

NOTES ON THE NATURAL HISTORY OF FORT MACON, N. C., AND
VICINITY. (No. 1.)

BY ELLIOTT COUES.

During two years' residence in this locality, I paid some attention to the zoology and botany of the vicinity, and the information obtained may be of some value to others besides myself. The present paper, in which mammals, birds, and reptiles are noticed, may be followed by one or more treating of the fishes, insects, marine invertebrates, and plants.

I. MAMMALS.

Lynx rufus, Raf.

Occasional.

Vulpes virginianus, Rich.

Putorius vison, Gapper.

Lutra canadensis, Sabine.

These three, but especially the mink, are common, and, with the first-named and the following species, represent the fur-bearing animals of the immediate vicinity which are of commercial consequence.

Procyon lotor, Storr.

SYN. *P. lotor* var. *Mexicana*, St. Hilaire, Voy. Venus, I, 1855, p. 25, pl. 6.—*P. Hernandezii*, Wagler, Isis, xxiv, 1831, p. 514.—*P. Hernandezii* var. *Mexicana*, Baird, Mamm. N. A. 1857, p. 212.—*P. nivea*, Gray, Mag. Nat. Hist., I, 1837, p. 580 (Albino).—*P. psora*, Gray, Ann. Mag. N. H. x, 1842, p. 261 (mutilated).—" *Procyon gularis*, Smith, Int. Mamm. Jard. Nat. Lib., xiii, 1842, 222" (fide Baird).

A common animal, in the wooded portions of the vicinity.

Residing for several years in different Southern States, where the Raccoon is either common or very abundant, I became familiar with its variations in size, color, etc., and feel sure that these are as great as those differences held to distinguish a western from the eastern form. Although I do not assign the above synonymy from direct comparison of specimens from the different localities (as I saw none in New Mexico, Arizona, or California), I am confident it is correct, provided *P. Hernandezii*, etc., do not differ from *lotor* in any other points than those given in descriptions of

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the authors above quoted. As Mr. Allen¹ holds, and probably has shown, all the features believed to distinguish the western raccoons may be discovered in examination of sufficiently extensive series of eastern ones. Dr. Gray's two species are not different, according to that author's subsequent admission.

Cariacus virginianus, Gray.

Common, almost to be called abundant in wooded portions of the main land near the coast, and said, upon good authority, to occur in the wooded part of the Banks. During the autumn and winter, venison is not much more expensive than beef, a fact attesting the above statements.

? *Balæna cisarctica*, Cope.

An individual, which I rather suppose than know to be of this species, was taken in May, 1869, off Shackleford. It measured about forty-five feet in total length. The fishermen called it a "right whale." Besides this kind, they spoke of two others, that they occasionally captured, under the names of "Scrag" and "Humpback" (*Agaphilus* sp? and *Megaptera* sp?). They usually take two or three each spring. Remains of whales, as the jaw-bones, shoulder-blades, humeri, and especially vertebræ, are strewn abundantly along the beach.

Delphinus Sp.

At least one species of porpoise is very abundant in and about the harbor, and I think that a second, smaller and darker than the other, is of frequent occurrence. They are to be seen at all times, but are most abundant in spring and fall, during the migration of the fish upon which they prey; and in April and May, during the pairing season, they become especially conspicuous in their amatory gambols. The sexual act is frequently witnessed, and may be recognized at a distance by the reversed position of one of the pair, and the smoothing of the surface of the water by the wasted emissions. The great voracity of the porpoises is evident in their pursuit of schools of fish, some of which are often driven out of the water, only to fall back into the open jaws of the pursuers. The animals are sometimes taken for their oil, in nets made especially for the purpose, but are not

¹ Bull. Mus. Comp. Zool., No. 8, pp. 182-3.

often molested, and usually show entire fearlessness of the nearness of man.

Remains of some cetacean (not a whale), about seventeen feet long, were cast upon the beach during a storm in October last, but identification was impossible, owing to the advanced stage of decay.

Lasiurus cinereus, Allen.

Occasional specimens, in summer.

L. noveboracensis, Gray.

Very abundant in summer, and appearing to live mostly in and about the fort itself, as far as the eastern extremity of the island is concerned; other suitable hiding-places not being in plenty.

Scalops aquaticus, Fischer.

Occasional traces of this animal's presence in the loose soil between the sand-hills and the marsh.

Sciurus carolinensis, Gmelin.

Very abundant in all the wooded vicinity.

Mus decumanus, Pallas.

M. musculus, Linn.

Everywhere about the fort and other settlements.

Fiber zibethicus, Cuvier.

Common.

Lepus sylvaticus, Bach.

One specimen from the neighboring island of Shackleford—the only one I ever saw in the vicinity. I scarcely think that it occurs on Borden, where the next species abounds.

L. palustris, Bach.

The most abundant and characteristic mammal of the island.

I gave some account of this species, in the Proceedings of the Boston Natural History Society for 1869 (p. 89), and have little to add to what there appears, or may be gathered from Audubon's and Bachman's article.

The animal sometimes reproduces in April, more commonly in May, and thence during part of the summer; I do not know whether more than one litter is reared, but think such is the case. The nest is a snug, pretty affair, in a tussock of rank grass or

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weeds, or little shrubby patch, in a dry situation. It is sunk a little in the ground, then arched over, with an opening on one side; built of dried grasses, mixed with a few leaves, and warmly lined with the animal's own fur. All those I have seen were so far from water as to be out of reach of any possible rise of the tide.

This appears to be the most distinct of the several species closely related to the foregoing; and is in fact distinguishable on sight, as some of the others are not.

Didelphys virginiana, Shaw.

SYN. *D. californica*, Bennett, P. Z. S., i, 1833, p. 40.—*D. breviceps*, Id., ibid.—*D. pruinosa*, Wagner, Suppl. Schreber, iii, 1843, p. 40.

Abundant in the wooded portions of the vicinity.

Having made this animal a special study, I am in position to offer remarks which cannot be reasonably questioned. Although my investigations were rather anatomical than zoological, I did not neglect the latter portion of the subject. The more specimens I examined, the more I was struck with the variations that depend upon sex and age, as well as those that different individuals corresponding in these conditions present. An examination of these points in the natural history of a single animal, may give results of general application. And yet, in calling attention to the variability of the opossum, I do not wish to be understood as supposing that the animal is not as constant as many or most others; for I believe it to be no exception to a general standard or average in this respect. I doubt that one could study any mammal as closely as I have the opossum, without being similarly impressed. The following paragraphs are mainly confined to consideration of external characters. I can affirm that not one of the characters assigned to the supposed species above cited, is not to be found in specimens of *D. virginiana* from the same locality; that the differences indicate individual peculiarities; and that even upon striking an average of preponderance of certain characters, common to each in various degree, no results will be obtained warranting the separation of the opossums from the southwest as even a geographical race or variety. The assertion is made, it should be understood, upon consideration of descriptions only, without direct comparison of specimens.

Professor Baird remarks (Mex. B. Survey, vol. ii, pt. ii, p. 33), that "although there are some differences in the skulls of the *D.*

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virginiana [and of *D. californica*], yet I am unable to establish on them any specific characters. In fact, the variation in the thickness and length of the muzzle in different specimens, in addition to other points, are so great, as readily to convey the impression of many more species than really exist." This is certainly true, and, I think, is speaking within bounds. The author's tables of measurements of skulls of *D. virginiana* show a difference of nearly an inch and a half in total length, in only four specimens; yet this scarcely represents extremes between the largest old males and the smallest young (though full-grown) females. I have skulls before me upon which a person so minded might base very specious *generic* characters. The lateral measurements of the skull are variably proportionate to the longitudinal ones. The muzzle is sometimes tumid, at others regularly conic. Sometimes the interparietal crest forms a high arch, at others is only a direct backward and upward prolongation of the face. This crest may be only a fourth of an inch, or more than half an inch above the expanded surface of the parietals, and when so large it may be partially detached, appearing like an osseous lamina developed in the fascia separating the masseteric muscles. Generally, it is in direct proportion to the size and strength of the individual, and is usually smallest in the female. The zygomatic arch is very variable in amount of outward curvature. The ramus of the lower jaw may be nearly upright, or slope backward so far as to overreach the condyle. It appears to vary with age. The long lower border of the jaw-bone may form a slight regular curve, or a strong irregular one. In two specimens before me, the difference in total length of this bone alone is a full inch, and the smaller of the two is that of the older animal, as shown by the stronger ridges and deeper depressions for muscular attachments, and the much-worn teeth. The difference in length between two canine teeth (both unworn) is a fourth of an inch; the possessors of these were both adult animals. In general, the tusks of the male are longer and stronger than those of the female. It is unnecessary to cite further details. Elimination of all these and other accidental variations shows how very different a skull should be, to furnish specific characters.

