

Avian commensals in Colonial America: when did *Chaetura pelagica* become the chimney swift?

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ABSTRACT: The clearing of primeval forest in eastern North America by European colonists led to a profound shift in the breeding ecology of the chimney swift (*Chaetura pelagica*). Historical accounts show that the swift, which nested in hollow trees during the pre-Colonial era, began nesting in chimneys as early as 1672 in New England, indicating that it was among the first native North American birds to nest commensally in European dwellings. Based on historical descriptions of nest sites and on changes in its vernacular name, the swift nested almost exclusively in chimneys on the Atlantic coastal plain by the late eighteenth century. Tree-nesting is now a rare phenomenon and fewer than two dozen instances of such behavior have been reported since 1900.

KEY WORDS: Mark Catesby – John Josselyn – *New Englands rarities discovered* – Thomas Pennant.

INTRODUCTION

American Indians had a significant impact on the forested habitats of eastern North America through burning and agricultural clearing (Swanton, 1922; Day, 1953; Russell, 1983), but the greatest landscape changes since the end of the last interglacial were precipitated by the arrival of European colonists who cleared millions of acres of primeval forest (Bidwell and Falconer, 1925). Although the probable impact of forest fragmentation on birds has been chronicled in some detail (see for example Terborgh, 1989; Askins *et alii*, 1990; Faaborg, 2002), the behavioral response of naïve avian populations to the first wave of European colonization, particularly of species that have adapted successfully to urbanization, has not been rigorously explored.

Few native birds of the Western Hemisphere have adapted their breeding ecologies to the edifice of European civilization as successfully as has the chimney swift (*Chaetura pelagica*). The swift nested in hollow trees, or perhaps in caves, in most of eastern North America south of the boreal forest in pre-Colonial America (Wilson, 1812; Tyler, 1940; Cink and Collins, 2002). Today, it nests almost exclusively in man-made structures such as chimneys, wells, silos, interiors of abandoned cabins and houses, porches and barns (Amadon, 1936; Tyler, 1940; Dexter, 1952; Fischer, 1958). Invariably placed in a shaded site, well protected from the elements, the swift's nest is constructed of small twigs cemented together with saliva from seasonally enlarged sublingual glands (Johnston, 1958; Barnawell, 1968). The shift to man-made structures has been so extensive that reports of swifts nesting in natural sites are now regarded as noteworthy events. A review of the literature revealed that fewer than two dozen instances of tree-nesting have been reported since 1900 (Cottrille, 1956; Kelsey, 1964; Blodgett and Zammuto, 1979; Tumer *et alii*, 1984; Ferguson and Ferguson, 1991), and most of these accounts were inadequately documented (for example Walker, 1939; Barbour and Gault, 1952; Hofslund, 1958; Ganier, 1962; Mengel, 1966; Sutton, 1967; Rising *et alii*, 1977; Nicholson, 1984, 1997; Bull, 1985; Sutcliffe, 1994; Stevenson and Anderson, 1994).

In any event, the paucity of tree-nesting records during the twentieth century suggests that the shift to man-made structures occurred in the nineteenth century or earlier. The objective of this paper is to determine from historical accounts when this swift began its commensal relationship with Europeans in North America.

HISTORICAL ACCOUNTS

Avian descriptions in Colonial-era literature, especially of songbirds, were often cursory and difficult to assign to a particular species. Swifts (Apodidae) and swallows (Hirundinidae) were believed to be closely related owing to their superficial similarity and convergent feeding ecology, until Sundevall (1836) classified them in different families.¹ Adding to the ambiguity of eighteenth- and nineteenth-century accounts, some English common names were occasionally applied to both the swift and the barn swallow (*Hirundo rustica*), a Holarctic species that also built its nest in Colonial buildings. Common names were accompanied by scientific names in most early sources, but several pre-1750 accounts used only common names. In those cases, the true identity of the bird may be determined from textual clues. This paper focuses on historical descriptions of nest sites and on the English common name of the swift under the assumption that perceived changes in the swift's association with human dwellings were tracked by changes in its vernacular name.

The first recognizable description of the swift in natural history literature appeared in John Josselyn's *New Englands rarities discovered* (1672: 8):

The *Troculus*, a small Bird, black and white, no bigger than a Swallow, the points of whose Feathers are sharp, which they stick into the sides of the Chymney (to rest themselves, their Legs being exceeding short) where they breed in Nests made like a Swallows Nest, but a glewy substance, and which is not fastened to the Chymney as Swallows Nest, but hangs down the Chymney by a clew-like [*sic.* ? glew-like] string a yard long. They commonly have four or five young ones, and when they go away, which is much about the time that Swallows use to depart, they never fail to throw down one of their young birds into the room by way of Gratitude. I have more than once observed, that against the ruin of the Family, these Birds will suddenly forsake the house and come no more.

