

REVIEW

SYSTEMATICS AND EVOLUTION OF THE GRUIFORMES
(CLASS AVES). 3. PHYLOGENY OF THE SUBORDER GRUES
BY JOEL CRACRAFT

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Made in United States of America
Reprinted from THE AUK
Vol. 91, No. 4, October 9, 1974
pp. 862-865

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Systematics and evolution of the Gruiformes (class Aves). 3. Phylogeny of the suborder Grues.—Joel Cracraft. 1973. Bull. Amer. Mus. Nat. Hist. 151. 127 pp., 51 figs., 49 tables. \$4.75.—This work consists mainly of an attempt to derive a phylogeny of the suborder Grues from a study of the osteology of the fossil and, to a much lesser extent, the living forms of the group. Cracraft has elsewhere (1972, Condor 74: 379) criticized ornithologists for basing classifications on “general overall resemblance,” and has espoused the cladistic approach of Hennig (1966, Phylogenetic systematics, Urbana, Univ. of Ill. Press) whereby phylogenies ideally are based on “primitive-derived character sequences.” The present paper thus allows us to assess the methods, results, and efficacy of “phylogenetic systematics,” at least as applied by Cracraft.

Previously, Cracraft has treated the fossil families Bathornithidae and Geranoididae in the American Museum Novitates series (1968 No. 2326, 1969 No. 2388, 1971 No. 2449). The bulk of the present work consists of systematic revisions of the Tertiary forms of the families Rallidae, Idiornithidae, Eogruidae, Ergilornithidae, Gruidae,

and Aramididae. A new family, Laornithidae, is proposed for the Cretaceous genus *Laornis*. A number of taxa are transferred from one family to another and two fossil rails and a species of *Idiornis* are described as new.

Using what he considers to be derived characters, mainly in the conformation of the distal end of the tibiotarsus and proximal and distal ends of the tarsometatarsus, Cracraft derives a phylogeny in which the suborder Grues is divided into two infraorders, the Ralli and the Grui. The Infraorder Ralli comprises the Rallidae and the Laornithidae, while in the Grui two "major radiations" are recognized—one consisting of the fossil families Geranoididae, Bathornithidae, and Idiornithidae, and the other of the Eogruidae, Ergilornithidae, Gruidae, Aramididae, and Psophiidae.

A major complaint is that Cracraft, who evidently intends to review the systematics of all the Gruiformes, has not yet justified his use of the traditional limits of the suborder Grues and no reasons are given for not including the suborders Turnices, Heliornithes, Rhynocheti, Eurypygae, and Cariamae, at least some of which appear to be intimately related to families included in the Grues. Thus it seems at best a piecemeal and provisional phylogeny that ultimately results. A further extension of this criticism is that Cracraft, in spite of assertions to the contrary, evidently has not made sufficient comparisons with recent skeletal material. Repeatedly, one finds that fossil taxa are minutely compared with other fossil taxa but not with living forms.

For instance, the species *Gypsornis cuvieri*, from the Eocene of France and usually placed in the Rallidae, is transferred to the Eocene family Idiornithidae. This form is based on a proximal end of a tarsometatarsus that, at least as illustrated by Cracraft, is scarcely separable generically from the modern genus *Psophia* and agrees with that genus in detail. Furthermore, except for the hypotarsus, the illustrated material of *Idiornis* itself is very similar to *Psophia*. Not wishing to found a suggestion on the basis of photographs alone, one searches for some discussion of the possible relationships of the Idiornithidae to the Psophiidae—but in vain. The Idiornithidae are compared at length with the extinct families Bathornithidae and Geranoididae but not with any living families. Cracraft places the Idiornithidae and the Psophiidae in different superfamilies at the ends of two entirely different phyletic branches (Fig. 46), yet to the eye they hardly differ morphologically. Could it be that *Gypsornis* and *Idiornis* are really psophiids and that the modern psophiids are relicts of an Eocene group that became extinct elsewhere after South America was isolated early in the Tertiary? Perhaps Cracraft's remark (p. 122) that the "Psophiidae are obviously of New World origin" will have to be re-evaluated.

