

THE *VULTUR SACRA* OF WILLIAM BARTRAM.

BY FRANCIS HARPER.

THE bird described under this name by Bartram has never been satisfactorily accounted for. Recent investigation, however, has shed new light on this long-standing puzzle, and at the same time has brought forward additional evidence in support of the general soundness and authoritative quality of Bartram's records of early American natural history.

While voyaging along the St. John's River above Lake George, Florida, in 1774 or 1775, he "turned" his "observations upon the birds of this country" and described (Travels, 1791, pp. 146-152) the appearance and habits of the Florida Crane, Limpkin, White Ibis, Wood Ibis, Black Vulture, and "Painted Vulture" (*Vultur sacra*). With the exception of the last, all of these are well-known and more or less common birds of the St. John's region.

"There are two species of vultures<sup>1</sup> in these regions I think not mentioned in history: the first we shall describe is a beautiful bird, near the size of a turkey buzzard,<sup>2</sup> but his wings are much shorter, and consequently, he falls greatly below that admirable bird in sail. I shall call this bird the painted vulture. The bill is long and straight almost to the point, when it is hooked or bent suddenly down and sharp; the head and neck bare of feathers nearly down to the stomach, when the feathers begin to cover the skin, and soon become long and of a soft texture, forming a ruff or tippet, in which the bird by contracting his neck can hide that as well as his head; the bare skin on the neck appears loose and wrinkled, which is of a deep bright yellow colour, intermixed with coral red; the hinder part of the neck is nearly covered with short, stiff hair; and the skin of this part of the neck is of a dun-purple colour, gradually becoming red as it approaches the yellow of the sides and forepart. The crown of the head is red; there are lobed lappets of a redish orange colour, which lay on the base of the upper mandible. But what is singular, a large portion of the stomach hangs down on the breast of the bird, in the likeness of a sack or half wallet, and seems to be a duplicature of the craw, which is naked and of a redish flesh colour, this is partly concealed by the feathers of the breast, unless when it is loaded with food, (which is commonly, I believe, roasted reptiles) and then it appears prominent. The plumage of the bird is generally white or cream colour, except the quill-feathers of the wings and two or three rows of the coverts, which are of a beautiful dark brown; the tail which is large and white is tipped with this dark brown or black; the legs and feet of a clear

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<sup>1</sup> *Vultur sacra*. (Bartram's footnote.)

<sup>2</sup> *Vultu[r] aura*. (Bartram's footnote.)

white; the eye is encircled with a gold coloured iris; the pupil black." (Bartram, Travels, 1791, pp. 150-151.)

Only one New World Vulture is known, that answers at all to this description. This is the King Vulture (*Sarcoramphus papa* (L.)), whose present range extends from Mexico into South America. The description in general, and even in certain minute details, applies remarkably well to this species, but there is a particular discrepancy in the color of the tail. In the King Vulture it is black, while Bartram has it white, tipped with dark brown or black.

"The Creeks or Muscogulges construct their royal standard of the tail feather of this bird, which is called by a name signifying the eagle's tail; this they carry with them when they go to battle, but then it is painted with a zone of red within the brown tips; and in peaceable negotiations it is displayed new, clean and white, this standard is held most sacred by them on all occasions; and is constructed and ornamented with great ingenuity. These birds seldom appear but when the deserts are set on fire (which happens almost every day throughout the year, in some part or other, by the Indians, for the purpose of rousing the game, as also by the lightning:) when they are seen at a distance soaring on the wing, gathering from every quarter, and gradually approaching the burnt plains, where they alight upon the ground yet smoking with hot embers; they gather up the roasted serpents, frogs and lizards; filling their sacks with them; at this time a person may shoot them at pleasure, they not being willing to quit the feast, and indeed seeming to brave all danger." (Bartram, Travels, 1791, pp. 151-152.)

