

A NEW FAMILY OF HOATZIN-LIKE BIRDS (ORDER OPISTHOCOMIFORMES) FROM THE EOCENE OF SOUTH AMERICA

JOEL CRACRAFT

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In the 1930's the Scarritt Patagonian Expeditions of the American Museum of Natural History, led by Dr George Gaylord Simpson, collected fossil birds in the Casamayor (lower Eocene), Deseado (lower Oligocene), and Patagonia (lower Miocene) Formations of Argentina. The specimens collected on these expeditions have proved to be some of the most interesting fossil birds found in South America.

Most of the bird bones collected in the Casamayor Formation belong to *Telmabates*, a genus of flamingo-like birds that is placed in its own family, the *Telmabatidae* (Howard 1955). Several other bony fragments were collected from the same deposits as *Telmabates* but have remained unstudied until now. One of these fossils, a proximal end of a right tarsometatarsus, represents a bird most closely related to the Hoatzin *Opisthocomus* (Opisthocomidae). This fossil tarsometatarsus possesses a number of peculiarities which set it apart from the Opisthocomidae, and which necessitate placing the fossil in a new family.

MATERIALS EXAMINED

During the progress of this study the new fossil was compared closely with every family of non-passeriform birds at least once and with 80-90% of these families on three or four different occasions.

In addition, the following representatives of Recent galliform families were examined in order to obtain a standard with which to interpret intra- and interfamilial variation: Megapodiidae: *Alectura lathamii*, *Megapodius reinwardt*, *M. affinis*; Cracidae: *Mitu mitu*, *Crax globulosa*, *Nothocrax urumutum*, *Ortalis motmot*, *O. vetula*; Phasianidae, Phasianinae: *Coturnix coturnix*, *Rollulus roulroul*, *Arborophila torqueola*, *Lophura rufa*, *Hierophasis swinhoii*, *Pucrasia macrolopha*, *Rheinardia ocellata*, *Argusianus argus*; Phasianidae, Tetraoninae: *Lyurus tetrrix*, *Bonasa umbellus*, *Tympanuchus cupido*, *Centrocercus urophasianus*; Phasianidae, Numidinae: *Numida meleagris*, *Phasidus niger*, *Guttera plumifera*, *G. edouardi*; Phasianidae, Meleagridinae: *Agriocharis ocellata*, *Meleagris gallopavo*.

SYSTEMATICS AND MORPHOLOGY

ORDER OPISTHOCOMIFORMES

Diagnosis: Proximal end of tarsometatarsus with single bony canal in hypotarsus located more nearly in centre of hypotarsus rather than toward internal edge; with external ridge of hypotarsus (in proximal view) not pronounced and not square-shaped (compared with galliforms) but more depressed laterally because of formation of well developed tendinal groove (tendinal groove 1; see below); and with intercotylar prominence very low and blunt.

ONYCHOPTERYGIDAE, NEW FAMILY

Type genus: *Onychopteryx*, new genus.

Diagnosis: In characters of the proximal end of the tarsometatarsus, differs from the Opisthocomidae in having: (1) posterior portion of external ridge of hypotarsus narrow lateromedially, and not flattened and broadened, (2) internal ridge of hypotarsus not

projecting as much posteriorly (apparently broken in fossil, thus the difference in this character is difficult to evaluate), (3) internal ridge of hypotarsus and posterointernal portion of shaft not as excavated, (4) posteroexternal portion of shaft (external to hypotarsus and distal to external cotyla) not as excavated or depressed but more planar, (5) external cotyla shallower and less well defined, (6) internal cotyla somewhat deeper and with more pronounced rims anteriorly and posteriorly, (7) intercotylar prominence slightly lower and located more anteriorly, and merging with surface of external cotyla much more smoothly, and (8) anterior metatarsal groove much more shallow, not undercutting cotylar region.

Onychopteryx, new genus

Type species: Onychopteryx simpsoni, new species.

Diagnosis: Same as for family; only included genus.

Onychopteryx simpsoni, new species

(Plate 9, Fig. 1 (a))

Holotype: Proximal end of right tarsometatarsus, A.M.N.H. No. 3188; from lower Eocene deposits, Casamayor Formation; Cañadón Hondo near Paso Niemann, south of Río Chico del Chubut, southern Chubut Province, Argentina.

Diagnosis: Same as for genus; tarsometatarsus about 25% smaller than that of *Opisthocomus hoazin*.