The Eocene genus *Telecrex*, originally described by Wetmore as forming a new subfamily of Rallidae, is retained in the Rallidae and said to be "decidedly raillike" by Cracraft, who might have been expected to recognize that it is actually a galliform (Olson 1974, *Wilson Bull.* 86: 246). For *Laornis*, a Cretaceous genus based on the distal end of a very large tibiotarsus from New Jersey, Cracraft erects a new family that he places in the infraorder Ralli and terms "the earliest known gruiform genus." After studying this specimen I conclude that it belongs not with the Gruiformes but with the suborder Lari of the Charadriiformes (Olson MS). Cracraft has the Ralli branching off early in the history of the Grues, while the Psophiidae and Aramididae are presented as later, more derived forms. However, the most primitive living rail, *Himantornis*, shows a number of resemblances to the Psophiidae (Olson 1973, *Wilson Bull.* 85: 381), suggesting that rails may have evolved from a psophiidlike ancestor rather than the opposite being the case, and also that Cracraft's two "infraorders" are more closely related than he would allow.

One cannot avoid the feeling that in his search for primitive vs. derived characters and in his professed aversion to the use of "general overall resemblance," Cracraft has at times become like the blind men and the elephant, minutely inspecting each process of a bone without considering the whole of which it is a part. Many of the characters chosen by Cracraft seem to resolve themselves into a choice of one of only two alternatives (e.g. external condyle rounded vs. not rounded, or internal trochlea reduced vs. not reduced) so that the particular feature in *any* taxon would *have* to fit one category or the other. Furthermore, seldom, if ever, is there any intrinsic feature of these characters by which one can determine whether the character is primitive or derived. That determination is made by the "distribution patterns of the character states," *after* the organism has already been assigned to some higher taxonomic category. And how does Cracraft make that assignment?—on the basis of "general overall resemblance," that's how.

Let us look again, for an example, at *Gypsornis*. In the discussion of the relationships of *Gypsornis* to the other genera of Idiornithidae (pp. 70–71) the tarsometatarsus of *Gypsornis* is shown to share with other early Tertiary gruiforms a number of characters that are not found in *Idiornis* or *Elaphrocnemus* and it is therefore considered primitive. But how was *Gypsornis* allocated to the Idiornithidae in the first place? Back on page 53 we see that it was because the formation of the hypotarsal canal and internal surface of the hypotarsus, the development of the intercotyler prominence, and the broad, robust proximal end of the tarsometatarsus of *Gypsornis* are similar to the idiornithids and different from the rallids. There is no talk here of primitive-derived character states—just good old similarity such as everyone else uses. A conventional systematist would have proceeded in the same manner. And after having placed *Gypsornis* with the Idiornithidae, wouldn't a conventional systematist also have deduced that because *Gypsornis* shared characters with taxa outside the family that it might be more primitive? Wouldn't the results and the methods be essentially the same? If Cracraft is really following the methods of Hennig then I fail to see how these differ in practice from what others have been doing all along. If anything, the apparent shortsightedness engendered by the search for derived characters would seem to subject the paleontologist to more errors in identification than he might otherwise make. Ornithologists can hardly be expected to take Cracraft's admonitions to heart if his methods place species in the wrong order and what appear to be closely related genera at the ends of different branches of a phyletic tree.

Apart from the apparent errors in identification and interpretation, Cracraft's paper is fraught with other mistakes of varying degrees of seriousness. For example, the specimen illustrated and discussed as the holotype of *Thiornis sociata* is not, in fact, the type, as an examination of the original reference would have disclosed. On page 36 the reference to Ballman 1969 pertains to a different paper than that cited in the bibliography. The species *Palaeoramides minutus*, described as new on page 30, is referred to in Table 6 on page 28 as *Palaeoramides* [sic] *minimus* (I here restrict the name to *minutus*, which is the usage employed elsewhere in the work). The species *Palaeoramides eximius* is consistently misspelled *eximus* (pp. 27–29). In the synonymy of *Aletornis marshi* (p. 13) the second entry should read *Protogrus marshi* not *Aletornis marshi*, which latter combination was first employed in Brodkorb (1967, Bull. Florida State Mus. 11: 99).

There are further annoyances. Cracraft often refers new material to previously described fossil species but seldom makes it clear which specimens were in the original series and which ones he himself has assigned. There is no consistency whatever in

the magnifications used in the photographs. The worst example is Fig. 10, where views of the three species of *Quercyrallus*, which are differentiated mostly on the basis of size, are presented at five different magnifications, making visual size comparisons impossible. Cracraft has designated a number of lectotypes but does not always illustrate them and for some reason, posterior views of most bones are usually omitted.

Because it is an extensive summary and illustrates many specimens not easily available for study, this paper will be a useful reference for the avian paleontologist. But one would be most incautious to rely heavily upon it either for concepts or accuracy of details. If it is indeed possible to derive a meaningful phylogeny of the Gruiformes with the information presently at hand, it has not yet been done.—STORRS L. OLSON.