Now the Muscogulges did not inhabit the St. John's region, but Bartram encountered them principally west of the Chattahoochee River in Alabama, some months after his return from East Florida. It was doubtless in Alabama that he noticed their use of tail feathers that were "white, . . . tipped with dark brown or black." Exactly such tail feathers are borne by the Golden Eagle (*Aquila chrysaetos canadensis*) during several years while it is attaining maturity. The territory of the Muscogulges was within at least the winter range of this species, and its feathers would quite naturally have been utilized by these Indians for ceremonial purposes, as they were by some of the more western tribes. Perhaps the "new, clean and white" feathers used "in peaceable negotiations" were wholly white, and thus taken from the Bald Eagle (*Haliaeetus l. leucocephalus*). In the absence of a whole specimen of either species of Eagle, and in view of language difficulties in conversing with the natives, it would not have been at all surprising for Bartram to have made the mistake of believing that these feathers belonged to his *Vultur sacra*. A point worth emphasizing here is that the Indians themselves called the feathers "by a name signifying the eagle's tail."

In another part of the 'Travels' (p. 454) Bartram mentions, among the sacred things deposited in the sanctuary of the council house in the Muscogulge town of Ottasse (or Attasse) in Alabama, "the calumet or great pipe of peace, the imperial standard, or eagle's tail, which is made of the feathers of the white eagles tail<sup>1</sup> curiously formed and displayed like an open fan on a sceptre or staff, as white and clean as possible when displayed for peace; but when for war, the feathers are painted or tinged with vermilion." Du Pratz describes (*Histoire de la Louisiane*, vol. 1, 1758, p. 105) a somewhat similar fan that the natives of Louisiana attached to their pipe of peace.

In enumerating the birds occurring from Pennsylvania to Florida, Bartram lists (*Travels*, 1791, p. 289) "*Vultur sacra*, the white tailed vulture" among those species that "are natives of Carolina and Florida, where they breed and continue the year round."

For a period of more than sixty years after the publication of the 'Travels,' there seems to have been little or no criticism or question of Bartram's record. It is true that neither Wilson nor Audubon mentioned the species in their works, apparently owing to lack of personal acquaintance with it, but meantime several other able American ornithologists devoted their attention to the bird.

Charles Lucian Bonaparte gives a brief description of "*Cathartes papa*, Ill." and adds (*Ann. Lyc. Nat. Hist. New York*, vol. 2, 1828, p. 23): "Inhabits the warmest parts of America: appears occasionally in Florida during the summer." Whether this statement was based upon Bartram's or upon some other, previously unpublished record, it would be difficult to say at this late date. A very similar statement appears in the Jardine edition of Wilson's '*American Ornithology*' (vol. 3, 1832, p. 228), on the authority of Bonaparte.

Nuttall, after quoting Vieillot's description of Bartram's "White-tailed Vulture" and repeating some of Bartram's information, says (*Man. Ornith. U. S. and Canada*, vol. 1, 1832, p. 43): "During a late journey to West Florida I made many inquiries respecting this rare bird, but could only learn, that they were occasionally seen near the sea-coast of the Gulf of Mexico." In the second edition (vol. 1, 1840, p. 42) he adds to the above: "Mr. Bartram met with it near New Smyrna, in East Florida."

Le Conte, in writing of "forgotten or lost" American animals, quotes Bartram's description of *Vultur sacra* and adds (*Proc. Acad. Nat. Sci. Philadelphia*, vol. 7, 1854, p. 11): "The tail was used by the Seminoles as a war standard. Dupratz, vol. ii, p. 109, mentions this bird under the name of White Eagle, and says that the Indians in whose neighborhood he lived, the Natchez, used the feathers for adorning their pipe of peace." In the same paper (p. 13) Le Conte pays significant tribute to Bartram as "a man

<sup>1</sup> *Vultura sacra*. (Bartram's footnote.)

of unimpeached integrity and veracity, of primeval simplicity of manners and honesty unsuited to these times."

Cassin discusses the species under the name of *Sarcoramphus sacer* (Bartram) and remarks (Birds Calif., Texas, etc., 1853, p. 60): "The identification of the bird here described, may be considered as one of the most important services to be performed in North America O[r]nithology. Its occurrence has never been noticed since the time of the accurate and veracious naturalist who first described it, and his careful description above quoted seems to clearly indicate it to be a species entirely unknown. The white tail especially is characteristic, and establishes a clear distinction from any other known species. It is related evidently to the King Vulture, (*S. papa*,) but that species has a black tail, and in case of mistake or misprint in Bartram's description, it may be presumed at any rate to relate to an occurrence of that species within the United States. There is no more inviting nor more singular problem in North American Ornithology."

