A FOSSIL HOATZIN FROM THE MIOCENE OF COLOMBIA

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THE rich collections of Miocene vertebrate fossils obtained by Dr. R. A. Stirton and his associates in the upper Magdalena Valley of Colombia, South America, have consisted chiefly of mammalian and reptilian material (Stirton, 1951; Savage, 1951). Even though a bat and small primates have been found, bird remains inexplicably are almost lacking. However, in close association with the monkey, *Cebupitheca sarmientoi*, was part of a skull which when prepared proved to be that of a galliform bird. Further removal of the matrix uncovered many of the fine details of cranial structure which showed that this fossil bird had close affinity with the aberrant galliform type known as the hoatzin, family Opisthocomidae. This family heretofore has been unrepresented in the fossil record.

Few groups of birds have the narrow, elongate postorbital cranium lacking high occipital crests which is found in the Galliformes. Some genera of the Tinamiformes have the same general configuration of the cranium, but in all the tinamous examined the suprameatic crest is very differently shaped from that in the Galliformes; it consists of a simple arc bearing a down-turned process anteriorly. Also the occipital condyle is a simple, single knob in the Tinamiformes instead of a dorsally cleft process as in the Galliformes.

The Miocene fossil shows so many points of similarity to the hoatzin, even in matters of precise location and size of foramina in the orbit, that I have no hesitancy in placing it in the family Opisthocomidae. It may be described as

Hoazinoides magdalenae, new genus and species

Type.—Partial skull, complete dorsally from midfrontal level to foramen magnum; temporal area and most of suprameatic border complete on left side; left posterior face of orbit represented, although fractured dorsally; basioccipital, exoccipital, and opisthotic well represented on right side; no. 42823, Univ. Calif. Mus. Paleo.; figs. 1 and 2.

Type locality.—"Approximately 8 meters of gray clays overlying concretionary sandstone which rests on the conglomerates so conspicuously exposed in the middle of the Villavieja-Cerro Gordo section . . . . Found in the clays adjacent to the Villavieja-San Alfonso trail, several meters beyond the house called La Venta, Huila, Colombia" (Stirton, 1951). Locality V 4517; Royo no. 1999. Late Miocene age. La Venta fauna.

Diagnosis.—Similar in size and configuration to *Opisthocomus hoazin* but parietal area of skull concave in lateral profile rather than rounded; frontal area less rounded in lateral profile and lacking median groove; distance from transverse occipital crest to upper border of foramen magnum slightly greater; median occipital ridge sharper

and more elevated; scar of *M. pseudotemporalis superficialis* on orbital surface less extensive dorsomedially; notches on anteroventral surface of suprameatic crest less well defined.

Measurements.—Hoazinoides: greatest width of frontals at anterodorsal base of postorbital process, 23.2 mm.; least width across skull at level of temporal fossae, 18.8. *Opisthocomus*, 3 skulls: width at frontals, 21.0, 21.3, 21.4; width at temporal fossae, 19.1, 19.4, 19.6.

TABLE 1

DIFFERENCES BETWEEN CRANIA OF THE OPISTHOCOMIDAE AND THE CRACIDAE (*Ortalis*)

Opisthocomus	*Ortalis*
Upper orbital fenestra: small, rounded	Large, extended anteriorly above septum
Supraorbital plate: laterally well produced at level of anterior brain surface	Less extended laterally
Scar of origin of *M. pseudotemporalis superficialis* inside orbit: large, well defined, extending close to borders of both orbital fenestrae	Margins not defined, attachments weak, area apparently smaller
Scar of origin of *M. adductor mandibulae externus superficialis:* large, well defined, extending close behind rim of postorbital process	Not well defined posteriorly, less extensive anteriorly, scar of a deeper layer visible within temporal notch
Axis of temporal notch or groove between postorbital process and suprameatic crest: horizontal (in line with palate)	Approaching vertical, about 60° from horizontal
Suprameatic crest: produced ventrolaterally with long anterior process	Closely pressed to cranium; anterior angle not produced
Supraoccipital ridge: close to foramen magnum	Well separated from foramen magnum
Basitemporal plate: two mounds on either side of mid-line	Smooth, evenly rounded surface
Lateral process of basitemporal plate (exoccipital, opisthotic): produced ventrolaterally	On approximately same level as main surface of plate

The opisthocomids differ from the cracids, which are a representative and apparently primitive group in the typical galliform line, in the points listed in table 1 as concerns the parts of the skull preserved in *Hoazinoides*. In general the skull of the modern hoatzin is shorter, the brain case is more rounded dorsoposteriorly, and the bill is shorter and more massive than are these parts in the cracids; concomitantly differences occur in the attachments and size of the adductor muscles of the jaw. The important differences in the angulation of the temporal notch, which in the Opisthcomidae has a nearly horizontal axis, and in the depth of the notch medial to and above the suprameatic

