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THE OTTAWA NATURALIST.

VOL. XIX.

OTTAWA, OCTOBER, 1905.

No. 7

THE HAIR-EEL (*GORDIUS AQUATICUS*, L.).

By PROF. EDWARD E. PRINCE, Dominion Commissioner of Fisheries, Ottawa.

Most people are familiar with the story according to which horse-hairs soaked sufficiently long in a pond or stream will be transformed into eels. I have seen a small book, published in Scotland 50 or 60 years ago, by an intelligent Forfarshire gardener, which, to the apparent satisfaction of its author, proved the vulgar belief to be true. Like most vulgar fallacies, this belief has some apparent foundation to rest upon. The elastic, hard, thread-like body of the Hair-eel (*Gordius aquaticus*) so resembles a brown or black hair from the tail of a horse that the origin of the popular error is easily explained. The further circumstance that ponds and other waters, in which hair-eels were never seen before, suddenly become peopled with these creatures, and that eels also appear unexpectedly in the most out-of-the-way localities, added strength to the theory, especially as the origin of the fish was a matter of dispute amongst naturalists. The sudden appearance of hair-eels was readily explained by the alleged transformation of horse-hairs; and the presence of eels was no mystery if they were simply developed from horse-hairs.

When a boy, I remember well discovering, to my surprise, specimens of *Gordius aquaticus* in the basin of a moss-grown spring by a Yorkshire (England) roadside. This clear, sparkling spring, as a rule, contained no visible signs of aquatic animals, and the appearance of the writhing, active hair-eel seemed difficult to understand.

A few weeks ago, during a short holiday at Fort William, P. Q., on the Ottawa River, about 120 miles above the Capital, I noticed examples in a pond about a mile from the Fort. A week later in a sand-pool, 6 or 8 inches across, which had been dug by some children the evening before, I obtained a specimen. In this newly excavated pool, only an inch or two deep, and thirty or forty yards from the Hotel Pontiac, the hair-eel appeared actively undulating and twisting about in characteristic fashion. Grenacher's paper "Zur Anatomie der Gattung Gordius" happened to be in my hands at the time, and I resumed the study of this curious creature after the lapse of many years.

Villot's monograph ("Monographie des Dragonneaux"), in which a detailed account of *Gordius* is given, had also been recently consulted by me.

My specimen was almost exactly 12 inches in length and a little over $\frac{1}{5}$ of an inch in thickness. Its smooth hard hair-like body, without distinctive head, and its uncanny contortions, suggested, at once, an animated horse-hair. It was engaged unceasingly in winding itself into endless gracefully curved knots, and as constantly unwinding itself. The Gordian knot of classical tradition was not more tortuously twisted, and the generic name *Gordius* seems very appropriate.

Observations have shown that these creatures will survive if removed from water and dried. Doubt has been cast on the somewhat venerable story that the Abbé Fontana kept a hair-eel in a drawer for three years, and that at the end of that time it was dry and hard, and exhibited no sign of life; but, on putting it into water, it very soon recovered its former vigorous activity. On the authority of the distinguished Professor Alexander Macalister, this traditional story is confirmed. "They are remarkable," he says, "for their tenacity of life, as they can be dried into hard, brittle threads, and yet appear lively and active on being moistened." Some author, whose name I cannot just now recall, tells of a museum curator who observed a hair-eel emerge from the body of a beetle which had long been killed, dried, and put away in a cabinet.

The usual colour of *Gordius* is black or dark brown, some are of a pale shade; but my specimen is of a very deep brownish black colour for the posterior $4\frac{1}{2}$ inches of its length, while for about $\frac{7}{8}$ ths of its length, from the head, it is yellowish or olivaceous-brown. The attenuated head end is very pale in colour. The hind portion of the body is thicker than the anterior part. I notice that Grenacher describes a reverse coloration in specimens from the Philippine Islands, the head end being dark, while the hind portion of the body is a lighter shade of blackish-brown. *Mermis acuminata*, Leidy, a species of the genus *Mermidæ*, allied to the *Gordiidæ*, is of a pale brown colour.

