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A NEW SPECIES OF *MILVAGO* FROM HISPANIOLA,  
WITH NOTES ON OTHER FOSSIL CARACARAS FROM  
THE WEST INDIES (AVES: FALCONIDAE)

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Extensive collections of vertebrate fossils from caves in Haiti have thus far yielded remains of two extinct birds—a giant barn owl *Tyto ostologa* Wetmore (1922b), and a flightless rail *Nesotrochis steganinos* Olson (1974). In this same material I have recently discovered a single well-preserved and diagnostic bone representing a new species of the falconid genus *Milvago*—a genus hitherto unknown outside of South America and Panamá. Study of this new form has prompted me to investigate the two other fossil caracaras known from the West Indies, *Polyborus latebrosus* Wetmore (1920) of Puerto Rico and *P. creightoni* (Brodkorb, 1959) of the Bahamas.

Within the Falconidae the caracaras form a distinctive group of vulture-like New World falcons, often accorded the status of a subfamily (Polyborinae or Daptriinae) or a tribe (Polybori). Of the other members of the Falconidae, the monotypic Argentine genus *Spizapteryx* appears to be the closest relative of the caracaras. Its intermediate nature may make it difficult in the future to recognize the caracaras as more than an informal group of the Falconidae (Olson, in press).

Nearly a hundred years ago, Ridgway (1876) reviewed the systematics of the "Polybori" in an excellent and meticulous monograph. Using a wide variety of osteological and external characters, he recognized four genera of caracaras—*Polyborus* (*Caracara* auct.), *Phalcobaenus* (including *Senex*), *Daptrius* (including *Ibycter*), and *Milvago*. These four genera have

been generally recognized, but Vuilleumier (1970) presented a revised classification of the group in which only two genera, *Daptrius* and *Polyborus*, were admitted, the latter encompassing *Phalcobaenus* and *Milvago*. Vuilleumier appears to have overlooked Ridgway's study. He does not consider many of the characters used by Ridgway and as a result his conclusions as to generic limits seem to have a less solid basis than do Ridgway's. For the present I prefer to follow Ridgway in continuing to recognize four genera of caracaras. Because two of these genera, *Daptrius* of neotropical forests and *Phalcobaenus* of the Andes and Patagonia, are not known in the West Indies, they will not be considered here.

#### MILVAGO SPIX

The genus *Milvago* is composed of two very distinct species. The southern one, *M. chimango*, ranges from southern Brazil and Chile south to Tierra del Fuego. In *M. chimango* the juvenal plumage is similar to that of the adult, the tarsus is long and slender, and the skin about the orbit is feathered. The other species, *M. chimachima*, is found from Panamá and northern and eastern South America east of the Andes, south to northern Argentina, sympatric in the southern parts of its range with *M. chimango*. In *M. chimachima* the adult and juvenal plumages are very different, the tarsus is short, and there is a considerable area of bare skin around the orbit. I agree with Vuilleumier (1970:17) that it is inappropriate to consider these two quite different and partially sympatric species as members of a superspecies, as was suggested by Brown and Amadon (1968). To the two living species we may now add a third, equally distinctive, extinct Antillean form.

#### *Milvago alexandri*, new species

##### Figure 1

*Holotype*: Nearly complete right tarsometatarsus, lacking part of the hypotarsal crest and part of the posterior process of the external cotyla,

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FIG. 1. *Milvago alexandri*, new species, holotype tarsometatarsus, USNM 214573: a, anterior view; b, lateral view; c, posterior view; d, medial view; e, proximal view; f, distal view; a-d stereo pairs, natural size; e and f, twice natural size.