The length of the tail, compared with the length of the body, appears to have been relied upon in some instances; but, for several reasons, it is difficult to predicate anything upon this

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character. In the first place, it is impossible to always measure the tail from the same point. There is no visible point of separation of tail from body; the latter narrows regularly and gradually into the former, so that we cannot say where one ends and the other begins. Measurement from the end of the fur is usually supposed to be meant; and about where the true fur ends the scaly plates begin. But it will be quite safe to allow for a variation of at least two inches in this regard. I have certainly seen so much difference as this, as well as I could judge. This refers to external measurements of the animal in the flesh; the dried, especially if skinned, tail can afford no data whatever. Finally, appeal to the vertebræ themselves is not infallible, for these may vary. The first coccygeal vertebra (as I hold it to be) resembles the others in physical characters, but is really a part of the sacrum, being anchylosed therewith. At the extremity of the tail, one vertebra or more may be lost without evident trace. The terminal dozen or more bones have no neural canal, nor any noticeable parts beyond the impervious centra by which they articulate; they resemble the internodes of a digit. The tail is singularly liable to ulceration upon injury, when one or more bones may exfoliate from the end, and the subsequent cicatrix be scarcely recognizable.¹ I met with one such case. It would not be safe to base a specific difference upon less than three or four inches in length of tail; and this should be taking age for age of the animal, of course, and be only declared of specimens measured in the flesh. In color, the opossum's tail is usually in largest part whitish or flesh-colored, blotched with a dark livid or blackish hue toward the base. The degree of blotching and the shapes of the dark spaces vary with almost every individual. Sometimes most of the tail is dark colored; sometimes there is almost no pigment in the scales. Absolutely nothing can be predicated of this feature.

The ears of this creature are very thin and membranous, and

¹ It is also highly probable that the coccygeal vertebræ normally vary one or two in number, that is to say, we may find 21, 22, 23 bones, without any having been lost by accident or disease. This, however, is an opinion of mine, not an observation. Some small long-tailed animals vary more than this; e. g., Mr. Allen says (Bull. Mus. Comp. Zool. No. 8, p. 228) that *Hesperomys leucopus* may have from 24-5 to above 30 caudal vertebræ. Other *Muridæ* appear to vary quite as much.

mostly naked, reminding one of the texture of a bat's wing. In color, they are like the tail; usually dark, blotched or rimmed with flesh-color; but they may be wholly blackish or mostly whitish; it is impossible to base any character upon their coloration. The general shape of the conch may be called pyriform (base uppermost) or subcircular; but it is not easy to see what the shape really is, unless the ear is pressed out flat. From their texture, they shrink and shrivel in drying. I have never seen a Virginian opossum with so pointed an ear as "*D. californicus*" is represented to possess in pl. iii. of the Mexican Boundary Survey; but if, as I presume, the drawing was made from a dried specimen, it is not trustworthy in this point, for indeed the true shape of the ear could have been only guessed at. The ears, like the tail, are peculiarly subject to disease; and may ulcerate away entirely, as I have observed in animals kept in confinement; and this, too, without appreciable general ill-health.

The general body colors are amongst the most variable features. The variation is largely a matter of individual difference; but there are certain things that influence it in a general way; especially age. The opossum grows gray with age, as a rule; half-grown ones seen at a little distance give the impression of a blackish animal; old ones, of a whitish animal. The paws are particularly variable. Generally, they are among the darkest parts, and are often quite blackish; frequently, they are as pale as any other parts. Not to go into tedious particulars in this connection, I may say, in short, that I have seen no points of coloration adduced for *D. californica* that might not be easily matched out of a dozen individuals of the Eastern species, with a single exception. To the best of my recollection, I have not seen a specimen of *Virginiana* with paws completely black to the nails.

Under the circumstances, it seems most probable that a second species of *Didelphys* remains to be determined, if occurring within our limits.

II. BIRDS.

The list is restricted to those species that came under personal observation on the unwooded portion of the island itself, and on the waters of the immediate vicinity; for an exhibit of the strictly littoral and maritime bird fauna, as distinguished from that of

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the locality at large, seemed to promise the more of real interest. At the same time it should be remembered, that any of the *Passer*es, &c., of the wooded main land adjoining, not here noted, may occasionally stray into the shrubbery of the sand-bars. The catalogue of the water birds is believed to be pretty full. Aside from these, and excepting a few maritime land birds like the *Ammodrami* for example, the bird-fauna of the locality appears to differ from that of the State at large, mainly in the absence during the breeding season of species that, like the robin and meadow-lark, pass the summer as well as other seasons in higher parts, and perhaps, also, in a rather earlier arrival in spring, and later departure in the fall, on an average, of the migrants.

Turdus migratorius.

Spring and fall, especially March and November; some winter; none observed in summer.

Turdus pallasii.

Spring and fall, occasional, in the shrubbery; spec. in Nov. As elsewhere¹ noted, this species migrates earlier in the spring and later in the fall than its nearest allies; and I have no doubt that it winters in this vicinity.

Turdus aliciae.

Like the last, but later in coming; specs. in April and May.

Mimus polyglottus.

Resident; common; but not so abundant as it is inland, and especially somewhat further south.

Mimus carolinensis.

Resident; common; but most numerous during the migration.

Anthus ludovicianus.

Abundant, in flocks, from early in November till April.

Thryothorus ludovicianus.

Common; resident; mates in March; nests and lays in April; young obtained May 9.

Telmatodytes palustris.

Abundant, particularly during the migration. It continues in plenty through part of November at least, and I think that some

¹ Coues and Prentiss, Smithsonian Report for 1861, p. 404
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may winter here. No nests were observed, and I doubt that any breed in this locality, although it is a common summer bird in Virginia swamps, and I found it breeding in the same latitude (about 35° N.) in the West.

Cistothorus stellaris.

One specimen, October 11, 1869, the only time that I ever saw the bird alive.

Geothlypis trichas.

The most abundant and characteristic of its family, in summer; and I presume, but do not feel sure, that some pass the winter here. They arrive in numbers during the latter part of March and early in April, when many of them have not acquired their full dress. They begin to sing almost immediately, and many nest in April. Young birds may be seen early in May, along with the first broods of the Carolina wren, and from that time until August. The species remains plentiful through part of November.

Parula americana.

Only occasional during the migration (one spec. in September).

Dendroeca coronata.

Very abundant in winter; complementing the yellow-throats at that season. They arrive late in October; become more numerous the following month, and remain until the last of March or early part of April, frequenting the shrubbery in flocks with the savanna sparrows. None were observed to have gained their full plumage before leaving.

Dendroeca discolor.

Arriving late in April, these birds become very numerous in May, when nearly every patch of juniper and clump of bushes has one or more in full song, and continually foraging for winged insects, which they catch in the air with great adroitness. The greater number pass north to breed, but many remain during the summer, especially in thinly wooded sandy tracts of the neighborhood.

Dendroeca striata.

Occasional, in the shrubbery, during the migration.

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Dendroeca palmarum.

Rather frequent, particularly late in the fall, in low shrubbery, with the sparrows.