From what has been said, it is clear that the Hair-eels are widely distributed on this continent and in Europe, while Grenacher's studies were largely based on specimens brought by Carl Semper from the Philippines.

The zoological position and the details of their anatomy and structure have been matters about which high authorities have seriously disagreed. Grenacher refers at some length to the contradictory views held. As he states, one author describes a mouth-opening, others deny its existence; one states that the digestive canal is obsolete in the adult, another gives a detailed account of its various parts; one found a pair of secreting organs, others regard them as alimentary pores. The great Carl Gegenbaur speaks of an enteron or alimentary tube in the entoparasitic larva of *Gordius*, but declares that it so degenerates that the mouth disappears, the ingestion of food ceases, and the adult relies upon the store of food taken in during its earlier life as a parasite. In my specimen a mouth is certainly present, though there can be no ground for the statement of Captain Thomas Brown that "its bite, sometimes, inflicted on being taken out of the water, has been known to produce the complaint called whitlow." The further statement that Linnæus recorded it as a popular opinion in Sweden, and that the fact has since been confirmed by various other persons, may be passed over. The mouth of *Gordius* is too small and feeble to inflict a bite: it is a simple minute pore.

Though *Gordius* has no jaws and not the slightest traces of biting or masticating organs, the round mouth-opening can be very distinctly seen in my specimen, when viewed in full face,—a small circular pore, like a black spot in the centre of the finger-like anterior tip. It is not situated towards the ventral side as in Grenacher's Philippine specimens, in which the head-end is very obtuse and bluntly flattened terminally. The lumen or chamber of the gullet, viewed from the dorsum, appears as a hair-like tube in optical section and is surrounded by a pale fibrous matrix, with striations passing forwards, the tissue becoming denser immediately posterior to this lighter anterior area. Microscopic sections show the gullet to be a minute tube with a simple epithelial wall. The body becomes gradually thicker posteriorly, and the tail end in the male *Gordius aquaticus* is split, the two halves separating like two cotyledons with an internal rounded projection between them. In *Gordius varius*, according to Kingsley's drawing, given by Packard, the terminal cleft is trifid and much more marked than in other species. *Gordius ornatus*, according to Grenacher (and shewn in his fig. 1. Taf. xxiii), exhibits a simple blunt termination with a centrally situated cloacal aperture. My specimen is apparently a female; yet the posterior end shows a slight indication of bifidity, a central depression being discernible: but no terminal aperture can be made out.

There are no traces of eyes or other sense organs; nor have glands, a water-vascular system, or definite nerve structures been determined beyond question in our common species. The various species differ greatly in the details of their anatomical features. Thus, in *Gordius aquaticus* the external cuticle, save for a few corrugations near the head end, is smooth. As the creature curls about, irregular creases, usually transverse, appear: but in *Gordius ornatus* remarkable protruding sense-organs are described by Grenacher. These structures have the character of cuticular mounds, and when highly magnified, are seen to consist of a bundle of stout threads, projecting like tendrils with a circle of papillæ around them. The tail region in *Gordius aquaticus* is