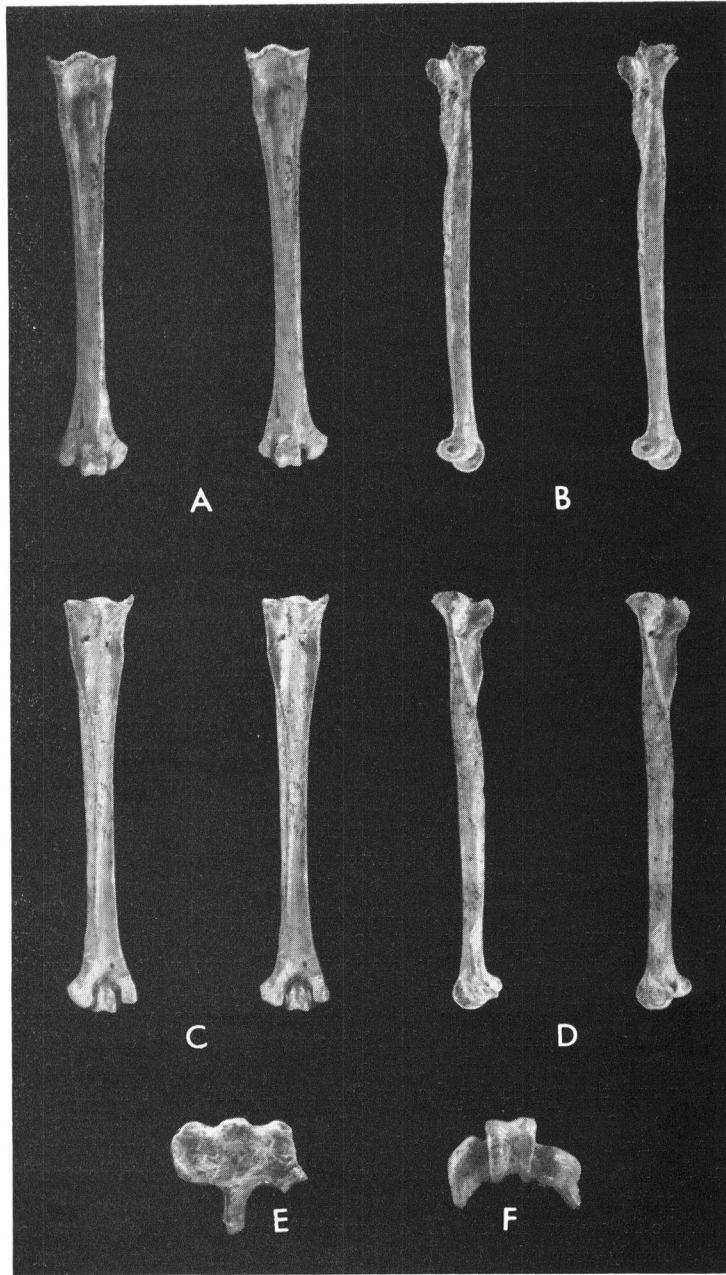


TABLE 1. Length of tarsometatarsus (mm; from skeletons) in three species of *Milvago*.

	n	range	mean	SD
<i>M. chimachima</i>	8	49.7–54.5	52.3	1.49
<i>M. alexandri</i>	1	—	56.2	—
<i>M. chimango</i>	9	57.8–63.9	60.1	1.88

USNM 214573 (Fig. 1). Collected in Pleistocene cave deposits (Cave I in Miller's notes) near St. Michel de L'Atalaye, Département de L'Artibonite, Haiti, Hispaniola, in 1925 by Gerrit S. Miller. The specimen is orange buff in color and was formerly encrusted with reddish limey matrix and old shellac, thus being identical in preservation and preparation to specimens from the older layers of the St. Michel caves.

*Measurements of holotype:* Overall length 56.2 mm, proximal width through anterior portions of cotylae 8.2, depth of internal cotyla 4.3, least width of shaft 3.4, least depth of shaft 2.6, distal width 9.1, depth through arc of trochleae 6.1, width of middle trochlea 3.4.

*Etymology:* I take great pleasure in dedicating this interesting new species to my close friend and associate Alexander Wetmore, in recognition of his many contributions to avian paleontology and to West Indian ornithology, particularly that of Hispaniola.

