

ed entirely of pine timber, creosoted in Great Britain, and sent out here. It has most effectively withstood the ravages of the teredo, whilst all other piles in the neighborhood had to be renewed twice.

Not satisfied with reports about its permanency, so far, I requested that the Sydney and Louisburg Coal and Railway Company would have an examination made for the purpose of this paper. I have to-day a telegram from Mr. D. J. Kennelly, Q. C., managing director of that Company, in which he says: "Creosoted pier absolutely sound; ten years erected. Timber not creosoted twice renewed."

One of the objects of this paper is, firstly, to point out the necessity which exists for a creosoting apparatus to be placed in Nova Scotia, somewhere in the region of the Teredo's most active operations; and, secondly, that experiments be conducted by some responsible parties, as to the best means to adopt to arrest the ravages of the *Limnoria Lignorum*.

Considering the interests at stake and the great annual loss to the Department of Public Works, Canada, from these destructive animals, one would think that something should be done in the public interests, by at least investigating the matter, and with the view of proper remedial measures being taken so far as practically possible, to mitigate or prevent their ravages in the future.

ART. VII.—SHORE BIRDS OF NOVA SCOTIA. BY BERNARD GILPIN,

A. B., M. D., M. R. C. S.

(Read April 10th, 1882.)

IN studying the immense flocks of what are called Shore Birds, which yearly appear during July, August and September of each year upon the flats of the Bay of Fundy, St. Mary's Bay, the Tuskets, and Digby Basin, in Nova Scotia, we must consider them as migratory birds, breeding, with few exceptions, in the Polar regions, and now returning with their young to warmer latitudes, reaching even the Gulf of Mexico, and thus passing our

shores. They are generally in imperfect moult, having lost their nuptial plumage, which is not yet replaced by their winter one. Few full plumaged males appear, but females, imperfect males and young. Hence the difficulty of classing them. The pursuit of food alone urges them on their migration southward, whilst that of reproduction swept them onward in the spring to the fierce North. The spring route is more direct, more inland, and more quick. We see nothing of them during spring. The most obvious, and those which from numbers and from sight most modify our landscape, are the sand peeps (sand pipers, tringa), and next them the ring necks (the plover). These two speck the feathery margins of our salt-estuaries, whitening our flats and flashing like silver clouds in the air. Next in number come the larger plover, golden plover and beetle heads, which migrate in sufficient numbers to modify our landscape. The other species must be looked for by the naturalist, and from their numbers are scarcely noticed, save by the sportsman, or naturalist, and yet in their aggregate great numbers pass us. I have thought the members of the Institute would be interested in a description and classification of all these birds, the numerous as well as the more rare, and therefore in this paper shall give only what I have seen personally myself, of all the various shore birds that pass our shores during the autumn. I do not doubt that some have evaded my notice, or that I have found a difficulty in classification in others, yet the work of an eye-witness is always valuable. I shall use the Smithsonian nomenclature (Dr. Coues), thinking it the best, but finding some difficulty even in it, to say nothing of Nuttall, Wilson, and the older naturalists, in properly arranging all my species. Of the vast flocks which, as I said before, modify our landscape, I have found from a study of years, from minute measurements and accurate coloured drawings, that they are composed of two species of ring neck plover, and three distinct of sand peeps, or sand pipers, all in common in huge flocks.

The ring necks are the American ringed plover, *Æ semipalmatus*, and *Æ melodus*, piping plover. Of the sand peeps, with the utmost study, I have only found three species, the less sand

piper (*Tringa minutela*), the greater sand piper (*Tringa Bairdii*), and the semipalmated sand piper, *E. pusillus*. It is with the greatest doubt I make this classification, as I think *Tringa Bairdii* too recent a nomenclature for a bird so well known. In Nuttall's work, so singular for its truth, he marks the Stint, a bird that I have never seen here or any sand peeps with any lateral tail feathers white. Besides in his descriptions and measurements he confounds at least four species. I shall minutely describe the two species of the Ring plover as I find them here, only saying that they as well as the sand peeps were selected from a heap of dead, brought in from shooting, and containing all five species of Ring plover and sand peeps in one stiffened mass.

Common Ring Plover shot at Digby, N. S., August 12, 1876 :

Length, $7\frac{1}{2}$ inches.

Wing to wing, 15 inches

Bill, $\frac{5}{8}$ inch.

Tarsus, 1 inch.

Toes, $\frac{7}{8}$ inch.