Several details in Josselyn's passage indicate that *Troculus* referred to the swift, rather than the barn swallow. Although his description of the nest was fanciful, the "glewy substance" can only allude to the saliva cement of the swift's nest. Similarly, the sharp feathers refer to the spine-tipped tail feathers of *Chaetura* swifts. Finally, young swifts frequently tumble into chimney hearths if their nests are washed down by rain and when the young fledge.

Lawson (1709:145) listed the "Swift, or Diving" among the birds inhabiting the Carolinas. Brickell (1737: 197), who paraphrased or copied directly from many of Lawson's species accounts, noted in *The natural history of North Carolina*:

The Swift, or Diving, has a great Head and Wide Mouth, but a small Bill. The colour of the Feathers of the whole Body is black, only under the Chin, is a Spot of white or Ash-colour; the Legs are short, but thick, and the Feet small. These Birds feed as the Swallows do, and have much the same Virtues.

Although Lawson and Brickell noted the nesting habits of some other species, most notably the purple martin (*Progne subis*) which nested in hollow gourds tied atop tall poles on plantations, neither author mentioned the nesting of swifts or swallows in chimneys or other man-made structures.

The first known illustration of the swift appeared in Mark Catesby's (1748) *The natural*

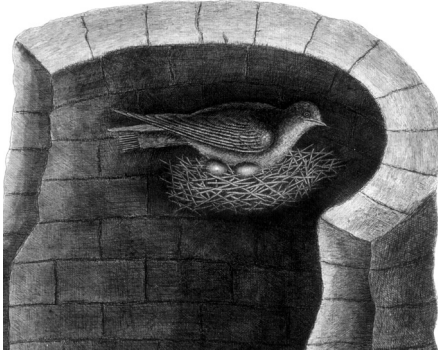


Figure 1. Detail from the earliest known illustration of the chimney swift (*Chaetura pelagica*) by Catesby (1748: Appendix, plate 8). Reproduced courtesy of the Joseph F. Cullman 3rd Library of Natural History, Smithsonian Institution Libraries.

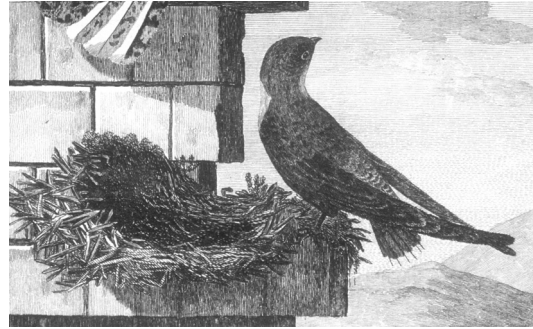


Figure 2. Detail from Pennant's (1785: plate 18) illustration of the chimney swift on a nest built on brickwork. Reproduced courtesy of the Joseph F. Cullman 3rd Library of Natural History, Smithsonian Institution Libraries.

history of Carolina, Florida and the Bahama islands (Figure 1) which depicted the “American swallow” incubating two eggs on a twig nest built inside a brick chimney²:

[The American swallow] is a little less than the English House-Swallow³, but very like it in shape. It is all over of a brown color, except that the under part of the body and tail is of a lighter brown; particularly the throat is almost white. The Cock has some feathers faintly stained with purple, except which he differs not in color from the Hen. The singularity of this Bird is, that the shafts of the tail feathers are very stiff, sharp-pointed and bare of feathers at their ends, which seem designated by Nature for the support of their bodies, while they are in an erect posture building their nests, which they do in chimneys, with little sticks interwoven and cemented together with a kind of glue or gum.

Nearly three decades later, Forster (1771a) erroneously cataloged two species of swift in North America – the “swift” and “aculeated swallow,” based on Lawson (1709) and Catesby (1748), respectively. Both names refer to the same species, as *Chaetura pelagica* was the only swift known to science in the Americas north of Mexico and the Caribbean during the eighteenth century (Wilson, 1812; Ridgway, 1911). Thomas Pennant (1785: 432) perpetuated Forster's error by presenting accounts for two species of swift (italics in original):

[Swift] With a very small bill: white chin: all the plumage besides dusky: all the toes standing forward. According to Mr. *Lawson*, inhabits *Carolina*. Found in vast abundance beyond lake *Baikal*, on the loftiest rocks; chiefly about the river *Onon*, where a variety with a white rump is very common. Extends in *Europe* as high as *Drontheim*.⁴