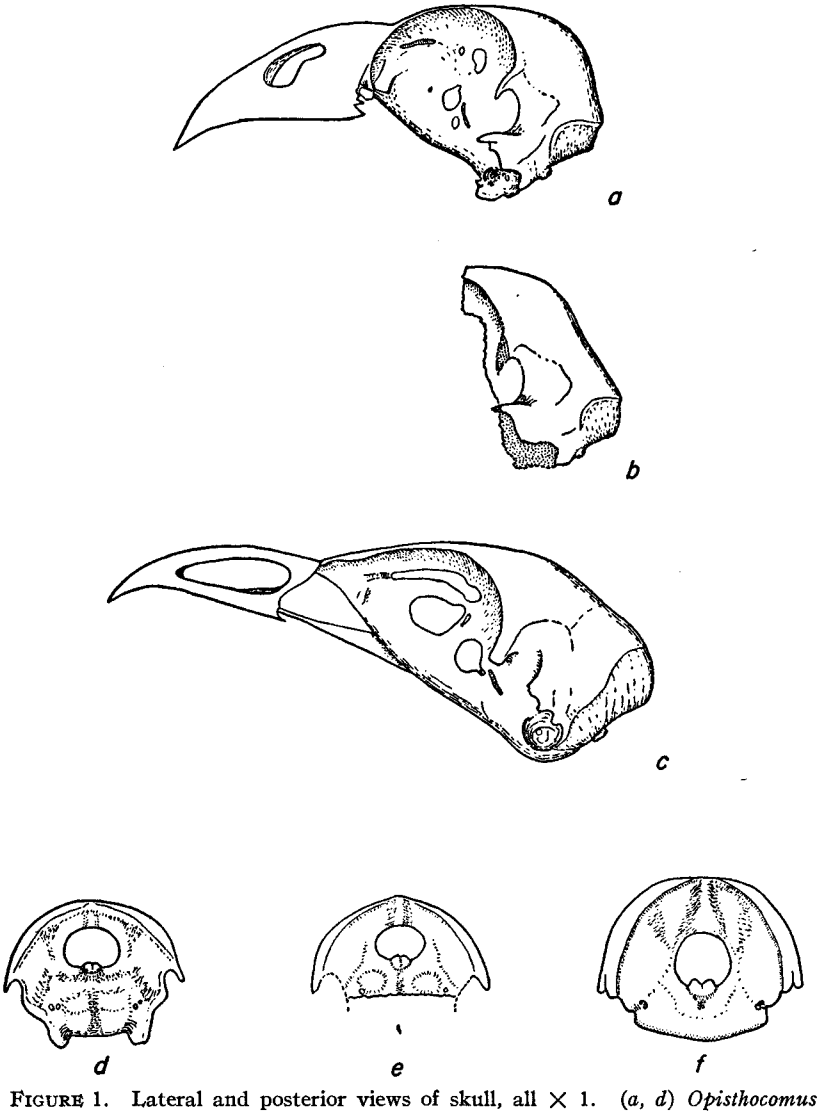

FIGURE 1. Lateral and posterior views of skull, all × 1. (*a, d*) *Opisthocomus hoazin*, no. 52886 Mus. Vert. Zool. (*b. e*), *Hoazinoides magdalenae*, type; stippled areas and margins consisting of broken lines indicate reconstructed areas; in bilaterally symmetrical drawings missing parts on one side are drawn as mirror images of other side without indication of reconstruction. (*c, f*) *Ortalis wagleri*, no. 78691 Mus. Vert. Zool.