studded with small rounded papillæ. Beneath the outer cuticle is an inner cuticular layer, underneath which is a thinner stratum composed of a granular matrix containing a few nuclei. This stratum sends up through the next layer, to be described later, a thin perpendicular lamella, which expands into a thickened rod or cylinder lying longitudinally upon the muscle layer. It may be likened to the hypoderm ridges projecting inwards from the subcutaneous layer in the Nematode *Ascaris*. *Ascaris* possesses four such internal ridges, dorsal, ventral and two lateral, these last being pierced by a minute canal, probably excretory in nature. If this comparison be justified, the ventral ridge (Grenacher's "Bauchstrang") is the sole representative of the hypoderm ridges in *Ascaris*. A thick muscular layer lies internal to the cuticular and granular layers mentioned. Its greatest thickness is midway along the body, and it is of a most interesting character. The fibres are flattened and longitudinal: but in transverse vertical section the cut ends look like radial fibres converging upon the internal organs. They are really large muscle cells, naked and pressed against each other, and are the simplest form of muscular tissue known, if we except the neuro-muscle cells in the Cœlenterates, or the peculiar transition cells in *Ascaris*. Each fibre exhibits a slight cavity which is much reduced, owing to their mutual pressure and flattened form. To this thick layer of muscle cells *Gordius* owes its marvellous power of contortion, of tying itself up in complex knots, and ceaselessly untying them.

Inside the muscle layer is the perienteric tissue, composed of irregular nucleated cells and fibrous intercellular tissue. In the midst of this tissue the central digestive tube passes, and on each side of the tube the genital glands lie. The latter, as long ovaries and cylindrical testes, pass backward and finally unite with a large terminal chamber, above which lies, in the female *Gordius*, the *receptaculum seminis*. When the ova are nearly mature, the ovaries become greatly expanded, and along the inner margin of each of these organs, passes an efferent canal, called the egg sac in the female, which further back becomes a slightly convoluted oviduct, or *vas deferens*, according to

the sex. Both these tubes end in a spacious atrium in the centre of the body. The digestive canal posteriorly is so pressed upon by these large viscera that it becomes reduced to a mere slit in the walls of the atrium. Villot states that the atrium or cloaca is capable of protrusion externally, and Grenacher found also, in *Gordius ornatus* a well-defined cloacal aperture, but Vejdovsky failed to discover it, or to make out the testes and *vasa deferentia*.

No doubt the main function of the adult *Gordius* is the production of eggs, and the perpetuation of the species, as the digestive organs are of limited capacity and appear to end blindly in the wall of the atrium. The modes adopted for dispersal are most remarkable. Adult Hair-eels have been taken from the bodies of water-beetles when flying from one pond to another by night, the serpentine creature being, it is stated, coiled around the abdomen under the wings and elytra, though Packard states that it actually penetrates into the body of beetles and locusts, twining round the intestines of its host, and finally emerging into free life, when the water is at last gained. It is difficult to understand how the adult *Gordius* can do this, and become for the time an entoparasite. The female, on reaching the water, deposits minute whitish pear-shaped eggs, attached in strings by a cement secreted in the atrium. A thick capsule and two or three thin internal layers protect the egg, which soon divides up into a group of rounded cells, like a thimble-berry; for one end becomes pushed in, converting the germ into a cup-shaped gastrula. Later the embryo elongates, becoming pyriform, and developing three rows of hooks in the gullet, and three sharp stylets at the apex of the body. With the last-named instruments it pierces the shell, and escapes into the water. The head is everted or can be drawn in like the finger of a glove. Villot describes a strong muscular band around the anterior half of the embryo, a protrusible proboscis, a gullet or throat-tube and a capacious intestine with a ventral pore a short distance in front of the acuminate posterior end of the body. As Packard points out, the larva is wholly unlike the adult, having "some resemblance to *Acanthocephalus* by its cephalic armature,