Measurements: Breadth across proximal end of bone, 9.7 mm; depth of bone from anterior end of intercotylar prominence to posterior edge of hypotarsus, 6.7 mm; anteroposterior depth of external cotyla, about 3.5 mm; anteroposterior depth of internal cotyla, about 5.0 mm.

Description of type: Proximal end of right tarsometatarsus (Plate 9) with external cotyla smaller than internal cotyla; external cotyla shallow with outer rim broken off, posterior rim ill-defined, inner rim merging smoothly with intercotylar prominence; internal cotyla decidedly deeper than external and the cotylar rims well defined; internal cotyla located slightly more distally than external, otherwise both cotylae very nearly on same level; intercotylar prominence low and broad; anteriorly, external slope of prominence much more gradual than internal slope; hypotarsus small, not broad lateromedially nor deep anteroposteriorly, with single bony canal in centre formed by two hypotarsal ridges, external ridge broadening slightly posteriorly, internal ridge broken off posteriorly but apparently short; internal surface of external ridge with shallow groove; hypotarsus in middle of bone, not merging laterally with rim of either cotyla; in proximal view, well marked tendinal groove (tendinal groove 1) formed between external side of hypotarsus and posterior edge of external cotyla; tendinal groove 1 prominent along surface of external ridge of hypotarsus; anteriorly, anterior metatarsal groove shallow, undercutting intercotylar prominence only slightly, external cotyla not undercut, internal cotyla slightly undercut; two proximal foramina, the inner being deeper; posteroexternal side of shaft apparently little excavated, outer foramina round and located almost at distal end of external ridge of hypotarsus; posterointernally, shaft much more excavated, hence internal side of bone shallower anteroposteriorly than external side; inner foramen located slightly more distal than outer foramen.

Etymology: *Onychopteryx*, Greek, alluding to claws on the wing, which are present in the young of the closely allied *Opisthocomus hoazin*; *simpsoni*, the species is named in honour of Dr George Gaylord Simpson, who collected the type and who has contributed extensively to our knowledge of South American fossil birds through his collecting.

PLATE 9

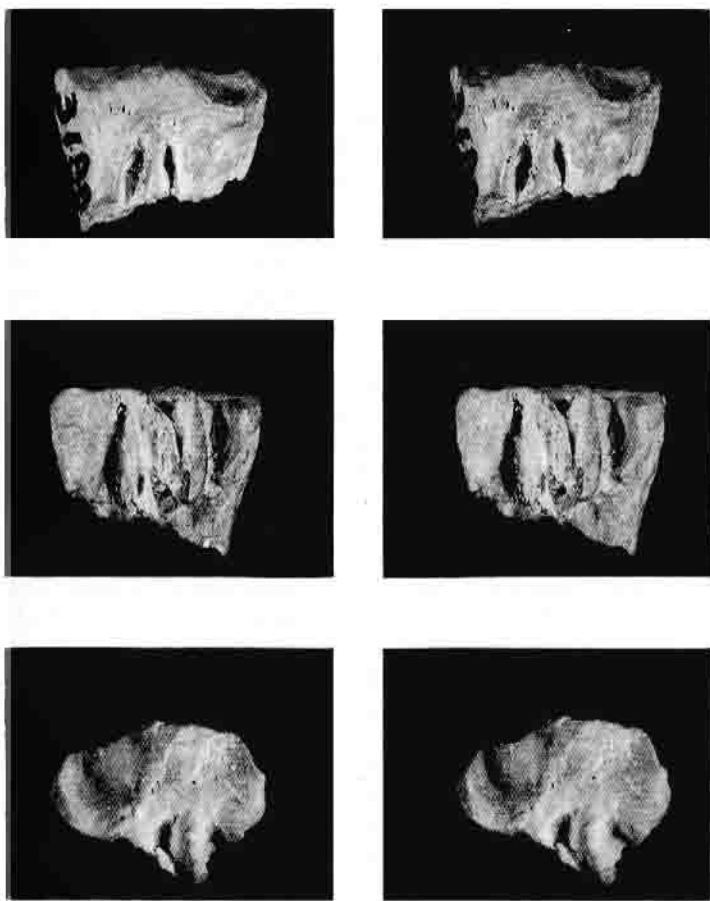


PLATE 9. Stereophotographs of *Onychopteryx simpsoni*, type specimen, A.M.N.H. No. 3188. Upper, anterior view; centre, posterior view; lower, view of proximal end. All about $\times 3$.