Progne purpurea.

Common, March to October; as many as can find accommodation breed about the fort.

Hirundo horreorum.

During the migration only; then abundant.

Hirundo bicolor.

Abundant during the migration. Numbers made their appearance January 11, 1870, on a warm day, though there had been ice a half inch thick two days before. They almost immediately disappeared during some blustering weather, but reappeared in greater numbers than before on the 20th, and were occasionally seen from that time until the regular migration took place, in April.

Cotyle riparia.

During the migration.

Vireo novæboracensis.

Common summer resident of the shrubbery, April—October.

Vireo olivaceus.

Occasionally seen, during the migration.

Pyrrhula æstiva.

Frequent, in summer.

Chrysomitris tristis.

Common, in flocks, from November to April. Here it spends much of its time on the ground, feeding apparently in greatest part upon the seeds of *Cenchrus tribuloides*.

Passerculus savanna.

The characteristic sparrow; very abundant everywhere outside the marsh itself, from October to May; none remain through the summer. Its numbers do not perceptibly decrease until the middle of April, when the greater part move northward; but loiterers are seen through most of May. Their earliest connected notes are heard late in March; and they are in full song and

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plumage before they leave. Some straggle back in September; more arrive in October, and the full complement appears with the first cold weather of November.

Zonotrichia albicollis.

Only occasional, in winter and during the migrations; although very abundant on the neighboring mainland.

Melospiza melodia.

Common; resident; but most numerous from October to April, as most of them pass northward for the summer.

Melospiza palustris.

Common; resident, I think, as I saw them after May, although I did not observe them through either of the two summers. They seemed most plentiful in November, when many were singing. The ordinary chirp of this species is totally different from that of the last. A timid bird, courting the seclusion of the thick bushes that border the marsh, it forms a sort of connecting link between the two last species that frequent open grassy places and sparse shrubbery, and the two next, that are confined to the marsh itself.

Ammodromus caudacutus.

Living side by side with the next, and with the same general habits and manners, the sharp-tailed finch nevertheless has some obvious peculiarities, as compared with the seaside. As the two species spring up together from the reeds, the sharp-tailed is recognized at a glance by its inferior size, and its general yellowish appearance, closely resembling, in these respects, the *Coturniculus passerinus*, the place of which it appears to fill in the marshes. Seen at the same hasty moment, the seaside looks more like the marsh sparrow; but the general impression received is of a gray, instead of a rufous bird; and its nearest approach, in color, is to the *Poospiza Belli*. The difference in plumage between spring specimens, in full dress, of the sharp-tailed, and the young of the same, in the fall, is striking, and greater than has usually been mentioned; it consists chiefly in the paleness or almost want of the orange-buff that marks the highest condition. There is also a remarkable difference between the two species of *Ammodromus*, in the time of the vernal moult. The seaside finches were all found in full feather, and with highly

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developed sexual organs, from the beginning of April; while the sharp-tailed remained in moult through the same month. This, of itself, is a good indication of some notable difference in the time, and probably the places, of breeding. I do not think that any of the sharp-tailed finches breed hereabouts; and it was not until May, when they appeared to be about leaving, that I found any with excited organs, or in perfect plumage. At that date the seashores were mating and nesting, if not already incubating. In the fall, when both species are again together, it is only during a part of the season that they are found in equal numbers. This is during the warm days of October, when they loiter in troops about the bushes around the edges of the marsh, as well as among the reeds. Previously, in September, there are few of the sharp-tailed to be seen; and on entering the marshes in November, the seashores will be found scarce or altogether wanting, while the former are still abundant. These observations, which I made very carefully, are mutually explanatory, and point to the fact that these two species, so closely allied, so often found together, and so commonly spoken of in identical terms, have really a different range of habitat (one being more northerly than the other), migrate independently of each other, moult at separate seasons, and breed more or less apart.

Ammodromus maritimus.

More numerous, on an average, than the last, and more truly characteristic of the locality, as it breeds here in great numbers. In April it retires from the interior of the marsh, to place its nest among the bordering bushes, a little above high-water mark. It begins to sing when mating, and is afterwards, during the incubating, particularly earnest and persevering about it. Each pair usually claims some particular copse, and the male has his favorite singing post, to which he continually resorts. The simple song is something like that of the yellow-winged sparrow, beginning with a few slow notes, then a rapid trill, finally slurred till it sounds like the noise made by some of the grasshoppers. The nest and eggs are now well known. The young in September are somewhat differently streaked from the adults, and appear to constitute Audubon's *A. macgillivrayi*.

The comparison that has been drawn between the actions of the Ammodromi and of Sandpipers seems somewhat forced, and

a more natural one might be traced in the Nuthatches, Titmice, and even Woodpeckers. They climb the reeds with remarkable ease, sliding up and down, skipping from one to another, and hanging in every attitude except head downwards; they are doubtless much aided by the somewhat stiffened tail. On the ground, they are unmistakably sparrow-like, and always proceed by hopping; the flight does not differ noticeably from that of their several near allies. It is irregular and very quick, and they never remain long on wing. They are rather difficult to procure in large numbers, independently of the miry nature of the places they inhabit; as they are not often, comparatively, seen at rest, and it is quite a knack, only acquired by practice, to shoot at them on wing with any certainty of killing. A collector will do well to take a score of them in a morning's walk, even when they are most abundant.

Comparing the Fringillidæ of this seacoast locality with those of inland places of the same latitude, the distinctive features are seen in the *Ammodromi*, and in the great abundance of *Passerculus*, together with the absence or only casual occurrence of several species elsewhere abundant. Thus, I never saw a Chipping Sparrow, Yellow-winged Sparrow, Bay-winged Bunting, or Snow-Bird, on the island.

Pipilo erythrophthalmus.

Common; summer resident, breeding; and just possibly a few spend the winter here, though I do not think I saw any between November and March.

Cardinalis virginianus.

Common; resident; breeds (in May and subsequently).

Icterus spurius.

Moderately common, from the latter part of April, through a portion of September; breeds.

Dolichonyx oryzivorus.

During the migrations only; in spring, not abundant, mostly in early May, when many are in full dress, and singing volubly; in fall, very common, beginning to arrive late in August, and continuing through October.

Agelæus phœniceus.

Resident; abundant. They become more numerous during the
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latter part of January, begin to sing in March, get restless in early April, when they come into full feather, but continue in flocks for a week or two longer. The greater number then pass off northward, and those that remain begin to pair. They breed sometimes by the single pair, sometimes in companies with the jackdaws, and have their first eggs early in May; though other batches may be found throughout June and part of July. I estimated that a narrow strip of brushy ground about two miles long contained about a hundred pairs. The young begin to flock about the middle of July; there may have been about a thousand in the tract just mentioned, before they were reinforced, in August, by new-comers from the north.

Sturnella magna.

Very abundant, in flocks, from October to April, when they pass north, or at any rate to higher grounds inland. I saw none breeding, and do not think I ever observed a pair during the summer.

Quiscalus major.

The characteristic species of the family, and very abundant. I judge it to be resident, though it is much less common during December and January, and may move off altogether during the extreme of the season. It does not seem to be authenticated as occurring beyond the Middle States; and, however far north it may occasionally stray in summer, it is essentially a bird of the South Atlantic and Gulf States. It is strictly maritime, and its food differs from that of most of its allies, much as that of the fish-crow does, in comparison with that of *C. americanus*. It feeds on molluscs, aquatic insects, fiddler-crabs, and small fry, which it catches expertly by wading in the water and striking with its bill, in a manner reminding one of a heron. It frequents the muddy flats at low tide, and for similar animal food, and is dispersed through the marsh in gleaning for seeds that form part of its fare. The sexes mingle in flocks, often of large size, up to some time in April, when they break up in pairs, several associating together in the same copse, and placing their nests close together in a sort of rookery, frequented also by the redwings and the green herons. The nests are bulky and inartistic, composed chiefly of interlaced twigs and intertwined grasses, generally with the addition of a few dried leaves as lining or wadding; 1871.]