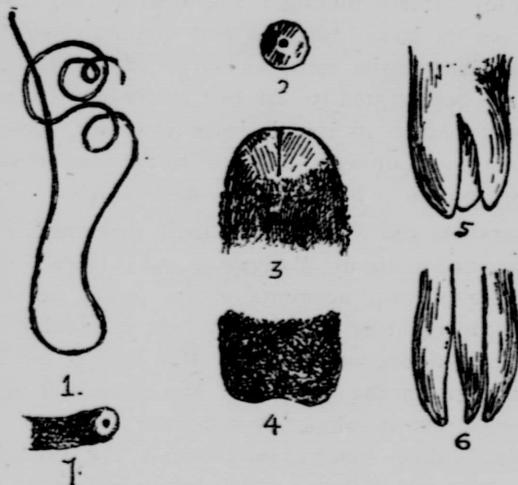
to the Nematoidea or thread worms by its alimentary canal, and in the nature of its secreting glands to the larva (Cercaria) of Trematodes." It enters the body of a water-snail, such as *Lymnæa* or *Planorbis*, but has also been found in the frog, fishes, aquatic insect larvæ, and in these it becomes encysted, or encased in a hard capsule. A second form of *Gordius* larva, more elongated and without head-armature, has been described in the body cavity, outside the intestine, of *Dytiscus*, the large water-beetle, *Carabus*, spiders, certain fishes and amphibians; and it was observed to move freely amongst the internal organs of its host. Later it loses its larval features and distinctively ento-parasitic habits, and takes on the form and free life of the adult. The larval life has been stated to last five or six months, at the end of which time it doubles its length, loses its spines, becomes swollen and soft: but on attaining a length of two inches the skin hardens, and the dark brown or black color is assumed.

If naturalists still disagree in their descriptions of the minute structure and anatomy of *Gordius*, and if there is some inconsistency in the existing accounts of its larval development and adult habits, it might be anticipated that its zoological position had been decided beyond dispute. But this is not so. It has been usual to group the Gordiidæ, Mermidæ, and Spherularidæ, in the order Gordiacea, alongside the order Nematoda, in the class Nematelmia; others place them amongst the thread-worms or Nematodes with which they agree in many important particulars; but other authorities remove them altogether, and regard them as aberrant, and not closely allied to the parasitic worms mentioned. The Nematode worms, it is true, are cylindrical animals, tapering towards each end, and never divided, like so many groups in the sub-kingdom Vermes, into segments or successive joints; and the Gordiidæ agree in this total absence of metamerism or segmentation: but in their minute structure they exhibit as many diverse features, as features of resemblance, and further study is necessary to establish the position and real character of the Hair-eels. Even their alleged survival after long periods of dessication needs

accurate corroboration, and this and other problems in the life of the Hair-eels offer subjects worthy of the attention of naturalists.

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EXPLANATION OF FIGURES.

1. *Gordius aquaticus*, natural size.
2. Head end of same, shewing centrally situated mouth. x 36.
3. Do. do. somewhat compressed under cover-glass, viewed from the dorsum. x 150.
4. Tail end of *Gordius aquaticus*, probably a female specimen, showing slight bifurcation. x 120.
5. Tail end of male *Gordius aquaticus* (from Packard).
6. Tail end of male *Gordius varius*, showing trifid termination (after Kingsley).
7. Tail end of *Gordius ornatus*, showing cloacal pore, enlarged from Grenacher's figure.

THE RED-BREASTED NUTHATCH

(Sitta canadensis).

By WM. H. MOORE, Scotch Lake, N. B.

Were our birds classified as are plants, according to their abilities to withstand the inclemency of our northern climate, the subject of the following sketch would rank as a hardy perennial among the avi-fauna of eastern Canada.

Although not a bird having a well-developed song as do some of our other winter birds, its voice is nevertheless well cultivated along certain lines. The ordinary notes sound like *yank* or *kngak*, and, when heard at some distance, are suggestive of loneliness. Then there are sweet twitterings uttered incessantly when the individuals of a family are foraging among tree tops. A noticeable flow of talk is poured forth as the mated birds are investigating and deciding upon a nesting site.

The search for the location of the nest apparently begins in the month of March. The yanking abilities are then taxed to a great extent, the birds being known to utter that call uninterruptedly for over a half minute. After the site is exactly decided upon, and work begun, the calling of the birds ceases to a great extent.