Several years later Cassin returned (in Baird, Cassin, and Lawrence, Pacific Railroad Repts., vol. 9, 1858, p. 6) to the subject that so interested him: "The sacred vulture of Bartram, *Sarcoramphus sacer*, . . . has not been observed or identified anywhere since his time. This has tended to throw a doubt on its existence, but recent information renders it probable that this, or at least a species different from the vultures just described, is found about Lake Okechobee, in Southern Florida, where it is called king buzzard."

If J. A. Allen is the most critical (and lengthy) commentator on Bartram's bird, it may be well to bear in mind Coues's characterization (Osprey, vol. 3, 1899, p. 128) of the learned and highly esteemed (then) editor of 'The Auk' as "the mildest-mannered man who ever cut an author's throat or scuttled a book." Certainly in my own slight contacts with Dr. Allen during the last fifteen years of his life, the outstanding impression I received was of a very quiet and shy scholar, wholly and unselfishly devoted to the advancement of zoological science. Yet it is evident that in 1871 he could hardly have had a proper appreciation of Bartram, else he would not have dealt with him in so severe a mood.

Allen refers at the outset (Bull. Mus. Comp. Zool., vol. 2, 1871, p. 313) to "The Painted or Sacred Vulture (*Vultur sacra*'), an apocryphal species described by Bartram." He then quotes Bartram's description and Cassin's subsequent comments, and continues (pp. 315-316):

"Although the description . . . accords more nearly with the *Sarcoramphus papa* than with any other known species, I cannot avoid the conclusion that it is in the main a *purely mythical species*, notwithstanding the high reputation for veracity generally accorded to Mr. Bartram. I mainly so regard it for the reason that Florida has of late been too often traversed

by naturalists, and especially all the parts visited by Bartram, for a bird of so striking an appearance, and so numerous as Bartram represented his *V. sacra* to be, to remain undiscovered if such a species exists there. While it nearly accords with the *S. papa* in size and general color, it is most radically different from this species, in the color of the tail, and in having a 'large portion of the stomach hanging down on the breast, in the likeness of a sack or half-wallet.' In the latter feature it is structurally widely different from any known American bird. . . . As to the feathers of its tail being used by the Creek Indians for a royal standard, and to which feathers they give a 'name signifying an eagle's tail,' it seems to me more probable that they were really feathers of the white-headed eagle (*Haliaeetus leucocephalus*), since it is well known that the tail feathers of that bird are very generally used for this and similar purposes by the Indian tribes of this continent, whereas the tail feathers of so foul a bird as the vulture must in all probability be too ill scented to suit even the unfastidious taste of an Indian. . .

"On the whole, it seems evident that Bartram's account . . . is a confused mixture either of pure fiction and truth, with the former largely in preponderance, or of the characters of several different species. The description would seem to have been mainly drawn from an example of *Sarcorhamphus papa* that he may have somewhere met with, but with which he combined certain features of this or other species which he had observed only at a distance, and that he thus misjudged their exact character (as in respect to the strange external food-pouch) or else added them solely on popular, fabulous rumors. The flights of these birds, which he observed assembling over recently burned districts, I think must refer to the *Polyborus tharus*, which is well known to have this habit, while the tail feathers he speaks of as used by the Indians in their councils were more probably either those of the *Haliaeetus leucocephalus* or *Polyborus tharus* than of any species of vulture, since a white-tailed American vulture, I believe, is a bird thus far unknown. If the '*V. sacra*,' then, is to be regarded as anything else than a myth, it should in all probability be identified with the *S. papa*, as already stated, and as was done by Bonaparte in his *Conspectus*."

Sharpe says (Cat. Birds Brit. Mus., vol. 1, 1874, p. 22) of *Cathartes sacer*: "This species, not met with since Bartram's time, still remains undiscovered. It is closely allied to *C. papa*, from which it appears to differ chiefly in its white tail."