*Diagnosis and description:* The holotype of *Milvago alexandri* is at once separable from *Polyborus* and *Phalcobaenus* by its much smaller size. From *Daptrius* it may be distinguished by its slender proportions, particularly the narrower proximal end, and by the narrower trochleae, less excavated posterior surface of the proximal end of the shaft and the lower and more elongate tubercle for the tibialis anticus.

In size and proportions the tarsometatarsus of *M. alexandri* is distinctive in being intermediate between the two living species, *M. chimango* and *M. chimachima*. In the last two there is no overlap in the length of the tarsometatarsus of the available skeletal specimens (Table 1). *M. alexandri* differs further from either of the living species as follows: the proximal foramina are larger and more widely spaced; in anterior view the external edge of the shaft bears a more distinct ridge, about as well developed as that of the internal edge, with the result that the anterior face of the shaft appears more deeply excavated; in external view the proximal portion of the external ridge of the shaft is thicker and the papilla for the tendinal attachment on it is better developed; the external trochlea is smaller, projects straight posteriorly rather than curving inward, breaks away more abruptly from the shaft, and has a noticeably deeper pit on the external face; the middle trochlea is proportionately smaller, with a deeper posterior groove.

In the following respects, *M. alexandri* differs from *M. chimango* and more closely resembles *M. chimachima*: shaft more robust; ridge of

hypotarsus extending farther down the shaft; internal cotyla in proximal view not as deep and with posterior border less rounded; wing of inner trochlea much less pronounced and not as distinctly set off from the body of the trochlea.

*Remarks:* Morphologically and geographically, *Milvago alexandri* is closest to *M. chimachima*. There are two possible explanations for its having a longer tarsus than that species. Either *M. alexandri* was derived from *M. chimachima* stock before the two continental species had diverged greatly in tarsal length, or the longer tarsus of *M. alexandri* evolved from the shorter one of *M. chimachima* after the colonization of Hispaniola. Vuilleumier (1970) suggested that a shorter tarsus in caracaras may be correlated with more arboreal habits and noted that the short-legged *M. chimachima* seems to prefer more wooded habitats than the long-legged *M. chimango*. Both species prefer open rather than densely wooded terrain, and this is about all that can be inferred of the habitat of *M. alexandri*.

The discovery of *M. alexandri* adds a hitherto unknown element to the avifauna of the West Indies. Unless some form of *Milvago* once extended farther north in Central America or through the Lesser Antilles, it must be assumed that *M. alexandri* was derived directly from northern South America.

Although it is probable that the flightless rail *Nesotrochis steganinos* was exterminated by introduced predators, and that the giant barn owl *Tyto ostologa* vanished with the extinction of the large rodents that formed its principal prey, it is not so easy to account for the disappearance of *Milvago alexandri*. Bond (1974) has indicated that Hispaniola is the least known, ornithologically, of the Greater Antilles, thus it is remotely possible that this bird might yet survive there.

#### POLYBORUS VIEILLOT

All the extant forms of the genus *Polyborus* are now considered to belong to a single species, *P. plancus*, which ranges from the southern United States to Tierra del Fuego. The populations of southern South America, *P. p. plancus*, differ from the northern forms in their barred rather than uniformly black dorsum and in their finer ventral barring. The northern forms range from northern South America through Central America to northern Baja California, southern Arizona, and southern Texas. Disjunct populations, probably relicts, are found in south Florida, Cuba and the Isle of Pines, but are not distinguishable from those to the west. The northern forms have at times been divided into three subspecies (*cheriway*, *auduboni*, and *ammophilus*) and were long regarded as a species (*cheriway*) distinct from *plancus*. Hellmayr and Conover

(1949) demonstrated that the two "species" intergrade in Brazil and regarded them as races of a single species. For the purposes of the following discussion, the three northern forms will be referred to collectively as *Polyborus plancus cheriway*. The population of the Tres Marias Islands, Mexico, is distinctly smaller and somewhat paler than the mainland forms and is recognized as a separate subspecies, *P. p. pallidus* (Grant, 1965). Of greater interest is the extinct form *P. lutosus* from Guadelupe Island off Baja California, which in its plumage, and to a lesser extent the shape of the rostrum, is quite distinct. Vuilleumier (1970) regarded *P. lutosus* as a subspecies of *P. plancus*, but most authors have accorded it full specific rank. What is most interesting about *P. lutosus* is that its plumage pattern is more similar to the South American race *P. p. plancus* than to the race of the adjacent mainland.