The nesting site is chosen in some decayed tree trunk, preferably that of a conifer, the second choice being the white or soft maple. The birds undoubtedly understand the method of decay in trees, as the above species of trees seem to decay most near the heart, and are more easily chipped out than trunks that are decayed upon the outside and sounder toward the centre. Thus, when the bark is pierced, the hardest of the mining is accomplished. Yet their work is often in vain, as they sometimes come upon knots in the wood; these they are unable to chip out, and they are obliged to choose a new site. In such instances, they evidently occupy a nest of a previous year, either one of their own species or that of a small woodpecker, as the female would be ready to lay the eggs before a new nest could be excavated. The length of time occupied in nest making is from two weeks to two months.

In one instance, when the birds located in a dead maple trunk set up for them within a few feet of our own house, the birds worked alternately at mining or excavating the hole in which the nest proper was placed. The length of time one would work varied from a few minutes to thirty. Then it would call a few times, and the mate would appear upon the scene and take a shift at the work. Toward the last of the mining operations the male performed that work and the female was busily engaged in collecting material for the nest. This consisted of fine shreds of cedar bark, other fibrous material, hair and a few small feathers, and the whole was well fitted together.

The excavation had been enlarged to satisfactory dimensions, which were as follows: entrance oval, one inch by one and one-eighth in diameter, leading inward an inch and one quarter on lower side, then downward six inches and enlarged to nearly four inches across for half the lower tunnel.

The next cavity measured about one and one-half inch in diameter and depth. All chinks and cracks within the excavation, if they lead to the outside, are tightly caulked with fibrous material of the same composition as the nest.

Before the female had completed the nest, the male began carrying fir balsam, from the trees surrounding their home, and besmeared an area about the entrance to the nest, fully four inches in diameter.

The Nuthatches we may consider our only birds which use artificial weapons for their protection. The entrance to the nests being always fortified by means of balsam, which seems to be applied for the purpose of keeping out the white-footed mouse, an omnivorous little rodent that would gladly avail himself of the opportunity of making a meal of the eggs or young birds, or drive away the old birds and use the nest for its own tenement.

The eggs of this species of Nuthatch are usually six in number, white, with brownish spots, chiefly near the large end. Some sets contain eggs nearly spherical in form.

The duty of incubation is performed by the female and covers a period of twelve days. The male occasionally feeds his mate during this period, adds more balsam about the entrance to the nest, and does general picket duty about home. When hatched, the

young are nude little creatures, having a very faint trace of down upon the feather tracts. At the end of a week the feathers are quite well grown, and the superciliary stripe begins to show. After the tenth day one of the young may often be seen looking out of the nest, but at the least disturbance retreats to lower quarters. At the age of two weeks the young leave the nest, and are led to pastures new; for suitable insects for their diet have been well garnered near home, and they must move to where their food is more plentiful.

Some months are devoted to the education of the young birds, who are shown where to look for food. It is interesting indeed to follow a family of these feathered mites, observe their movements and listen to their talk when they all alight in the top of some spruce or fir tree, and with much twittering search among the cones and twigs. Soon all are off to another tree, and the searching and jeering go on; many insects, caterpillars and eggs of various insects are taken. No doubt, many small seeds are also eaten. Toward autumn and throughout the winter the birds are often observed upon highways, searching among the excrements dropped by horses. One specimen in the writer's collection was struck by the foot of a passing horse and killed. When night comes on, a roosting place is chosen among thick grown conifers.

Thus the Red-breasted Nuthatches pass the time, and among their feathered companions are others of our hardy annual aves, such as the Black-capped and Hudsonian Chickadees, Golden-crowned Kinglet and Downy Woodpecker, the half-hardy Brown Creeper and semi-annual Ruby-crowned Kinglet.

The adults of the Red-breasted Nuthatch measure from four and one-half to four and three quarters inches in length. Of this the tail takes one and one-half inches and the bill one-half inch. The upper parts are leaden blue, brightest in the adult male, who has a black crown, with a white stripe over the eye, and a black stripe through the eye. The under parts are of various shades of brownish, being lightest in young birds and richest in adult males. The wings are fuscous with pale ashy edgings; the tail-feathers, except the middle pair, black, the lateral, marked with white.