Coues, in an extensive discussion and commendation of Bartram's ornithological work, says (Proc. Acad. Nat. Sci. Philadelphia, vol. 27, 1875, p. 344) of his *Vultur sacra*: "Undetermined. This is Bartram's particular puzzle; it is elaborately, but not recognizably described, at p. 150." Maynard suggests (Birds E. N. America, 1881, p. 327) that the bird Bartram saw was the Caracara (*Polyborus*).

Then after many years, during which this bird had all but sunk into oblivion as a former inhabitant of the United States, my good friend Arthur H. Howell joined the ranks of Bartram's critics in referring (Florida Bird Life, 1932, p. 8) to "his famous 'painted vulture,' *Vultur sacra*, an apparently mythical species having some of the characters of the King Vulture of South America (*Gypagus papa*). . . . No such bird has been seen by later observers, and we are forced to the conclusion that Bartram in this case drew on his imagination or repeated some tale related to him by others."

Now Bartram's honesty is unimpeachable, and the time has rather definitely passed when his natural history observations can be seriously challenged (cf. Small, Jour. N. Y. Bot. Garden, vol. 32, 1931, pp. 155-161; Harper, Sci. Monthly, vol. 31, 1930, pp. 52-57). It is true that his chronology is extremely confused, and that his routes and distances are often vaguely described, but his failings in these respects do not affect the soundness of his contributions to American natural history. Dr. Allen should have known that it was not Bartram's habit to indulge in "pure fiction." There is apparently no record of Bartram's having preserved any bird specimens on his southern trip, and his descriptions were probably written in part from memory. However that may be, it can not be reasonably doubted that he observed in Florida either the King Vulture or some closely similar species.

There are such a number of parallel cases of discontinuous distribution, particularly among raptorial birds, that there would be nothing very surprising in the former occurrence of the King Vulture in Florida. As examples of such distribution, mention may be made of *Jabiru mycteria* (in the Pleistocene), *Gymnogyps californianus* (Pleistocene), *Teratornis merriami* (Pleistocene), *Rostrhamus sociabilis plumbeus*, *Buteo brachyurus*, *Polyborus cheriway auduboni*, *Speotyto cunicularia floridana*, *Aramus p. pictus*, *Aramides cajanea* (Pleistocene), and *Aphelocoma coerulescens*. All of these Florida birds are widely separated geographically from their representatives in western North America, Central America, or South America—representatives that are either completely identical with, or else closely related to, the Florida forms. At some former period the eastern and the western representatives doubtless had a continuous distribution, and the absence of a considerable proportion of the above-mentioned species from the present West Indian avifauna suggests the northern shores of the Gulf of Mexico as the territory once connecting their now disjointed ranges. As Wetmore has pointed out (Smithsonian Rept. 1928, p. 386), various forms now considered subtropical ranged as far north as Nebraska under the mild and fairly uniform conditions of the Pliocene. Subsequent cooling of the climate apparently forced such birds southward into Florida and

Mexico and in some cases, at least, disconnected the eastern and the western portions of their ranges by driving them entirely out of the Mississippi Basin.

Although Bartram's statement that he considered his bird "not mentioned in history" is ample evidence that he derived no part of his account from published sources, it may be of interest at this point to review and compare some accounts of the King Vulture by his predecessors. Perhaps the earliest reference is by Hernandez (*Nova Plantarum, Animalium et Mineralium Mexicanorum Historia*, 1651, p. 319), who recognizably describes the bird under the name of "Cozcaquauhli" or "Regina Aurarum." According to him, the legs are red ("crura rubra") and the iris is yellow ("Iris fulva").

Albin describes (*Nat. Hist. Birds*, vol. 2, 1738, p. 4, pl. 4) the "Warwovwen, or Indian Vulture" (also referred to as "King of the Vultures"), which he had seen in captivity at Charing-Cross in England. It was supposedly of East Indian origin, but corresponds in most details to *Sarcorampbus papa* and may be safely identified with that species. "The Crow was of a flesh Colour, and bare of Feathers hanging down like a Bag on the Breast. . . . The Tail was composed of twelve white Feathers tipt almost half way with black. The Legs and Feet were of a yellowish flesh Colour." The accompanying plate agrees in all these details. The basal part of the tail is white, squarely cut off from the black tip; perhaps Albin was led into this error by the white under tail-coverts. If this drawing is admittedly none too accurate, the same may be said of his other plates, of more common birds.