Wetmore (1920, 1922a) described a new species of caracara, *Polyborus latebrosus*, from Pleistocene cave deposits in Puerto Rico, based on the proximal end of a right carpometacarpus (holotype) and the proximal end of a right ulna. It was said to be intermediate between *P. cheriway* and *P. plancus* (then considered separate species) but distinct from either.

Howard (1938) analyzed the abundant caracara remains from the Pleistocene tar pits at Rancho la Brea in southern California and concluded that they represented an undescribed species which she named *Polyborus prelutosus*. In her studies, *P. plancus* and *P. cheriway* were regarded as distinct species and *P. prelutosus*, like *P. latebrosus*, was said to exhibit characters intermediate between the two forms and others in which it was more similar to *P. plancus*. Howard concluded that *P. plancus*, *P. lutosus*, *P. prelutosus*, and *P. latebrosus*, were more primitive and more closely related to each other than any were to *P. cheriway*, which was presumed to have replaced the more primitive forms in the areas where it presently occurs. I am basically in agreement with this conclusion, my main reservation being the level at which the taxa are to be recognized. Howard stated (1938:239) that *P. prelutosus* undoubtedly "represents a form not far removed from, if not actually the ancestral type of, the Recent caracaras," but she rejected the idea of its being a temporal subspecies on the

grounds that temporal variation "cannot be evaluated in the same manner as intergradation of contemporaneous geographic races." Pleistocene remains of caracaras from New Mexico and Florida, previously referred to *P. cheriway*, were reidentified as *P. prelutosus* by Howard (1938). Records of *P. prelutosus* from other localities, including Texas, are listed by Brodkorb (1964). A series of specimens of *P. prelutosus* from San Josecito Cave, Nuevo Leon, Mexico, was found to average smaller than the series from Rancho La Brea, some specimens being smaller than the minimum for that locality. Although there was broad overlap in measurements, Howard (1940) designated the Mexican bones as a new subspecies, *Polyborus prelutosus grinnelli*.

From a Pleistocene deposit on New Providence Island, Bahamas, Brodkorb (1959) described yet another species, *Caracara* (= *Polyborus*) *creightoni*. This was based entirely on a fragmentary distal portion of a left carpometacarpus consisting mostly of the second metacarpal.

I have studied the type-material of *Polyborus latebrosus* and *P. creightoni*. Comparisons were made with 7 skeletons of *P. plancus plancus*, 11 of *P. p. cheriway*, 1 of *P. lutosus*, and 10 carpometacarpi of *P. prelutosus*. It must be emphasized that within the modern and fossil series there is a very great deal of individual variation in size, in proportions, and in the conformation of minor features of the bones.

The holotype carpometacarpus of *P. latebrosus* was said to be slightly larger than in *P. p. cheriway* (Wetmore, 1922a). As shown by Howard (1938), who also studied the type, the bone is near the maximum or slightly larger than in *P. p. cheriway* but falls well within the range of *P. p. plancus* and *P. prelutosus*. The referred ulna of *P. latebrosus* was described by Wetmore (1922a) as being larger than in *P. cheriway* but smaller than in *P. plancus*. In reality, however, it is matched only by smaller specimens of *P. cheriway*. In view of the seeming discrepancy between the size of the ulna and that of the carpometacarpus of *P. latebrosus*, it may be worth noting that Howard (1938) found the carpometacarpus of *P. prelutosus* to be proportionately larger than would be expected from the size of the other elements. The supposed distinctions