DISCUSSION

In characters of the proximal end of the tarsometatarsus the Onychopterygidae and Opisthocomidae are closer to each other than either is to any other family. It must be stressed that this conclusion is derived solely from study of this single skeletal element. Furthermore, whereas the morphology of *Onychopteryx* does not support the removal of the Opisthocomi (*sensu* Wetmore 1960) from the Galliformes (e.g. Barnikol 1953, Stresemann 1959, Hudson *et al.* 1966), a study of other osteological characters suggests that the affinities of the Opisthocomi may be with several non-galliform families (Short & Cracraft, unpubl. obs.). However, because the true relationships of the Opisthocomi are uncertain at this time, it seems valid to make comparisons of *Onychopteryx* with *Opisthocomus* and various galliform taxa. This approach is meaningful since with respect to tarsometatarsal morphology *Onychopteryx* and *Opisthocomus* are closer to the Galliformes than to any other order.

In *Onychopteryx* and *Opisthocomus* the position of tendinal groove 1 is very different from the galliform families in being well developed and located close to the external cotyla (Fig. 1 (a), (b)). The only galliform family with a well developed tendinal groove 1 is the Megapodiidae (Fig. 1 (c)), but in this family the presumably homologous groove is located more posteriorly on the side of the hypotarsus and is separated from the external cotyla by still another notch (tendinal groove 2). Tendinal groove 1 is present in some other galliforms, but as in the megapodes, it is located more posteriorly. In *Opisthocomus*, and presumably also in *Onychopteryx*, tendinal groove 1 is occupied by the tendon of *M. flexor hallucis longus*. The tendon of *M. peroneus longus* is very thin and located superficially (see Hudson *et al.* 1959). In the Megapodiidae and other galliforms, however, the tendon of *M. peroneus longus* is large and sometimes occupies a groove, here designated tendinal groove 2, that has a position on the hypotarsus similar to that of tendinal groove 1 of the Opisthocomi. In this case the tendon of *M. flexor hallucis longus* is shifted more posteriorly. The question of the homology of these grooves is difficult and uncertain. Thus, should homology be based on the relative position of the grooves themselves or on the tendons that occupy these grooves? *Onychopteryx* has a more internally located tendinal groove 1, therefore suggesting that it was similar to the condition of *Opisthocomus* in containing the tendon of *M. flexor hallucis longus*. The outer surface of the external cotyla immediately anterior to tendinal groove 1 has a minute depression (Plate 9), which perhaps contained a thin tendon of *M. peroneus longus*. At the present time I will base homology of these grooves on the tendons they contain.

The hypotarsi of the Cracidae, Phasianinae, Tetraoninae, and Numidinae are all very similar to each other, although the latter two subfamilies have better developed grooves on the posteroexternal side of the hypotarsus and thus do not exhibit a square-shaped edge. In these four taxa the hypotarsus is continuous with the posterior edge of the external cotyla, and hence a marked tendinal groove (either 1 or 2) is typically not present.

The characters listed in the family diagnosis are distinct enough to warrant placing *Onychopteryx* in its own family. Such a decision is subjective but seems justified because *Onychopteryx* differs from the Opisthocomidae as much as other families which have been considered to be closely related and have frequently been placed in the same order. While I acknowledge the problems inherent in recognizing a monotypic family for a fragmentary fossil, several other factors must also be considered in assigning a rank to *Onychopteryx*. First, as already stated, there is a marked morphological gap between *Onychopteryx* and the Opisthocomidae. Second, the lowest rank that could reasonably be accepted for *Onychopteryx* would be that of a subfamily within the Opisthocomidae. To choose this alternative would imply a much closer relationship of these two taxa than may be justified. And third, some aspect of age must also be taken into consideration. Before placing a fossil as old as *Onychopteryx* in a Recent family, the morphological evidence should be compelling. I do not believe it is in this case.