I saw none with either mud or horsehair. The laying season is at its height the third or fourth week in April; I did not find more than six, nor fewer than three, eggs in a nest. They measure on an average $1\frac{1}{4}$ by a little over $\frac{3}{4}$ inch; and have the usual shape and curious zigzag markings, on a pale bluish-green ground color. On leaving the nest, the young are curious-looking objects—clear brown above, pale gray or almost white below, with a naked space about the eyes, and fluffy tufts of down on the head. They appear early in June, and by the first of August both old and young are flocking. The young rapidly change after leaving the nest, the brown acquiring a greenish-black cast, the gray of the under parts becoming brown. Both sexes undergo a change in the early fall, after rearing of the young is over, and again in the spring. The moult begins on the head, and progresses backward, the quills and tail-feathers being renewed last. When in perfect plumage, the male is a splendid-looking bird; its large fan-shaped tail, with the lateral feathers placed slantwise, giving it a jaunty air, and serving to steady its flight. A fuller account of this interesting species will be found in the "Ibis," 1870, p. 367.

Corvus ossifragus.

Very common, and resident, though less numerous in summer, and not to my knowledge breeding in the immediate vicinity, probably through lack of suitable woods. They frequent the sea beach, contending with the turkey-buzzards and herring-gulls for the refuse from the fort, and scatter over the marsh, often in company with the last species, feeding upon various animal substances gathered from the shoals and mud-flats, such as shell-fish, fiddler-crabs, and aquatic worms.

Tyrannus pipiri. (*T. carolinensis.*)

Common summer resident, April to September; breeds. This is the only one of the family that appears to regularly visit the island, though four or five species at least are common in the woods of the adjoining land.

Ceryle alcyon.

Occasional, at any season.

Chordeiles virginianus.

Very common, from April to October; breeds, and is especially numerous in August.

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Coccyzus erythrophthalmus.

Frequent, during the migration.

Colaptes auratus.

Rare or occasional (one specimen taken October 10, 1870).

The *Picus querulus*, although not actually observed on the island, may be here noticed, as one of the characteristic species of the South Atlantic States, and an abundant bird of the pine swamps of the neighboring mainland, where it is resident. It is easily distinguished from our other *Pici* proper, at any reasonable distance; first by its different note, and next by the greater blending of its colors, producing a grayish appearance at a distance where the other species still look definitely black and white. The sexes are exactly alike, except that the ♀ lacks the red over the auriculars, and of the same size; average measurements give $8\frac{1}{2} \times 15 \times 4\frac{1}{2}$; tail $3\frac{1}{2}$.

Falco sparverius.

Frequent; apparently resident.

Accipiter cooperi.

Frequent; apparently resident.

Accipiter fuscus.

Specimen in September.

Circus hudsonius.

Very common; resident.

Pandion haliaëtus.

Common, especially in spring and fall.

Haliaëtus leucocephalus.

Frequently observed at different seasons.

Strix pratincola.

Occasional; specimen taken in the marsh in daylight.

Brachyotus palustris.

Frequent, about the marsh.

Cathartes aura.

Abundant; resident; more numerous in summer than in winter; believed to breed in the neighboring pine swamps.

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Cathartes atratus.

This species was observed in summer too frequently to be considered as merely a straggler, though it is far less abundant here than on the coast of the next State southward. Numbers were seen *March* 22d, 1870 (their first appearance that year); and in *November* of the same year I saw many near New Berne, N. C.

Zenædura carolinensis.

Resident; abundant; begins to flock in August, and so continues until April.

Ortyx virginianus.

Casually on the island, which is not entirely suited to its wants; plentiful in the vicinity.

Charadrius virginicus.

Common during the migration, particularly in October and November.

Aegialitis vociferus.

Abundant, especially during the migration, but observed at all seasons, and probably resident, though not known to breed.

Aegialitis semipalmatus.**Aegialitis melodus.**

These two species come and go together, and are usually found in company; but the first named much outnumbers the last. They become very plenty in April, and so continue through that month and the next, after which none are to be seen until the latter part of August. In September and October they are again plentiful, and remain in scarcely diminished numbers until cold weather, frequenting all the water-edges with several other small waders. Before leaving in the spring, they come into perfect dress, with very brightly colored bill and feet, and the brilliant ring around the eye. All the colors are duller in the fall, although even at that season adults are easily distinguished from the birds of the year. The two species are easily told apart at any distance by the paleness of *A. melodus*, which closely resembles the winter condition of the sanderling.

Aegialitis wilsonius.

The characteristic species of the family; summer resident; breeding abundantly.

[May 2,

Iris brown; no conspicuous coloring of the edges of the eyelids; bill wholly black; legs pale flesh-color, sometimes with a livid, at others with a yellowish, tint. Shade of the upper parts intermediate between that of *melodus* and of *semipalmatus*; ♂ with a perfect black pectoral collar and bar across the vertex, the nape and cervix strongly tinged with rufous, as in the western species; ♀ with the bars plain grayish-brown, and with little rufous; young, like the female, but duller and grayer. When newly hatched, the down of the upper parts is curiously variegated with brown and black; the under parts are pure white; the bill and feet are as in the adult.

None of these Plovers winter here. They come from the south late in March, with constant increase during April; a part pass further north in May, but many remain to breed. Excepting a few stray sandpipers, they are the only waders of the beach during June and July. Before pairing and resorting to the sand-dunes to breed, they frequent the beach, sand-shoals, mud-flats, and scant-herbaged salt meadows indifferently, in flocks of considerable size, keeping much among themselves; their size, longer legs, and large black bill render them conspicuous among their congeners; they are rather shy than the rest, and their note is decidedly different. In those opened were found gravel, insects, soft substances apparently both animal and vegetable, and fragments of small molluscs, particularly the fragile young of the *Solen ensis*.

Some account of their nidification, and a description of the eggs, will be found in the *American Naturalist* for September, 1869. This occasion is taken to repeat that the usual number of eggs is three, not four.

Squatarola helvetica.

Abundant during the migration, particularly in October. Here they frequent the water-edges, and the flesh is hardly so good as when they feed over uplands.

Streptilas interpres.

Very common during the migration, and some probably winter. In May, just before they leave, very perfect specimens may be procured. They begin to return the last of August, and soon become abundant. Many of the old birds at this time retain much of their spring attire, and are thus readily distinguished from the young.

1871.]

Gallinago wilsonii.

Common during the migration, and often in winter; but are somewhat uncertain. They frequent the marsh, &c.; but rarely, if ever, the more open ground about the harbor.

Macrorhamphus griseus.

Very abundant during the migration, and perhaps some winter, as they may be taken in December. They occur in large flocks on the sand-bars and mud-flats, as well as on the salt meadows; and afford excellent shooting. They are not so common in the spring, and the passage is more rapid.

Pelidna americana.

Very abundant, April and May, and September to November; some may remain all winter. A large part of them attain their perfect dress before leaving in the spring; and it is partly retained by many during the full migration, when, however, most of them are in plain gray plumage. The vernal change begins early in April, soon after the main body arrives from the south. Even in spring they are often found exceedingly fat; and in the fall their corpulence seems only limited by the capacity for expansion of the skin. In examining a great number, I found a variation of a third of an inch in the length of the bill; but this is always considerably over an inch long, and never quite straight. They seem to prefer muddy flats to the beach, and are among the most snipe-like of the sandpipers.

Actodromas bonapartei.

Common, during the migration, associating in flocks with several other species. The larger size, and conspicuously white rump, mark it at once from *Ereunetes*, and the next species, its most frequent companions.

This little species is liable to be found in sandy and muddy places throughout North America, east of the Rocky Mountains. It breeds in Labrador, where, in July and August, it is one of the most abundant shore birds; and in various parts of British America. I found it migrating through Kansas in May.

Actodromas minutilla.