in the type of *P. latebrosus* are very minor features, most of which are highly variable in modern forms. The variation in the shape of the first metacarpal, for instance, is so great in the comparative series that given the same level of criteria as used to differentiate *P. latebrosus* it would be possible to name nearly each specimen as a different species. In her comparisons, Howard (1938:225) commented that "*latebrosus* reveals marked overlapping similarities" with *P. prelutosus*. The only distinguishing feature of *P. latebrosus* was said to be in the "unusual position of the notch between the process of metacarpal I and the trochlea," which was said to be at the junction of those two features rather than anterior to that junction. This was deemed sufficient to separate "*latebrosus* from the Rancho La Brea bird as well as from all the other species" (Howard 1938:225). Wetmore (1922a:305) also mentions a "notch at the outer margin of the proximal condyle [being] lower so that it is found at the line of ankylosis of the first and second metacarpals instead of above that point." Even after prolonged scrutiny of the type, the feature was not apparent to me and the distinction would seem to be a very minor one.

It is difficult not to doubt the validity of *Polyborus creightoni* solely on the basis of its being based on such a fragmentary specimen almost wholly lacking in diagnostic features. Nevertheless, it cannot, in fact, be summarily dismissed. Because the type is so imperfect, it occurred to me that it might be from some bird quite unrelated to *Polyborus*, but on comparison no more suitable placement for it could be found. In contrast to the type of *P. latebrosus*, the type of *P. creightoni* is small. Although it falls within the size range of *P. p. cheriway*, only one of the specimens examined was smaller, this being number 28302 in Dr. Brodkorb's collection (distance from distal end of metacarpal II to metacarpal I = 42.9 mm as opposed to 43.8 mm in *P. creightoni*). In two of the characters given by Brodkorb (1959), *P. creightoni* does appear to be distinct; the other differences cited do not stand up on comparison with the series of *Polyborus* at hand. These two characters are: "metacarpal III with its base nearly straight, without medial angulation proximal to intermetacarpal tuberosity; tuberosity of metacarpal II, in medial view, with its



outline more angular and less rounded, and its base more deeply excavated dorsally and laterally" (Brodkorb, 1959: 353). It is difficult to determine just how much consideration should be given to such minor differences.

The only fossil form of *Polyborus* for which there is adequate material to make any determination of its status is *P. prelutosus*. Howard (1938) has demonstrated that this form is not identical with its geographically nearest modern congeners. Yet when *P. cheriway* and *P. plancus* are combined, virtually all of the variation seen in *P. prelutosus* falls within the range of the expanded species *P. plancus*. It appears that only in its smaller and proportionately wider bill is *P. prelutosus* recognizably different from *P. plancus* and in this respect it resembles *P. lutosus* of Guadelupe.

I do not consider that an adequate basis exists for regarding any of the named fossil forms of *Polyborus* as being specifically distinct from *P. plancus*, particularly given the great variability of that species. *P. prelutosus* is almost surely the temporal equivalent of, and on a direct genetic line with, *P. plancus*. The present status of the West Indian forms *P. latebrosus* and *P. creightoni* seems unsatisfactory when one recognizes that both geographic as well as temporal variation may be involved. I believe it is best to regard all the known fossils of *Polyborus* as belonging to the species *plancus*. Within that species, *prelutosus* is a valid temporal form. The names *creightoni* and *latebrosus* are available if further material should indicate that either of the populations they represent are subspecifically distinct, although the possibility exists that such material might show *latebrosus* to be inseparable from *prelutosus*.

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## RESUMEN

Se describe una nueva especie de caraira (Falconidae), *Milvago alexandri*, encontrada en depósitos pleistocénicos de la Española. El género *Milvago* hasta ahora se conocía sólo de América del Sur y Panamá, por tanto la especie *M. alexandri* representa un elemento completamente nuevo para la fauna antillana. Otras dos especies fósiles de carairas antillanas, *Polyborus latebrosus* Wetmore de Puerto Rico y *P. creightoni* (Brodkorb) de las Bahamas, no fueron descritas en base de restos suficientes de modo que puedan ser distinguidas de la especie viviente *P. plancus*. Aquí consideramos que pueden ser sólo subespecies de *P. plancus*.

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