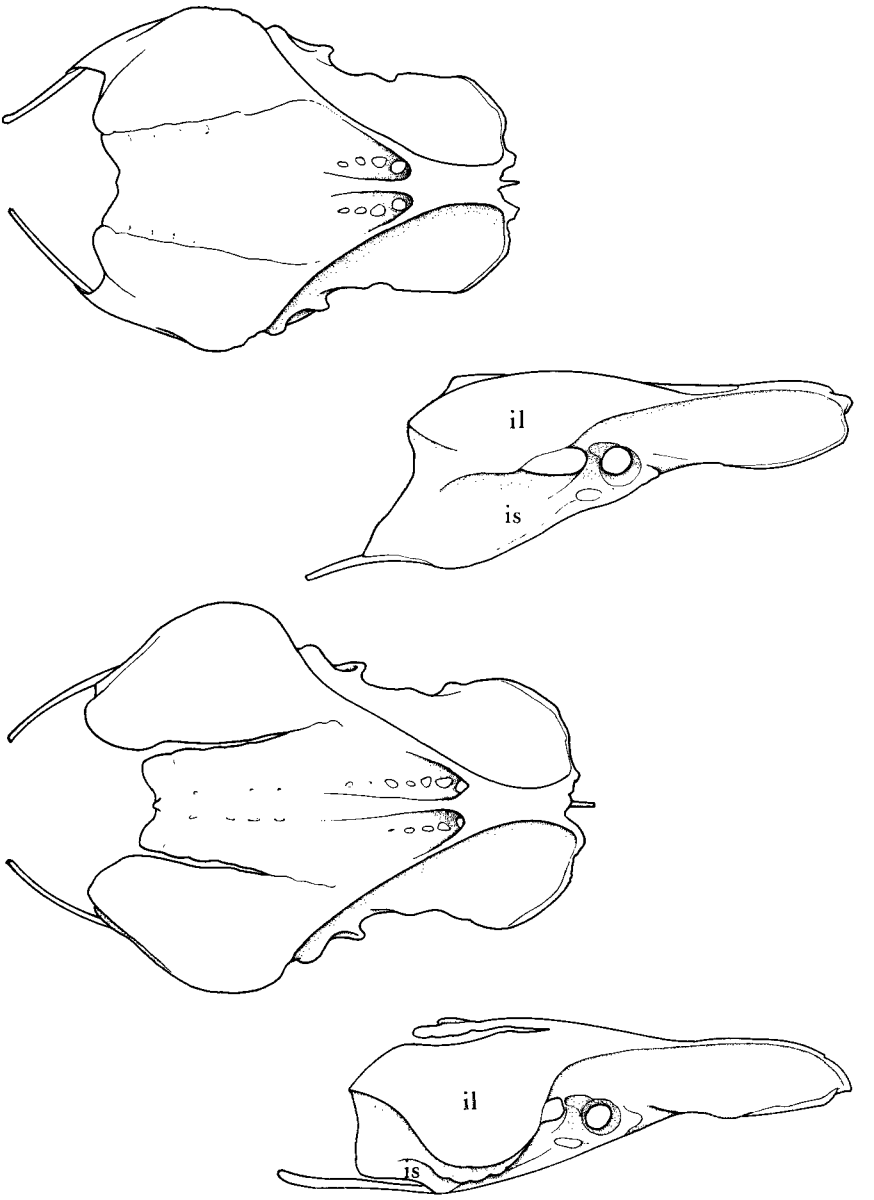
An important matter at the beginning of the examination of this Conard Fissure material was the determination of the characters found in the skeleton to separate the two currently accepted genera, *Tympanuchus* and *Pedioecetes,* since the general over-all appearance of the fossil placed it as a grouse of one of these two categories. I have had available in this study a series of 8 *Pedioecetes phasianellus columbianus* from Montana to represent that group, 4 *Tympanuchus pallidicinctus,* 2 of the recently extinct *Tympanuchus cupido cupido* from Massachusetts, and 3 *Tympanuchus c. pinnatus* from North Dakota. In life the modern species of *Tympanuchus* are marked by rounded tail, a prominent air sac bare of feathers on the sides of the neck (less evident in females), over which there is a tuft of elongated feathers in the male sex. *Pedioecetes phasianellus* has four central rectrices elongated to project prominently beyond the others, and lacks the bare area over the air sacs and the elongated neck feathers of the other group. Habitat and general habits are fairly similar in the two, and both gather in spring on display grounds where the males strut, posture and call. In detailed examination of the skeleton, element by element, beginning with the skull and continuing through sternum, pectoral girdle, wings, pelvis and posterior limb, I find that the only definite characters to separate the two groups of species appear in the pelvis. Details evident in other parts of the skeleton serve to identify species but are not valid to separate the two groups recognized as genera.

In *Pedioecetes phasianellus* the posterior section of the sacrum, viewed from above, is only slightly narrowed posteriorly, and remains in close contact with the ilium to the posterior border of the pelvis. Viewed from the side the posterior end of the ilium is produced as a point. From this same view the ischium below, and particularly behind, the ilio-ischiadic foramen is decidedly broadened. Overhang of the free border of the ilium over the foramen in question is slight. (See Figs. 1–2.)

In the forms of the genus *Tympanuchus* the posterior end of the sacrum, when viewed from above is narrowed, and does not extend to the end of the ilium (with or without an additional caudal element coalesced with it). Both internal and external angles of the posterior border of the ilium are rounded, and both, in this area, are free, the inner one from the posterior end of the sacrum, and the outer one from the projecting shaft of the pubis. Viewed from the side the ischium is narrowed, with the outer margin of the post-acetabular portion of the ilium projecting above it as a pronounced overhang. (See Figs. 3–4.) This projection is evident in both sexes but usually is broader in males.

There is enough of the sacrum preserved in the material of *ceres* to demonstrate that this species is a member of the genus *Tympanuchus.*

The specimen forwarded by Mr. John E. Guilday found in Lloyd's Rock Sinkhole, in the New Paris Sinkholes, one and one-half miles northeast of New Paris, Bedford County, Pennsylvania, collected September 21, 1958, is represented by all of the important parts of the skeleton. While these bones were in mixed association, they appear to come from one individual, since there is no duplication among them, and the paired elements represent right and



FIGS. 1–2. (*above*) Dorsal and lateral views of pelvis in the Sharp-tailed Grouse, *Pedioecetes phasianellus columbianus* (¾ natural size).

FIGS. 3–4. (*below*) Dorsal and lateral views of pelvis in the Greater Prairie Chicken, *Tympanuchus cupido pinnatus* (¾ natural size).

left sides. The pelvis (and the other bones) indicate clearly that the bird is the Sharp-tailed Grouse (*Pedioecetes phasianellus* [Linnaeus]), this being the first Pleistocene record for the species in eastern United States. Mr. Guilday interprets the considerable mammalian fauna with which the bird was found as a more boreal association than that of the present day in Bedford County. The presence of the grouse does not militate against this, as this species at present ranges north into northern Manitoba, northern Ontario, and Quebec. In modern times it has not been found in the United States east of northern Michigan. The fossil is believed to date back to late Wisconsin time.

There were a number of bones of the Ruffed Grouse (*Bonasa umbellus*) associated with the other species, affording another Pleistocene locality for this wide-ranging species.

Literature Cited

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