Extremely abundant, April and May, and August to October, both on the beach, in flocks with the next, and also in muddy meadows.

[May 2,

The beach and marsh are cleared of all their sandpipers about the first of June; and, for some six weeks, scarcely a straggler of any sort is to be seen. But about the middle of July—a few days before or after the 15th—a few of this and the next species reappear, and in August the numbers are materially increased, still in advance of the main body of September arrivals. It is an open question about these July birds. It seems improbable that they should have gone so far north as the most southern places where we know of their breeding, and have raised a brood, in the short six weeks of their disappearance. Probably they are either those that left in the van of the spring migration, or those that did not accomplish a complete migration, from whatever cause.

Ereunetes pusillus.

Extremely abundant, as elsewhere along the Atlantic coast, during the migrations; here, chiefly from early April to June, and from August (see above) through October. They show as decided preference for the beach as the least sandpipers do for muddy flats.

Calidris arenaria.

Very abundant at all times, excepting during the three summer months. The greater number pass north early in May, but a few linger until June. Some arrive late in August, and most of them in September. After October they are conspicuous by their light color, appearing almost white at a distance. The vernal change commences in April, but the process is slow, and few completely ruddy birds are seen here. Up to a short time before their departure, they continue in compact flocks; but in May, are more dispersed, and the prospective pairs are seen chasing each other over the sand, the males, puffed up to nearly twice their usual size, going through a variety of odd motions, and piping in excited tones.¹

¹ In this bird, with no external trace of a hallux, the accessory metatarsal is present, without, however, bearing even a rudimentary phalanx, and without causing any protuberance of the metatarsal envelope. It is a small oval or somewhat reniform ossicle; slightly twisted on itself, and deeply sulcate along the middle, lying in the fossa between the three prongs of the metatarsus, where it is ligamentously bound down. It lacks the usual roughened surface of opposition with the principal bone. Independently of morphology. 1871.]

Symphemia semipalmata.

Resident, but less common during the colder months; very abundant at other times, and one of the few waders that regularly breed here. Numbers arrive from the south in March and April; a part of them proceed further north, and the rest, in May, scatter over the marshes to breed. In August the ranks are again recruited by the numbers hatched here, and in September by others returning. The large size, variegated color, and restless, noisy disposition combine to render it one of the most notable birds of the vicinity in summer.

*Gambetta melanoleuca.**Gambetta flavipes.*

Both common during the migration—the first named the more abundant.

Rhyacophilus solitarius.

Only observed in April and May, and September and October, and not abundant.

Tringoides macularius.

Summer resident, arriving late in March, becoming very abundant in April, and the greater number passing north in May; but the young are common in July.

Limosa fedoa.

Abundant during the migrations, particularly in the fall. Possibly some may breed in the vicinity, but I am not sure of this. Some appear in August, many more in September, and they continue plentiful about the harbor until December.

Numenius longirostris.

Resident; abundant during the migrations, and rather common at other times. I observed it in February, and at irregular intervals through the summer, when it is sparingly dispersed over the marshes, in all probability breeding.

Immense flights of curlew sometimes occur in October and

gical considerations, its presence is not readily accounted for; but it seems to be a sort of trochlear ossicle, for the guidance if not the increased action of the flexor tendons. This bone, in a more or less rudimentary condition, may perhaps be discovered in more three-toed birds than are now believed to possess it.

[May 2,

March. Some flocks that I witnessed must have contained thousands of birds. These were not the species just named, but whether *hudsonicus* or *borealis* was not ascertained.

Recurvirostra americana.

I scarcely think that this is a regular, and it certainly is not, according to my observations, a common migrant here. The only time I identified it with certainty, was on the 12th of September, when a flock of six was seen.

Ardea herodias.

A resident species, common on the marshes at all seasons. This and the Bittern are the only species of the family that I observed in winter. I do not know that it breeds in the immediate vicinity, but such is probably the case.

Herodias egretta.

Only observed late in summer, and through autumn, when moderately common, and generally seen in small flocks.

Garzetta candidissima.

Apparently a summer resident, though not observed breeding. I first saw it early in May, when it appeared to be migrating, but individuals were obtained at various times during the summer. They were oftenest in flocks of considerable size. Old birds killed in July still had lengthened plumes on the head and breast, but the former were not recurved, and the dorsal ones were wanting. Except in these respects, the birds of the year were like the adults. They remain until October at least, and probably later.

Butorides virescens.

Summer resident, and very abundant, arriving late in March and early in April, and remaining until October. They breed in colonies with the jackdaws, placing the nests in the thick shrubbery that covers part of this end of the island. The nests are rather large and frail platforms of loosely interlaced twigs, built on dense beds of small branches, or saddled in a crotch, or swung like hammocks upon a mass of climbing vines. The birds begin to lay the second or third week in April, but some do not fill the nest until after the first of May. The complement is usually five or six; but I have found only four, and in one instance *seven*—the latter number probably being the maximum. The old birds
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shed their dorsal plumes during the period of incubation; the young, for some time after quitting the nest, show traces of down here and there, particularly about the head.

Botaurus lentiginosus.

I think that the Bittern will prove a resident species here, though I have only observed it from September to May. It is quite common in the fall; thus, I have shot two or three, and seen as many more in an afternoon's walk in October. Singular as it may seem, viewing the abundance of the bird, and its wide distribution over North America, a complete history has not yet appeared. The earlier accounts are defective, and not entirely accurate. Perhaps the best notice we have is Mr. Endicott's, in the *American Naturalist*, iii, p. 169.

***Rallus crepitans.* (= *R. longirostris*, Bodd.)**

This is probably the most abundant, and it is certainly one of the most characteristic birds of the locality. It should properly be classed among the resident species, although its numbers are greatly diminished during December to February, and it may entirely disappear in very cold weather. Its ranks are largely recruited in March, and little or no decrease is perceptible until November. It becomes very noisy in April, and the marshes resound with its harsh cries until the next autumn. The laying season is at its height during the latter part of April, and through a portion of May; but eggs may be procured nearly all summer. A full account of its nidification, with other particulars, will be found in the *American Naturalist*, iii, p. 600. I have nothing to add to what is there given, but I would now increase the number stated as an average nest-complement of eggs, to nine or ten. The largest number found in a nest was twelve, although there is no certainty, in such a case as this, that all were deposited by the same bird.¹

¹ Embryos about one-half developed, taken May 14, afforded the following tracts of the downy plumage. Pteryla capitis continuous, though weak, and running uninterrupted into prolongation of both spinal and ventral. The strong pt. spinalis commences as a single band on the median line over the coccyx, divides after passing the pelvis into two slightly divaricating bands, that approach but do not join on the cervix, and run uninterrupted to the nape—inclosing a narrowly lanceolate space on the back, and a linear one on the hind neck; but this is very narrow, and would probably

[May 2,

Porzana carolina.

During the migration only, in April, May, and part of August to October; then common.

P. noveboracensis.

One individual observed April 12th, under circumstances that left no doubt of the identification.

The numbers of wild-fowl that throng the sinuosities of the coast in winter are simply incalculable. Immense flocks cover the waters of the harbor; and yet these are said to be inconsiderable compared with those upon the land-bound reaches of water a little removed from the coast. Aside from the natural conditions determining this influx of the Anatidæ, such as congenial latitude, convenient feeding-grounds, and an abundant supply of food, we may attribute a part of the number of water-fowl to the incessant and systematic persecution they suffer somewhat further north. Here they are comparatively free from annoyance, their destruction not being attempted methodically, nor usually with any considerable degree of skill. A few of the species appear in the early fall, but the great flight does not fairly set in until the cold weather of November. The numbers are full the following month, and continue undiminished through the winter. The decrease is

disappear soon, by fusion of the two branches on the upper half of the neck behind. The pt. humeralis is completely isolated by apteriæ from surrounding tracts; it is short but wide and strong, and lies parallel with the spinal. The pt. femoralis is doubled; an inner and outer row of feathers are entirely separate, and both of them are strong. The under or upper band arises over the extremity of the pelvis, and runs with slight obliquity to the front of the knee; the outer arises from the side of the coccyx, and runs parallel with the other along the lower edge of the outer aspect of the thigh to the crus; it is there almost continuous with the ventral tract, and is but slightly separated at its origin from the caudalis; but is as widely separated from the other femoral tract as this last is from the spinal. The pt. cruris is as yet only indicated by a few sparsely distributed follicles, with the feathers beginning to protrude along the anterior and posterior borders; the pt. alaris is in the same condition, and the caudalis but little more advanced. The ventral pteryla is double throughout; its branches are separated from each other on the neck, by as much space as they are from the spinal tract; and rather abruptly divaricate on the breast, inclosing a broad oval space, finally approaching gradually as they pass backward. The anal circle of feathers is just perceptible, but that around the oil-gland is not visible.