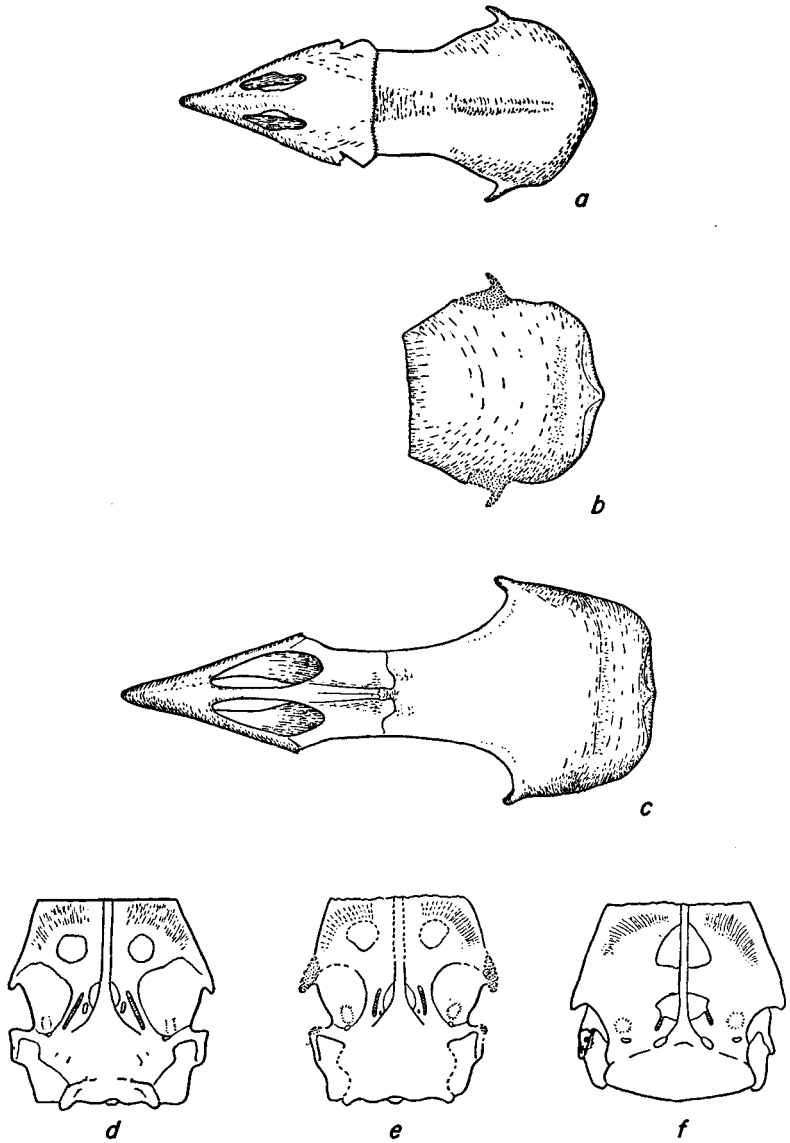

FIGURE 2. Dorsal views of skulls and anterior views of orbit and base of cranium (semidiagrammatic), all × 1. (*a, d*) *Opisthocomus hoazin.* (*b, e*) *Hoazinoides magdalenae.* (*c, f*) *Ortalis wagleri.* Same specimens as in figure 1.

crest reflect much of the type of bill and its angulation and leverage The close correspondence of the fossil with *Opisthocomus* in these significant particulars strongly indicates that *Hoazinoides* had a similar bill and jaw apparatus. Moreover, in the details of location and shape of the foramen for the trigeminal nerve and of the foramen and groove for the ophthalmic branch of this nerve and in the sculpturing of the under surface of the orbital roof, *Hoazinoides* closely matches *Opisthocomus*.

The most significant departure of *Hoazinoides* from *Opisthocomus* consists of its flatter, less rounded brain case, especially in the parietal area. This Miocene representative had not attained the degree of doming of the cranium, and perhaps not the general skull shortening which seems to go with this feature, that is seen in the living bird. In this respect *Hoazinoides* is very similar to other galliforms and especially the cracids of similar size such as *Ortalis wagleri; Crax* on the other hand has attained, independently of the development in the opisthocomids, an arched parietal area.

Does this similarity in the parietal area actually serve to bring the cracid and opisthocomid lines closer together than they formerly were considered to be? Probably it should be so interpreted, but there is the possibility that the lesser arching of the cranial roof of *Hoazinoides* is independently developed apart from a cracid or common galliform ancestry.

The scar for *M. pseudotemporalis superficialis* on the orbital surface is less extensive in *Hoazinoides* than in *Opisthocomus*, but its rim is not visible at all in *Ortalis*. Probably this feature of *Hoazinoides* should be interpreted as indicating a slightly lesser specialization of the bill and jaws than in *Opisthocomus*. This condition along with the lesser doming of the skull leads me to regard *Hoazinoides* as a more primitive member of the opisthocomid line, thereby marking a closer approach of this line to the general galliform stock, possibly even to the cracid division. Yet it should be realized that *Hoazinoides* by no means establishes a phyletic junction point with other galliforms. Such junction must considerably antedate the Upper Miocene, for in its main features, even in the Miocene, *Hoazinoides* had become an opisthocomid as we know the type today. The less advanced morphological modifications of *Hoazinoides*, however, do lend support to the inclusion of the Opisthcomidae in the Galliformes, an inclusion which has variously been doubted in the past (Parker, 1891; Banzhaf, 1929; Stresemann, 1934).

The single living species of hoatzin inhabits river-border woods of the low-lying drainage basins of the Amazon and Orinoco rivers in

South America. It is not known to occur west of the Andes in the Magdalena River drainage where the Miocene fossil was found. If the Miocene bird favored similar woods and border brush above damp ground or water, it would be expected to occur in an area such as that represented by the La Venta deposits. Here existed a low-lying river flood plain with a rich crocodilian and aquatic chelonian fauna (Savage, 1951) and a considerable woodland as indicated by the presence and close association of primate fossils (Stirton, 1951).

The modern hoatzin is a bird that clambers about in dense vegetation and flies weakly. Both adults and young not infrequently fall into or take to the water. The young are renowned for their possession of well developed claws on the first two digits of the wing which they use extensively in climbing, and the adults, although lacking claws, use the whole wing as an aid in climbing (Beebe, 1917). The primitive aspect of the wing of the young, although it has been made much of as a possible stage, or at least a copy of a stage, in the evolution of the wing of birds (Parker, 1891; Beebe, 1917; Heilmann, 1927), is generally regarded now as a secondary adaptation of the young for climbing in the preflight stage (Steiner, 1918; Stresemann, 1934).

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