[Aculeated swallow (Figure 2)] With the bill short, broad, and black: head, upper part of the neck, and wings, dusky: breast cinereous: back, tail, and belly brown: tail even at the end; extremities of each shaft naked and sharp-pointed: wings extend far beyond the tail: legs longer than common to this tribe, and naked a little below the knee. Length five inches and a half. Inhabits many parts of *North America*. Arrives in *New York* and *Pensylvania* in *May*; sometimes early, sometimes late in the month. Builds in chimnies, forming a most curious nest, with bits of small sticks, cemented by peach-tree gum. It is open at top, and forms about a third of a circle. Lays four or five eggs in June, and quits the country in *August*. They often stick close to the chimney-wall by their feet, and support themselves by applying their sharp tail to the sides. They make all day a great thundering noise, by flying up and down the funnel.⁵

The common name first reflected the swift's association with European dwellings when Kalm (1761) referred to the “Korstens-Swalor” (chimney swallow) in the Swedish text of *En*

Resa til North America. Forster's (1771b) translation of Kalm's text included the following passage:

The chimney swallows ... derive their name from building their nests in chimneys which are not used in summer. ... It is remarkable that each feather in their tail ends in a stiff sharp point, like the end of an awl; they apply the tail ends to the side of the wall in the chimneys, hold themselves with feet, and the stiff tail serves to keep them up. They cause a great thundering noise all day long by flying up and down in the chimneys; and as they build their nests in chimneys only, and it is well known that the Indians have not so much as a hearth made of masonry, much less a chimney, but make their fires on the ground in their huts, it is a natural question to ask: where did the swallows build their nests before the Europeans came and made houses with chimneys? It is probably that they formerly made them in great hollow trees.⁶

Several English common names were applied to the swift in the period between Forster's (1771b) translation of Kalm and the publication of Wilson's *American ornithology* (1812). It is unclear whether Belknap (1792) arrived independently at "chimney swallow" for the swift in New Hampshire or if he was influenced by Kalm's account via Forster (1771b). In the same year, Bartram (1792: 290) introduced a confused nomenclature that assigned "house swallow" to *Hirundo pelasgia cauda aculeata*, a Latin name that combined elements of two names previously erected for the swift – *Hirundo pelasgia*⁷ (Linnaeus, 1766) and *Hirundo cauda aculeata americana* (Catesby, 1748). He compounded the problem by specifying "chimney swallow" as the common name for a second species, *Hirundo cerdo*. Bartram probably intended *Hirundo pelasgia cauda aculeata* to represent the barn swallow (Wilson, 1812), and Barton (1799) stated that *Hirundo cerdo* pertained to the swift. Coues (1875) later concluded that both of Bartram's names referred to the swift.

Williams's (1794: 114–115) similarly muddled description of the "house swallow" combined the morphological characteristics of the barn swallow (*Hirundo rustica*) with nesting characters of both the swift and cliff swallow (*Hirundo pyrrhonota*):

The house swallow. This may be readily distinguished from rest, by the greater forkedness of its tail. It has also a red spot upon its forehead; and under its chin. This species build their nests in chimneys. Their nests are made of small sticks, cemented together, with a kind of gum, and mud; they are covered or arched over the tops, and the aperture is on one side.

It is probable that Williams's "house swallow" referred to the swift because of the reference to stick nests inside chimneys.⁸ This seems to be confirmed later in the passage (Williams, 1794: 116) when he wrote "The species called the house or chimney swallow has been found during the winter in hollow trees." Notwithstanding his erroneous belief that swifts hibernated in trees, it appears that "house swallow" and "chimney swallow" were used interchangeably for the swift in New England during the 1790s. Two other contemporary accounts of the swift were brief but straightforward. Thomas Jefferson (1794) called it the "American swallow," whereas Barton (1799) listed it as the "aculeated swallow" or "chimney-bird."

Wilson (1812) wrote the most comprehensive and biologically accurate narrative of the swift until Fischer's study (1958). An excerpt from Wilson's account (1812: 48) summarizes the swift's nesting habits at the beginning of the nineteenth century:

[The chimney swallow] like all the rest of its tribe in the United States, is migratory, arriving in Pennsylvania late in April or early in May, and dispersing themselves over the whole country wherever there are vacant chimneys in summer sufficiently high and convenient for their accommodation. In no other situation with us are they observed at present to build. This circumstance naturally suggests the query, Where did these birds construct their nests before the arrival of Europeans in this country, when there were no such places for their accommodation? I would answer probably in the same situations in which they still continue to build in the remote regions of our western forests, where European improvements of this kind are scarcely to be found,

namely in the hollow of a tree, which in some cases has the nearest resemblance to their present choice of any other.