1871.]

very great in March, and few are found later. I do not know that more than one species is resident.

Bernicla canadensis.

A few geese may come in October, but they are not plenty for a month subsequently. Some are to be seen in April, but the greater number depart in March. I think that occasionally a pair may remain to breed in the vicinity, as I have seen a brood in domestication, said to have been raised from the egg; a statement that bears weight from the impossibility of procuring young birds in any other way. But such instances are doubtless exceptional. Geese may be procured, in season, for a dollar, or even less, apiece; a fact of itself attesting their abundance.

Bernicla brenta.

Common in winter, and seen until April 6. This and the last were the only geese observed; nor did I ever hear the gunners allude to any white ones, though I should judge that *A. hyperboreus* would also occur in winter.

Anas boschas.

Very common.

Anas obscura.

Common.

Dafla acuta.

Common. Among the earlier October arrivals.

Chaulelasmus streperus.

Common.

Mareca americana.

Common.

Querquedula discors.

Nettion carolinensis.

Both teals are very common, and are among the first to arrive, and the last to leave; flights occurring in September, and sometimes even in August.

Aix sponsa.

Resident; abundant; breeds on the island.

The Anatinae, as a group, are outnumbered in the harbor by the Fuligininae, and none of them are so numerous as some of the sea-ducks. The reverse is said to be the case on the inland waters.

[May 2,

Bucephala americana. (= *B. clangula*?)

Bucephala albeola.

Fulix marila.

Fulix affinis.

Aythya americana.

Of these the two last named are apparently the most abundant. The canvas-back I have never seen here.

Oedemia perspicillata.

Very common. Early in November, 1870, before the complement of general wild-fowl was made up, these were perhaps the most abundant ducks on the harbor, mixed with a number of the next species. By far the larger proportion were females and young. The young males at this season almost exactly resemble the females; having the two whitish spots on each side of the head, and bill wholly black, the place of the future black spot in the bill being indicated by a slight corrugation of the skin. But they are generally distinguishable by the presence of a few perfectly black feathers about the head, and by the rather more turgid bill.

Oedemia americana.

Common. The female and young are distinguished from those of the last by the different number of tail-feathers, different shape of bill, and the continuously whitish sides of the head; otherwise the resemblance is very close. Both are known as "black ducks," and by a probable further confounding with *A. obscura*, are pronounced good eating by those who do not intend to eat them.

Mergus serrator.

Very abundant. I should judge this to be the most numerous of all the family in this vicinity. They are always on the harbor from October to April, and a few both earlier and later; and are not much molested, being unacceptable even to not over-fastidious people. The distribution of their colors, showing large pure white areas, marks them out at any distance; the *Bucephalæ* being the only ducks to which they bear any special resemblance.

Pelecanus fuscus.

A few observed at irregular intervals through the summer months.

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Sula bassana.

Several were seen during foul weather, in February and March, both years; but the species is not a common, if indeed a regular, winter visitor.

Graculus floridanus.

Cormorants may be seen at intervals the whole year, and are common except during the warmer months. There are two species; but I did not succeed in ascertaining their times of arrival and departure. The summer birds are all, without doubt, the *G. floridanus*, to which species a full-plumaged specimen, captured in the spring of 1869, belonged; and the winter ones are in all probability

Graculus dilophus.

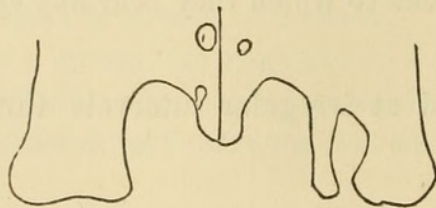
Very common in winter. Judging from the light brown appearance of most individuals observed at this season, they were chiefly young birds.

Puffinus fuliginosus.

A specimen taken May 21, 1870, in fine plumage, but injured in one of the webs; this disability probably accounting for its exceptional occurrence. It was caught by hand near the shore, and kept alive for some time. Placed on a level surface, it could with difficulty stand upright, and on endeavoring to walk, sprawled with the use of its wings and by hooking itself along with the sharp point of the bill—not, however, grasping with both mandibles. I was before ignorant of this method of assisting locomotion on land, but can readily believe it to be a habit of birds of this family, and a means of approaching and leaving the places where many of the petrels are known to breed. The bird showed some spirit, snapping with all its strength; but was perfectly silent.¹

¹ Length 18, extent 40, wing 12, tail 4, bill $1\frac{3}{4}$, tarsus $2\frac{1}{4}$, middle toe and claw $2\frac{2}{3}$.

Some points in the coloration of this specimen might lead one to suppose it to be a state of *P. major*. The accompanying cut (of natural size) shows a great irregularity in the contour of the posterior border of the sternum.



[May 2,

Larus smithsonianus.

Winter resident; very abundant; the characteristic and only common bird of the family throughout that season. I have been repeatedly assured that some of the "sea-gulls," as this species is called in distinction from the smaller kinds, remain all summer, but have never seen any at that season, and doubt the statement, except perhaps in its application to diseased or otherwise disabled individuals. Some, however, certainly linger longer in spring than would have been anticipated, being seen almost until June. There is little falling off in their numbers in March; but most of them pass northward early in April, about the time that the Terns and *Chræcocephali* make their appearance. A few arrive in September, but they are not plentiful until the latter part of October. In consequence of being rarely molested, they become quite familiar, often mixing with the tame geese about the fort, and permitting themselves to be approached within a few feet; still, as a rule, they show that they have an excellent idea of gunshot range. Three styles of these gulls are easily distinguished. The birds of the year are smoky-brown (becoming grayer towards spring), and differ in this respect from the young of any other species occurring here. The birds hatched the previous summer but one are pale grayish, with the blue of the mantle showing in irregular patches, the primaries wholly black, and the rectrices either the same or white with a terminal black bar. The birds in their third year are in perfect plumage, but show the dusky streaking of the head and hind neck characteristic of the winter plumage. The bills of the birds of the first class are black; of the second, flesh-color, black-tipped; of the third, yellow, with or without the orange spot at the angle of the gonys. Most of the old birds regain their nuptial dress before leaving. They are rather silent during the winter, being rarely heard except when quarrelling for food; but in April, before they move off, the air resounds with their hoarse cries. Among the substances found in the stomach were the remains of a marsh-hare, though I hardly think that the animal could have been captured alive.

L. delawarensis.

Spring and fall; common, and *probably* also a winter resident, although I did not identify it at that season.¹

¹ In winter the head and hind neck of this species are definitely *spotted* with blackish. In the case of the last species, and of, probably, the whole 1871.]

Chrococephalus atricilla.