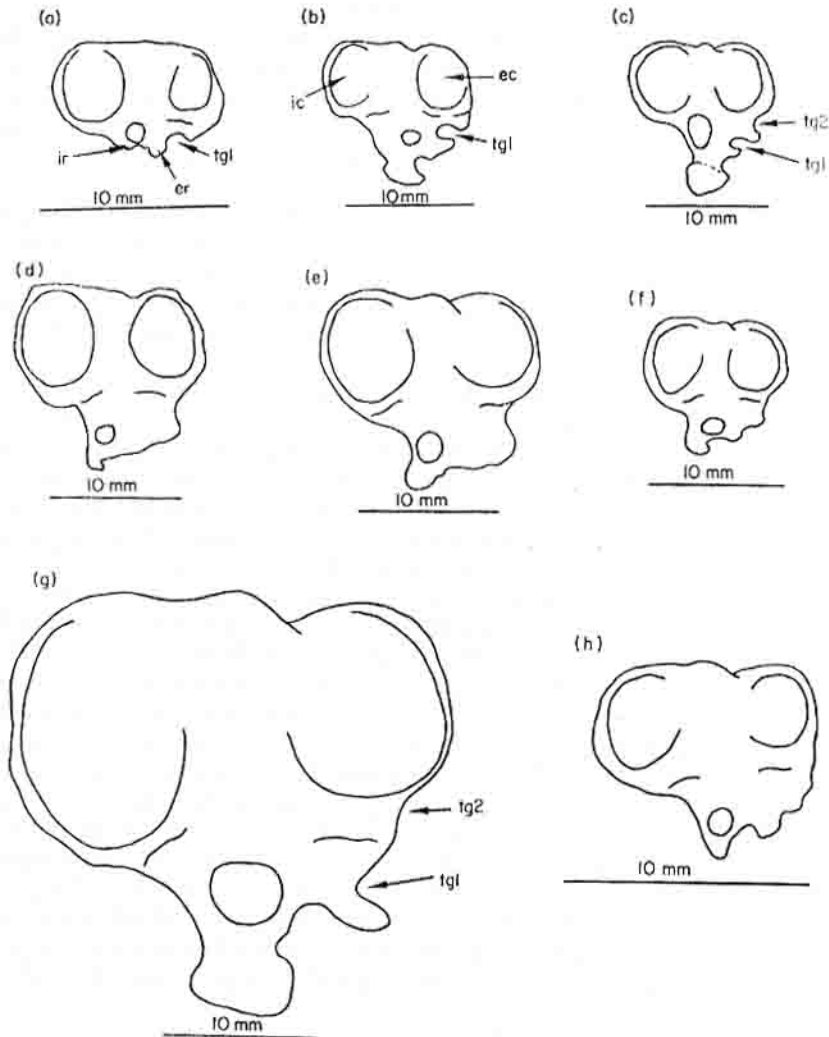


FIGURE 1. Views of the proximal end of the right tarsometatarsus. (a) *Onychopteryx simpsoni* (Onychopterygidae); (b) *Opisthocomus hoazin* (Opisthocomidae); (c) *Megapodius reinwardt* (Megapodiidae); (d) *Crax globulosa* (Crucidae); (e) *Argusianus argus* (Phasianinae); (f) *Guttera plumifera* (Numidinae); (g) *Meleagris gallopavo* (Meleagridinae); and (h) *Lyrurus tetrrix* (Tetraoninae). Abbreviations: ec, external cotyla; er, external ridge of hypotarsus; ic, internal cotyla; ir, internal ridge of hypotarsus; tg 1, tendinal groove 1; tg 2, tendinal groove 2.

While it might be tempting to consider *Onychopteryx* as being a member of a group that was ancestral to the Opisthocomidae, the evidence is far too scanty to conclude this with any degree of confidence. The only fossil Hoatzin is *Hoazinoides magdalenae* from the upper Miocene (La Venta fauna) of Colombia (Miller 1953). Unfortunately, *Hoazinoides* is known solely from the posterior portion of the skull and thus cannot be compared with *Onychopteryx*. It is apparent from Miller's description that *Hoazinoides* is correctly placed in the Opisthocomidae and is no more than generically distinct from *Opisthocomus*. The major difference between *Opisthocomus* and *Hoazinoides* is the flattening of the cranium in the fossil.

The discovery of *Onychopteryx* is important in that the fossil demonstrates opisthocomid-like birds had become differentiated by the early Eocene and that they were part of the South American avifauna by this time.

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SUMMARY

A new fossil genus and species, *Onychopteryx simpsoni*, is described for a proximal end of a tarsometatarsus from the lower Eocene (Casamayor Formation) of Argentina. *Onychopteryx* is considered most closely related to the Opisthocomidae but is sufficiently distinct to be placed in its own family, the Onychopterygidae. *Onychopteryx* indicates that the Opisthocomiformes had differentiated by the early Eocene and were present in South America at that time.

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- Dr Y. Cracraft, Department of Ornithology, American Museum of Natural History, New York. Present Address: Department of Anatomy, University of Illinois at the Medical Centre, Chicago, Illinois 60680