GENERAL EXCURSION TO CHELSEA.

On Saturday afternoon, September 23rd, the third General Excursion of the season was held at Chelsea. The outing was fairly well attended, many of the Normal School students being present. The President, Dr. Sinclair, was in charge.

On arriving at Chelsea, most of the party went into the grove, and then down to the rapids. Here the water was very low. Large boulders and rocks usually covered, but now bare, formed an interesting study. The other division of the party, under the guidance of Dr. Ami, went up the railroad track, to examine geological conditions, and to see a cutting in which sea-shells were in great abundance. At 4.30 p.m. the party assembled in the beautiful grove contiguous to the railway station. Here short addresses were given by some of the leaders of the Club.

Mr. W. T. Macoun gave a practical talk on the identification of forest trees, showing specimens of the foliage of many kinds, which he had collected during the afternoon. Mr. Shutt drew attention to the fact that the unwise denudation of our forests, if continued, must eventually deprive Canada of one of her most valuable assets, viz. her magnificent water falls. The present reduced condition of the Chelsea rapids was pointed out as an object lesson illustrating this fact.

Dr. Ami gave a brief sketch of the geology of the district and showed some interesting specimens which he had collected. He mentioned that the oldest and the youngest, or newest, rocks which composed the earth's crust, were to be found at Chelsea in immediate contact.

Rev. Mr. Eifrig gave an interesting talk on the migration of birds, instancing in special the migrating habit of our beautiful robin. Mention was also made of many of the common birds of the district, and songs of some of the species were mimicked.

Mr. Halkett showed specimens of spiders, insects, etc. which he had captured during the afternoon, and gave interesting descriptions of some of these. A fine specimen of the large millipede, *Julus canadensis*, was exhibited.

Mr. Clark, the Secretary of the Club, spoke on some of the plants which he had seen during the afternoon, mentioning particularly some of the ferns to be found about Chelsea.

Mr. Cameron, of London, Ont., formerly of the Toronto Globe, in a few well chosen words congratulated the Club on the value and efficiency of its work.

A. G.

NATURE STUDY.—No. XXVIII.

A SHORT INTRODUCTION TO SOME OF OUR COMMON BIRDS.

SWALLOWS AND SWIFTS.

Rev. C. W. G. EIFRIG.

When a bird lover has solved the riddles that the identification of the members of the Finch, or Sparrow, family presents to him, of which Nature Study No. 25 treated, other birds also clamor for recognition at his hands. The Finches present themselves first and insistently for his consideration, on account of their greater abundance, variety, difficulty of separation and nearness to one's home. However, in small cities, along the outskirts of larger ones, and especially around country homes, there are certain birds just as plentiful at places, and then even more apparent than the sparrows. These are the Swallows, those welcome harbingers of spring.

Although they are swift of flight and do not settle very often, thus making it somewhat difficult to get a good view of them, yet their identification should not present any insuperable difficulties, even to the novice, on account of the small number of species belonging to this family. There are only five kinds of Swallows to be found in most parts of Eastern Canada, or at most six.

The first Swallow to arrive in spring, in fact one of the first of birds, is the lively and pretty Tree or White-bellied Swallow. The latter name, though not the most euphonious, is the better, because it gives at once the distinguishing mark, i.e., the *pure white under parts*. It arrives at Ottawa the first or second week in March, and for a month it is the only Swallow; and, as all Swallows make themselves very noticeable by their swift graceful flight, made possible by their comparatively long, sickle-shaped wings, the Tree Swallow can not long remain unnoticed. So, when you see a swallow darting around over rivers and ponds, white only below and steel-blue or green above, that is the Tree Swallow, *Tachycineta bicolor*. It is called Tree Swallow because it makes its nest in cavities, knot-holes or old woodpecker holes in trees and fences.