Wilson's influential *American ornithology* (1812) marked a watershed in the evolution of the swift's English common name. With few exceptions, the "chimney" appellation has been used since then. Audubon (1839) listed three common names for the swift (American spine-tail, chimney swallow, and American swift) and Baird (1845) called it the "chimney bird." However, "chimney swallow" was the only name cited in most references until the late 1870s (James, 1823; Bonaparte, 1828; Peabody, 1839; Linsley, 1843; Baird, 1860; Baird *et alii*, 1874). "Chimney swift," the common name used today, was introduced by Nuttall (1840) but was not widely adopted until it was published in *The code of nomenclature and check-list of North American birds* (American Ornithologists' Union, 1886).

DISCUSSION

When Josselyn was writing, European settlements in New England were largely limited to the Atlantic coastal plain and the Connecticut River valley (Friis, 1940). Although natural nest sites were undoubtedly available in the vast expanses of primeval forest in outlying areas, Josselyn's narrative (1672) suggests that the swift was already a commensal inhabitant of cabins and houses only five decades after the Plymouth settlement. This raises the rhetorical question first posed by Kalm (Forster, 1771b) and later by Wilson (1812): where did the swifts build their nests before the arrival of Europeans in North America? The answer was well known to both naturalists but the question serves as an indicator of how unusual tree-nesting was in settled areas of eastern North America at the end of the eighteenth century. By the 1790s, historical descriptions of nest sites and changes in the English common name suggest that on the Atlantic coastal plain the swift nested almost exclusively in chimneys. In an era when homes were heated with wood in open-hearth fireplaces, swifts opportunistically built nests in chimneys that were unused during the summer months (Wilson, 1812). Stone or brick chimneys provide nesting sites that, in many cases, were probably superior to those available in natural cavities and hollowed trees. In particular, the rough surfaces of brick, stone and mortar afford an ideal substrate for the attachment of twig nests. Chimneys may also provide a greater degree of protection from predators and inclement weather than hollow trees.

Did the swift nest commensally in American Indian dwellings before the arrival of Europeans? The size and stature of some Indian dwellings, particularly Iroquoian longhouses (Tuck, 1971; Ritchie and Funk, 1973) and the ceremonial buildings constructed atop temple mounds in the Mississippi Valley (Le Page du Pratz, 1758), rivalled those of barns, churches and houses built by seventeenth-century European colonists. Although supporting references have not come to light, one may speculate that the darkened recesses of large and less-frequented structures (for example, ossuaries, temples and storehouses) may have provided suitable conditions for nesting, particularly given the variation in nest-site selection exhibited by present-day populations of *Chaetura pelagica* (Tyler, 1940; Dexter, 1952; Fischer, 1958; Cink and Collins, 2002).

In summary, historical references indicate that the chimney swift was among the first native North American birds to nest commensally in European dwellings. The conversion from hollow trees to chimneys appears to have occurred rapidly in settled areas and several

authors noted that chimney swifts were common to abundant in the vicinity of settlements and cities in the early nineteenth century (Wilson, 1812; Audubon, 1839).

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NOTES

¹ A complete synonymy of the swift's scientific name since Linnaeus (1758) is found in Ridgway (1911).

² Catesby's name, *Hirundo cauda aculeata Americana*, was the probable stimulus for Forster's (1771a) "aculeated swallow", referring to the spiny tips of the swift's rectrices.

³ Probably the common swift (*Apus apus*).

⁴ Pennant apparently confused *Chaetura pelagica*, which is restricted to the Western Hemisphere, with the common swift (*Apus apus*) in Europe and the Pacific swift (*Apus pacificus*) in the Lake Baikal region of Siberia.

⁵ Pennant's biologically accurate illustration (see Figure 2, this paper) of the "aculeated swallow" depicts *Chaetura pelagica* perched on a twig nest built on brickwork.

⁶ Kalm's account (translated from the Swedish by Forster (1771b)) of the barn swallow (*Hirundo rustica*) indicated that it nested in man-made structures when available:

The barn swallows, or, as some Swedes called them, house swallows, are those with a furcated tail. ... They build their nests in houses and under the roofs on the outside; I likewise found their nests built on the lower side of overhanging rocks. They build, too, under the edges of perpendicular rocks; and this shows where the swallow made their nests before the European settled and built houses here; for it is well known that the huts of the Indians could not serve the purpose of the swallows.

⁷ Linnaeus (1758) based his description of *Hirundo pelagica* on Catesby's (1743) "*Hirundo cauda aculeata americana*". He changed the specific epithet to *pelasgia* (Linnaeus, 1766) but it later reverted to the original spelling (Baird *et alii*, 1874).

⁸ Williams (1794: 115) also described a "barn swallow" (= *Hirundo rustica*) whose nest was found "in barns and out houses; and they are formed of grass, straw, and feathers. Their eggs are speckled, of a dark brown and white. It is called the barn swallow from the place in which it generally builds its nest." In contrast, the eggs of the swift (*Chaetura pelagica*) are white and unspotted.

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