Bartram was a correspondent of George Edwards and supplied him with a considerable number of specimens and accounts of American birds as material for the latter's 'Gleanings of Natural History' (3 vols., 1758, 1760, 1764). The colored plates of the Marsh Hawk and the White-throated Sparrow in this work were engraved from Bartram's own very creditable drawings of these species. A letter from Edwards to Bartram, mentioning a presentation copy of the second volume, is published by Darlington (*Memorials of Bartram and Marshall*, 1849, pp. 419-420). There is no mention of the King Vulture in this work, and Bartram—at least up to the time of the publication of his 'Travels' in 1791—must have been unfamiliar with Edwards's earlier 'Natural History of Uncommon Birds,' for the species is described and illustrated there (vol. 1, 1743, p. 2, pl. 2). The original material was a live specimen in Sir Hans Sloane's collection. Though informed that it had been brought from the East Indies, Edwards believed that it was of West Indian origin. He comments on the fact that Albin makes the tail black only at the end, and further states that he "could discover no such Crow of bare Skin, as Albin has figured." (Prob-

ably Albin's bird had just had a meal, while Edwards's bird had not. In some study skins the bare breast is largely concealed by feathers overlapping from the sides.) Both text and plate in Edwards show that "the Legs and Feet are of a dirty, white Colour"; this is certainly in close agreement with Bartram. The iris is white. Edwards's quotation (p. xx) from Navarette (in Churchill's 'Collection of Voyages,' vol. 1, p. 46) is in great contrast to Dr. Allen's assumption as to the repulsive nature of the species: "But the gayest and finest bird I have seen, is the *King of the Copilotes*, which I saw several times in the Port of *Acapulco*, and never had enough of looking at him, still more and more admiring his Beauty, Stateliness and Grace."

Du Pratz, in writing on the natural history of Louisiana, fell far short of attaining Bartram's standards of accuracy. In fact, Coues remarks (Birds Colorado Valley, Bibliog. Appendix, 1878, p. 582): "The matter is very wild, and of no account." It is extremely interesting, however, to find Du Pratz introducing (*Histoire de la Louisiane*, vol. 2, 1758, p. 109) an avian species bearing a certain resemblance to Bartram's and also possessing plumes that were prized by the Indians for ceremonial purposes. A translation of his account follows:

"The eagle, king of birds, is smaller than the eagle of the Alps; but it is a much finer bird, being almost entirely white, and having only the extremity of its quills black. As it is rather rare, that is a second reason for making it prized among the natives, who pay a high price for the wing quills as an adornment of the symbol of peace. This is the fan of which I spoke in describing the pipe of peace."

Much of the foregoing matter was already in manuscript, when some highly important and significant documents, apparently never examined previously by an American zoologist, became available. These are two volumes of Bartram manuscripts, the originals of which form one of the treasures of the library of the British Museum Herbarium. Through the courtesy of Dr. Herbert Smith, the Librarian of that department, and of Mr. Julian P. Boyd, the Librarian of the Historical Society of Pennsylvania, I have been privileged to examine photostat copies. The manuscripts are in the nature of reports by William Bartram to his patron in London, Dr. John Fothergill, and cover approximately the first two years of his travels (1773 and 1774). They are perhaps abbreviated transcripts of field journals that Bartram must have kept, but of which no trace seems now discoverable. While there is no definite indication as to when they were prepared or dispatched, I consider that a likely date is the spring of 1775, when Bartram had returned to Charleston, S. C., after a long absence in Florida, during which he had been more or less out of contact with his friends and had even been given up for lost. The Historical Society of Pennsylvania possesses



two letters written by Bartram from Charleston at this period: one of March 27, 1775, to his father, and one of April 20, 1775, to Dr. Fothergill.