The second swallow to arrive from the south—the first or second week in April at Ottawa—is at the same time the largest

of the family, namely, the Purple Martin, *Progne subis*. It is also the darkest of them all, looking black from a distance; but in reality it is of a glossy steel blue all over, except wings and tail, which are duller. This is the one also showing least fear of man, inasmuch as it takes up its abode right in the heart of even large cities, and is not frightened by the noise produced by trains, street cars and wagons in our busiest thoroughfares. At Ottawa I have noticed colonies—for they always nest in colonies—at the Canada Atlantic Railway freight sheds, on Rideau street and in other places. Its song is a melodious chuckling, twittering. It can be easily distinguished from Blackbirds by its more graceful *gliding* flight, its shorter, little-forked tail and its notes. It takes kindly to bird houses provided by man; but they must be made large enough to afford room for several pairs. Their nesting near one's home should be encouraged by all means, since they do away with an immense number of flies and other pests.

The beginning of May brings two more Swallows, the Barn and Cliff Swallows, and these two need closer inspection than the first to separate them. The lovable Barn Swallow, *Chelidon erythrogaster*, can best be told by the *deeply forked tail*, the only Swallow having this; in flight, however, it keeps the tail closed; then the next best characteristic is that the under parts are *entirely brown*, the whole upper surface steel blue. The song is a merry twittering. The nest is built of mud under the eaves of barns, etc., sometimes in them. It also should be protected by all means, because it is a friend to the farmer on account of its great insect-destroying propensities.

The Cliff or Eave Swallow, *Petrochelidon lunifrons*, may at first sight be confounded with the preceding species on account of the general likeness in size and colour. But it has not that deeply forked tail. Furthermore, its *forehead* is *whitish*, and the upper tail coverts are light brown or yellowish. Otherwise, it is also steel blue above and brown on throat and breast; but the belly is white, not brown like in the Barn Swallow. So, when you see a Swallow flying away from you, that has a *light spot or area between the back and tail*, put it down as a Cliff Swallow. This name really holds good no longer; for it has in most places adapted itself to civilization, building its mud nest no more against the sides of cliffs, but,

like the Barn Swallow, under the eaves of barns and other buildings. The gourd-shaped nests of both species may occasionally be seen in peaceful commingling on the same barn.

The last member of the Swallow family to arrive from the south is the Bank Swallow, *Riparia riparia*. This is the least pretty of our swallows, also the smallest. It is brownish-gray above, and white below, with the exception of a dusky band across the breast. It can be recognized at once by its nesting habits. What it loses by its lateness in coming, it makes up doubly by its energy in nesting. No sooner has it come than it digs into the nearest sand bank, without any delay after its long journey from the south, and this, without taking into consideration the nearness of boys or other evil agencies, that will at once render unavailing its best efforts. In a sand pit at Ottawa, when its nests were destroyed by the breaking down of the sand walls by the men hauling the sand away, they would nevertheless set to work digging new tunnels in the same banks. When ground was broken for the foundations of the new Victoria Museum at Ottawa, these Bank Swallows came in numbers, bored into the sides of the excavations and did not in the least mind the men working a few feet away from their nests. By the dusky band across their breast they can be told from the Tree Swallow; their twittering is also more rasping than that of the other swallows.

The sixth and last swallow, the Rough-winged, *Stelgidopteryx serripennis*, is found in some places in south-western Ontario only. It is much like the Bank Swallow, but may easily be distinguished from it by the dusky gray of throat and breast, being the darkest of the smaller swallows.

Now a reader may ask, What about the Chimney Swallow? Where does that come in? Answer: The Chimney Swallow is no swallow at all but a *Swift*, belongs to an entirely different order, far removed from the swallows in classification and by structure. But, since it is associated with the Swallows in the popular mind, we will here introduce it

The Chimney Swift, *Chætura pelagica*, is an inhabitant of our cities like the Purple Martin, and, like the Cliff Swallow, has adapted itself to and made use of the changed conditions wrought

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