Extremely abundant, in spring and fall. They appear the last of March or early in April, and become plentiful during the latter month. They remain so late, and are absent so short a time during the summer, that I think some breed near by, though I found none actually nesting in the vicinity. Probably only two years, instead of three, as in the case of the larger *Lari*, are required for them to assume the perfect plumage. The majority of the spring birds are in full attire, but among them a large number of the conspicuously brown birds of the preceding year are always seen. A few return in August, many more in September, and by the last of this month their number defies computation. It is no exaggeration to say that I have seen a thousand rise at the same moment from a single sand-bar where they were resting and pluming themselves after feeding. They fish in companies often of numbers but little inferior, following the shoals of small fry about the harbor, continually descending upon them, and rising on wing again after a moment's half-submergence. At such times they are in pursuit of the small fish that form the principal food of the blue-fish, and their presence is an unfailing guide. At this season the brown birds greatly outnumber the others. The adults are mostly moulting when they return, and retain traces of the spring plumage—seen in a slight glow of the under plumage, carmine tint in the dusky of the bill, red mouth, and slate about the head—at least until October, when the renewal is completed. The young of the year are quite definitely brown, etc., and bear little resemblance to the parents; but they may always be distinguished from any other gull by the length of the tarsus in comparison with the toes, and by the downward curvature of the end of the bill, which is sufficient to bring the tip nearly on a level with the angle at the symphysis. The birds thin

race of "herring-gulls," as *argentatus*, *occidentalis*, etc., the same parts are streaked with lighter dusky. In the gulls without black on the primaries, as *glaucus*, *glaucescens*, *leucopterus*, etc., this winter marking takes the form of obscure clouding with grayish. These distinctions hold good with all the species of the family with which I am acquainted, and, moreover, the darkness of the plumage of the young of the year, in all, is correspondingly graduated from smoky-brown to pale gray. Similarly, the primaries and tail-feathers of the "white-winged" gulls above mentioned are, for the first year, gray like the general plumage; while those of the others (including *marinus*) are black.

[May 2,

off in November, and few are seen after this month. I am not sure that *any* remain all winter.

Chræcocephalus philadelphia.

Extremely abundant, but only in spring and fall, being strictly migrants here. They appear about the first week in April with the last species, generally remain through most of May, and return in September, remaining until the end of November. But this general statement may be somewhat qualified in detail by some observations that have interesting bearing, unless I wrongly interpret them. In 1869, from the beginning of April until the 22d, the birds were here in great numbers, and with a marked preponderance of old full-plumaged individuals. Without any change in the weather, or other assignable cause, they suddenly disappeared, presumably having moved northward. For a week or ten days scarcely one was to be seen; when they became more numerous, if possible, than before, and so continued through the greater part of May. This last lot was almost entirely composed of birds of the previous year, as shown by the plumage, there being hardly a black-headed one among them. I should judge, therefore, that the old birds migrate in advance of the young, and also that they move the more hurriedly of the two. It is probable, moreover, that only these adults were going to breed that year, although it is pretty certain that some gulls, at least, reproduce before gaining their perfect plumage. In the fall few black-headed ones are ever seen, the hood being lost before they reach this latitude; but even at this season the old and young are readily distinguished by other marks. Many return in September, and then the earliest ones to come are the young. I verified the same general observations through four migrations that I witnessed. This year (1870) there were few—almost no—birds in part of October, after the September young appeared to have passed on; but as I write (Nov. 18) the harbor is covered with thousands of old ones in their winter dress. They appear at a little distance almost pure white, and are beautifully conspicuous among the other gulls and the terns with which they associate.

Audubon is certainly mistaken in representing the female of this species with a brown hood. The sexes are not distinguishable by any outward marks. If there is a United States gull with the head of the color shown in the plate just alluded to, it must
1871.]

belong to a species that has escaped the notice of later ornithologists.¹

Thalasseus regius.

This tern certainly breeds somewhere in the vicinity; for, although I did not find any nests, I saw it constantly through two summers, and occasionally noticed birds so young that they were still receiving attentions from their parents; while in June and July small flocks were often noticed pursuing so straight a course for long distances, that I had no doubt they were passing directly between their nests and their feeding-places. It commonly arrives from the south early in April, and through this and the next month is more abundant than at other times until the fall—a part, I presume, passing further north. It becomes numerous again in September, and so continues until the end of November. I cannot say whether or not any remain all winter, but think that, if observed at that season, it will be an exceptional case. It is more wary than any of the other terns, and is always the first to rise among the miscellaneous troops that flock the sand-bars. It is conspicuous by its size and bright red bill; and the young are easily distinguished by the smaller size, yellow instead of red bill, and spotted plumage. The old birds lose the black pileum in September, the crown then becoming white, bordered behind by the long, loose blackish feathers of the occiput, and a few other dark ones on the sides of the head. The bill in winter is not so vivid in color as in summer, and much shorter. All the changes of the old are finished by October; but the young remain blotched, and with mere traces of the pearl-blue mantle, all the fall. I took one old bird with the feet curiously mottled with yellowish and black, and yellow claws—probably a pathological state, although the bird appeared perfectly healthy. These are vigorous, spirited birds, showing good fight when captured, and strong enough to bite pretty severely. Their voice is loud and raucous, though still without the deep guttural intonation of that of the shear-waters.

Thalasseus acuflavidus.

Chiefly a migrant, but also a winter resident, sparingly; none observed to pass the summer here. It becomes numerous early in April, with the last, and remains through part of May; returns

¹ Qu. *Larus capistratus* of Bonaparte's Synopsis.

[May 9,

in September (a few probably somewhat earlier), and is very common until December. A large number shot in the middle of September were in the same condition of plumage as *T. regius* was at the same time. The species may be marked out among its allies by its size, its singularly trim shape, conspicuously black, *long* bill, yellow-pointed, and a general *whiteness*; the mantle being paler than in any of the others. Specimens, even in the fall, frequently show a rosy blush of the under plumage, much like that generally supposed to characterize *T. elegans* of the California coast.

The difference in the pattern of the coloration of the primaries of this bird, that was noted in my "Review" as separating the species (or whatever it is to be considered) from the European *T. cantiacus*, has not failed in a single instance that has come to my knowledge. No reliance, however, can be placed upon the yellow tip of the bill as a character; this varies from *nothing* (in immature specimens) up to a third, or nearly, of the total length of the bill, and no two specimens show exactly the same line of demarcation between the yellow and the black. Specimens, as usual in this family, differ much in size, and particularly in the length and stoutness of the bill. The feet are always black, as in *T. regius*.

Sterna hirundo.

Very common, but only during the migration. Arriving from the south early in April, they all pass on during the following month. They are abundant again in September and October, perhaps a little earlier and later, but I identified none except during these months. In the spring they are scarcely to be told with certainty, unless shot; but in the fall they are conspicuous by the fact that they retain the black pileum, at least as long as they remain here. It has been stated, upon eminent authority, that this species never loses the black on the head; and, although I do not confirm this from examination of specimens taken in the depth of winter, my observations until the end of October support it, and I do not remember to have seen in any museum a Wilson's tern without the feature in question. Numbers shot here in September had completed the winter plumage, and were newly feathered, except on the crown, where the black looked worn and faded, but was still unmixed with white, except a few specks on the extreme front. I presume that the change on this part of

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the body is very gradual. At this season the feet were simply orange-yellow, not vermilion, and the bill was dusky-shaded throughout. Some of the year's young had nearly perfect wing and tail feathers; but the mantle showed dusky mottling, with some blackish areas upon the wing-coverts; while younger still were marbled and otherwise beautifully variegated with gray, light brown, &c. In all the young, the feet were yellowish, more or less obscured; and the bill mostly black, with yellow or orange on the basal part of the under mandible; it was smaller than that of the old, not so horny, and more obtuse.

Sterna Forsteri.