The particular significance of the present manuscripts is that they are doubtless far fresher documents than the published 'Travels,' which did not appear till 1791, and by the same token they are probably much more authoritative than the book in the considerable number of details wherein they differ from the latter.<sup>1</sup> Arrangements for the publication of the manuscripts are in progress. Meanwhile the following paragraph from volume 2, page 49, is of immediate interest. It appears in an account of the birds of East Florida, among which three "eagles," ten hawks, and three vultures receive the major share of attention.

"The Croped Vulture. This is a very beautiful bird, not quite so large as the Turkey buzzard, they are chiefly white the back & wings of a deep nut brown, the Bill yellow Legs white, the head & part of the neck bare of feathers covered with a naked skin of a vermillion colour, what is remarkable in the Bird their craw or stomach hangs like a pouch or purse bearing outside on the breast & bare of feathers. When the vast meadows and Savanahs of Florida are set on fire, they gather in flocks to the new burnt ground where they feed on the roasted snake frogs Lizards Turapins and other reptiles, where I had an opportunity of getting one."

There are two outstanding points in this paragraph. First, there is no longer any question as to whether Bartram had a specimen in hand, and this utterly disposes of any further possibility of referring to his bird as a "mythical species." Secondly, this scant description, as far as it goes, agrees somewhat better with the King Vulture than does the one in the 'Travels.' At least there is no mention of a white tail—the feature that has hitherto proved the greatest stumbling-block in the identification of the bird. As the most likely explanation of this point, I would suggest that Bartram failed while in the field to make a note of the color of the tail, and years later, when preparing his book, he may have unfortunately attempted to fill in details from memory. It is also possible that his memory of the tail resulted in part from his impression of a soaring bird, whose white under tail-coverts might have been mistaken for a white basal portion of the rectrices. At the probable date of the present manuscript (spring of 1775) he had not yet journeyed to Alabama, where, in all likelihood, he eventually observed the ceremonial use of the white tail feathers of one or two species of eagles among the Muscogulges, and confused them with the plumage of

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<sup>1</sup> In this connection the following remarks of Dr. William Baldwin, in a letter of July 3, 1817, to Dr. William Darlington, are illuminating: "He [William Bartram] informed me, in 1812, that these Travels had not been published under his own inspection; but that he had by him all his original manuscripts, from which a more correct work might be compiled:—that it had always been his intention to publish a correct edition,—but had neglected it until old age prevented." (Darlington, *Reliquiæ Baldwinianæ*, 1843, p. 235.)

his "Painted," "White-tailed," or "Cropped Vulture." Unfortunately this species is not represented among Bartram's colored drawings of animals and plants now in the British Museum Herbarium, as I am informed by my friend David A. Bannerman.

It is also perfectly clear from the paragraph quoted above—if not indeed from the account in the 'Travels'—that it was the craw or crop, and not the true stomach or gizzard, that Bartram referred to as hanging down on the breast. This point should never have been so difficult as it appears to have been for Dr. Allen. He should not have expected too much exactness in anatomical nomenclature or description from one who was primarily a botanist! The fact of a full crop bulging out in front of the breast in raptorial, gallinaceous, and various other birds is too well known to require comment. One is inclined to suspect that Dr. Allen had no specimen of the King Vulture before him as he wrote. Bartram's description of the "craw" is remarkably similar to Albin's, and actually tends strongly to fix the identity of his bird as the King Vulture. In two adult male specimens in the Academy of Natural Sciences of Philadelphia (Nos. 75152-75153), collected by Wharton Huber and J. Fletcher Street at Eden, Nicaragua, the bare skin of the breast (now brownish yellow, and bulging slightly even in these dried specimens) gives every suggestion of having been distended by the crop at each good feast the birds attended. The labels bear the following color notes: "Iris cream white. Legs and feet slaty black."

Bartram's statement of the size of his bird fits the King Vulture thoroughly. (According to Swann, *Mon. Birds Prey*, 1924, pp. 6, 15, *Sarcoramphus papa* is 27 inches in length, with a wing of 494-500 mm. and a tail of 253 mm., while *Cathartes aura septentrionalis* is 29 inches in length, with a wing of 510-540 mm. and a tail of 270-285 mm.) His description of the sculpture and coloration of the bill and head applies remarkably well to the King Vulture, and to no other known species. As to the legs and feet, neither Albin nor Edwards ascribed to captive birds the same blackish color that some recent authors do. It is of interest here to recall that it was on the accounts of Albin and Edwards that Linnaeus based (*Syst. Nat.*, 10th ed., vol. 1, 1758, p. 86) the first valid binomial name of the species—*Vultur papa*. Later, following Brisson (*Ornith.*, vol. 1, 1760, p. 470), Linnaeus describes (*Syst. Nat.*, 12th ed., vol. 1, 1766, p. 122) the feet as red ("Pedes rubri")! Tschudi (*Fauna Peruana*, *Ornith.*, 1846, p. 69) says, "Die Füsse weisslich." According to Swann (*loc. cit.*, p. 6), the adults have "greyish-black" feet. In a discussion of this point with me, M. A. Carriker, Jr., has suggested that the legs of vultures have a whitish bloom that is easily rubbed off after death. This would account for some of the varying colors ascribed to them by different authors, and substantiate Bartram's statement.

Bartram's "gold coloured iris" is within the range of variation of the colors ascribed by other authors, from "white" or "cream white" to "yellow" or even "lebhaft rostgelb" (Tschudi, loc. cit., p. 69).

Dr. Allen's suggestion of confusion with the Caracara (*Polyborus*) is quite invalid, since Bartram's description as a whole could not possibly apply to that species. In 1774, as to-day, the Caracara may have been scarce or absent in those parts of Florida visited by Bartram; and this might explain his failure to include the species in his list of birds. Apparently Dr. Allen himself failed to meet with the Caracara in 1868-69 during his investigations along the St. John's as far south as Enterprise, Volusia County.

Altogether, the conclusion seems inescapable that Bartram actually met with his "*Vultur sacra*" in Florida; and further, that his description, save for a few fairly minor and explainable discrepancies, applies very satisfactorily to *Sarcoramphus papa* (L.). Therefore, as a matter of belated justice to our worthy eighteenth-century naturalist, I suggest that the King Vulture be recorded henceforth among the birds now extinct in the United States, but as having been observed *and collected* (though probably not preserved) by Bartram along the St. John's River in 1774 or 1775. It seems well within the bounds of possibility that Wetmore or some other paleontologist may yet have occasion to report the discovery of osseous fragments of the species from either the Pleistocene or the Recent deposits of Florida.

Within its present range from Mexico to South America the King Vulture is "rare in most localities" (Swann, *Mon. Birds Prey*, 1924, p. 6), and extinction of a former small, isolated population of this species in Florida, at the extreme periphery of its range, is practically as comprehensible as the similar disappearance of the several Pleistocene species mentioned on a preceding page. In speculating on the cause of its extinction here, one finds a possible correlation in the case of the royal palm (*Roystonea regia*), which Bartram discovered along the St. John's in the same general region as his *Vultur sacra* (Travels, 1791, pp. 115-116). Its natural range in Florida is now restricted to the extreme southern portion, in Dade, Monroe, and Collier Counties. The northern colony described by Bartram "may have been destroyed by the severe frosts of 1835" (Cooper, *Ann. Rept. Smithsonian Inst.* 1860 (1861), p. 440). According to Small (*Jour. N. Y. Bot. Garden*, vol. 29, 1928, p. 8), "All this evidence . . . indicates . . . that up to about a century ago Florida had a protracted warmer and perhaps less changeable climate, [and] that the sporadic occurrence of tropical and semitropical plants in the more northern part of the peninsula represents the remains of a generous distribution of more typically southern plants further north."

Antonius reports (*Zoologischer Garten*, vol. 6, 1933, p. 110) concerning King Vultures in the Schönbrunn Zoo that their talons are much more sensitive to frost than those of any Old World Vulture, and that one bird thus lost all its toes. The foregoing suggests that climatic changes, as indicated by the results of the severe "freezes" of 1835 and other years, may have been responsible for the disappearance of the King Vulture from Florida, as they probably were for the destruction of the royal palms along the St. John's.

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