Chiefly migrant, but also winter resident. Compared with the last, there is, I think, a difference in the migrations, &c., something like that I have endeavored to show in the case of the *Ammodromi*, this being the more northerly species of the two, migrating earlier in the spring and later in the fall, and wintering where *S. Wilsoni* does not; of the breeding I can say nothing from personal observation. A few Forster's terns come back in August; they become abundant the following month, and there is little or no decrease of their numbers until December, when a part go further south, to return the latter part of March, and the rest remain. It is one of the most plentiful terns on the harbor in October and November, when it may be distinguished at any reasonable distance with ease; Wilson's tern being the only one at all resembling it, and this being marked in the manner just indicated. Forster's at this season has the crown white, the occiput blackish, and a remarkably distinct black transocular fascia, better marked than in any other species of ours. In this plumage it is unquestionably *S. havelli*, Aud., as I pointed out some years since. The bill is nearly as in summer, but not so bright; the feet are orange instead of red. This plumage was finished in all of a number of old birds shot the second week in September. The young of the year can also be distinguished from the young of *hirundo* at ordinary gunshot range. The whole head is white, faintly washed with brownish, except the transocular fascia, which is pure black, and very sharply defined; but nearly all the feathers of the crown have dusky bases, that will increase during the fall and coming winter, until the condition above noticed is attained. The eye-stripe is $1\frac{1}{3}$ inch long and about $\frac{1}{2}$ an inch wide, reaching from the lores

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through the eyes to and over the auriculars. The blue mantle only partly appears at this time, being lightly washed over with gray and clear brown; the rectrices are heavily dusky, as in *hirundo* at the same season, but the dark color is on opposite webs in the two species. The wing-feathers are new and perfect, and more hoary-silvery than those of *hirundo* of the same age; but the pattern of coloration is exactly duplicated. The feet are yellow, more or less obscured with dusky.

Sterna antillarum.

Summer resident, from early in April until October; and, except at the height of the influx of the other kinds, the most abundant tern of all. It breeds here in great numbers. Referring again to an article in the American Naturalist for September, 1869, for an account of its nidification, I have only to add here—

A tern shot May 17, had then an egg ready to be laid; but most of the eggs are deposited towards June, and during the fore part of that month. The first young birds I noticed were flying June 20th; but this was early for them, the broods not being fairly on wing until the middle of July. During all of May and June, indeed, there are plenty of immature birds about; but these, it should be observed, are of the last summer's broods, rendering the conclusion obvious that at least two years are required to assume the perfect dress. These birds have the bill black, no black cap or white crescent, slaty auriculars and occiput, dark bar along the front edge of the wing, imperfectly colored primaries, and slightly forked tail; thus not possibly to be confounded with birds of the season, which are curiously variegated with gray-brown, and white, and show no pearly blue. The yearlings were in plenty with the adults at the breeding-grounds; but whether or not they were paired and had eggs too, was plainly impossible to determine, as terns' eggs are almost never identified as to the exact parent, when numbers of the birds are breeding together. The usual number of eggs, I may repeat, is two, not three, and often only one is laid; they do not average over $1\frac{1}{4} \times 1$ inch. The black tip of the bill of this species varies from *nothing* to a fourth of the length of the bill. The distinctions between the species and *S. minuta* are constant and perfectly satisfactory.

Hydrochelidon fissipes.

Migrant only; very abundant. This tern differs somewhat from the rest, in its times of migrating and other particulars. It is not very common, comparatively, in spring, and passes north swiftly and silently. The first spring I saw none until May 15th, and had begun to think that I had missed them, or that they were migrating inland, when they became plenty, but only for a week or ten days. All that I saw were in perfect spring dress. They return in the van of all the terns, about the second week in August, when many are still black, but by far the greater number in the plumage of the young. They remain until October—not later, I think—and during September are as common as any of the others. Although they flock with the rest over the harbor, and on its sand-bars, they also frequent the marsh, where they flutter about for hours, busy catching insects—chiefly grasshoppers, I think—in a manner that reminds one of night-hawks similarly engaged; and, in fact, the two birds are frequently associated together at such times.

Haliplana fuliginosa.

Concerning this species I can offer nothing beyond the record of the appearance of a flock *March* 16, 1869, during a southwest gale. I have seen none since, and can as little account for this as for their isolated appearance on that occasion. If, as is most probable, the gull-billed, arctic and roseate terns pass this point, they escaped me altogether.

Rhynchops nigra.

These birds I have only noticed late in the summer, and during the autumn, though I presume that they pass by in the spring; none breed here, to my knowledge. In September they become plentiful, and so continue until the latter part of November, some doubtless remaining later. In examining large numbers of specimens, I find a great difference in size, and particularly in the bill. Some individuals are fully a third heavier than others. The bill varies over an inch in length, and especially in the length of the under mandible. Sometimes the difference between the two mandibles is hardly a third of an inch; at others, over an inch. The oblique striæ on the under one are sometimes obsolete. In high condition, the bill is bright red (vermilion) and black; otherwise, orange and black, or even mostly dusky, only yellowish at base.
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The young in the fall are curiously variegated with dusky and whitish above—few specimens being exactly alike. The note of this species is instantly distinguished from that of any of our other species of this family by its deep guttural intonation, more like the croaking of some herons than the cries of the gulls and terns. The bird also differs from its allies in going in true flocks, as distinguished from the gatherings, however large, in community of interest, that occur with the gulls and terns. The birds move synchronously, which is not the case with any of the others. They feed chiefly by night, or at any rate in the dusk of evening, at which time, in passing over the harbor, one may hear their hoarse notes on every hand, and see the birds gliding swiftly along just over the water, either singly or in small flocks. During the day-time, when the gulls and terns are busy fishing, the skimmers are generally seen reposing on the sand-bars, and they never drop on their prey like their allies. Their mode of feeding is not exactly made out, but it is believed they skim over the surface with the body inclined downward, the bill open, and the under mandible in the water, so that they really take their prey in a manner analogous to the feeding of whales.

Colymbus torquatus.

Abundant winter resident, from the latter part of September until May. The greater part, however, do not arrive until some time in October, and a few linger through a portion of May. I took one full-plumaged bird alive in the latter part of June; but it had evidently been prevented from migrating by sickness, and died shortly afterward.

Podiceps cristatus.

Occasional, in winter. (Specimen, January 29, 1870.)

Podilymbus podiceps.

Frequent, in winter.

III. REPTILES.

I am indebted to my friend Mr. J. A. Allen, of Cambridge, Mass., for identification of some of the specimens.

SAURIA.

Cnemidophorus sexlineatus, D. & B.

Very abundant on the islands and sandy parts of the adjoining mainland. They appear usually early in April, and may be 1871.]

found until cold weather in October. In spite of their remarkable agility, they are one of the animals oftenest found in the stomach of the larger snakes.

Alligator mississippiensis.

Of common and regular occurrence in the swamps of the adjoining land, and *said* also to occur in the woody, marshy part of the island.

Ophisaurus ventralis, Daud.

One of the most abundant and characteristic reptiles of the island. The first examples noticed each year were taken the third week in March, and this is probably the usual time of their appearance. Like the smaller lizard, they are out until the cold weather of October. They avoid the wetter parts of the island, and are especially numerous in open grassy places, as about the fort, where they may be almost daily taken during the summer. They appear rather inactive, if not sluggish, make little or no resistance when captured, and readily become tame. With an average length of a foot and a half, specimens were taken ranging from a few inches to nearly a yard; and the tints vary greatly, the variation being apparently a matter of individual peculiarity.

OPHIDIA.

Caudisoma horrida (Linn.), Cope, Pr. A. N. S. Philada. 1859, 338, and Smiths. Cont., Jan. 1861, 122.

Common in the vicinity, and certainly occurring on the islands as well, though not obtained there. One specimen measured upwards of five feet in length.

Ancistrodon contortrix, B. & G.

Common, chiefly in low, moist places.

Nerodia sipedon, B. & G.

Rather uncommon here, according to my observations. One specimen was taken in the open sea, swimming among the breakers.

Ophibolus getulus, B. & G.

Common. Females with eggs taken in July. One specimen, nearly 6 feet long, presented a different pattern of coloration from that usually seen; one set of branches of the series of bifurcations of the yellow lines being defective, giving the snake the appear-

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Coues, Elliott. 1871. "Notes on the natural history of Fort Macon, N.C., and vicinity. (No.1)." *Proceedings of the Academy of Natural Sciences of Philadelphia* 1871, 12–48.

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