The bill was high at base, nostrils basal black at tip, dull orange at base, legs and toes dull orange, nails black, joints pencilled black, no hind toe, toes joined at base with webs, outer web nearly double the inner. In colour, forehead, chin, neck running behind the head, all below and inside the wing, white. Above head, hind head, back, shoulders and wing coverts, olive brown. The forehead is black, holding within it a white spot, and running beneath the eye to the lores. A deep black collar, nearly an inch broad and running insensibly at the back into brown, surrounds the neck. Tail, when closed, black, sides of rump lightest; tail of twelve feathers. Outside feather white outer edge, more or less white on tips of four outside feathers, middle feathers black at ends; primaries, secondaries, and tertiaries more or less dark with white shafts, coverts tipped obscurely with white. Some specimens had scarlet rings around the eyes, some not. The olive brown colour and the semipalmated and orange foot, determine their species very easily, as the semipalmated plover of Wilson, and the *Ægialites semipalmatus* of Coues. Another Ring neck shot in August, 1876, differed from these in

colour of body, size and colour of legs, and not having semi-palmated feet. In colour it was white below, and pale bluish ash above, with no brown or olive tint. The signs of black or of ring about the neck were very slight, and light dusky. The middle tail feathers were black, tipped white at the end, and there was a white stripe through primaries, secondaries and tertiaries. The bill and feet black and shorter than in the true ring plover, and the whole bird smaller. On searching for these birds I found they went by themselves, were scarcer, and hard to get. I have classed them, with some doubts, with the *Charadrius melodus* of Nuttall and Wilson, and *Ægialitis melodus*, Coues, thinking the difference of leg, bill and colour were from imperfect or young birds. We may generally conclude that the semi-palmated variety is very common, and individually found in brightest colour of olive brown, yellow feet and red ring about the eye; that he always assorts with the peeps; is found at high water, emarginating the shores, waiting for the ebb to bare the flats, over which he spreads himself; and that he appears sparingly in July, numerous in August, and leaves in September. Of the second species you think them plenty; but searching for them, you find them scarce—though found in company with the peeps. All these birds have doubtless lived at the north, and are passing our shores with their females and young. As I saw a few breeding on Sable Island with the peeps and terns, though not determining their species, I think that increasing population, and not choice, may send them so far north. All due allowance must be made for imperfect moult and young birds.

After writing a description of these Fall birds I have had an opportunity of examining three specimens of this plover, *Ægialitis melodus* (Coues), shot April 24th, 1882, at Digby, N. S., and in full nuptial plumage. Mr. Downs also has a group of the adult birds and young, shot near Halifax, proving that it breeds with us, though the greater numbers that appear in Fall must prove it also to be migratory.

Extreme length, 6 6-10 inch.

Wing spread, 14 inch.

Length of bill, $\frac{1}{2}$ inch.

Length of tarsus, 7-10 inch.

Colour of bill yellow, with black tip; toes and legs yellow, but palms and toes slightly pencilled dark, yellow ring about the eye. Head, back, wing coverts and rumps ashey grey, but coverts with slight black shading, each feather with a white edge. Forehead white, with a black band above, a black collar going round the back, but more or less incomplete in front. The cheeks whitish with ashey wash, showing small black spots beneath and behind eye. In one specimen the black collar was entire around the throat; chin, hind neck, breast, belly and all below white. Sides of rump white, middle tail feathers black with light tips; lateral tail feathers white, 2nd lateral tail feathers white, 3d inner white, with a black spot in it, the other lateral ones having black bands on the extremities, but near the body white. Shaft of the primaries and secondaries white. The primaries black upon the outer van, but having a white streak running through them and the secondaries, and joining the lower edges of the greater wing coverts and tertiaries. The tips of primaries and secondaries were black, the wings not reaching the end of tail in dead bird. The eye was black with yellow ring. No hind toe, inner toe cleft to base, scarcely a web between outer and middle toes. This is the nuptial plumage of the piping plover, differing sharply in colour, and not having semi-palmated feet, from the semi-palmated species, and agreeing with the imperfect Fall birds. I have not noticed Wilson's plover in Nova Scotia.

Of the sand peeps I have been able after years of study, measurement and coloured drawings, to determine but three species. It will better serve the interests of truth for me to describe these species from my own note book, rather than attempt a classification with the older or more modern naturalist. Those who are willing to wade through my paper will, I am certain, have a true history of the Nova Scotian Species.

Small Sand Peep, Aug. 23, 1876, Digby :

Extreme length, $5\frac{3}{8}$ inches.

From wing to wing, $11\frac{1}{8}$ inches.

Length of bill, 6-8 inch.

Length of tarsus and toes, $1\frac{1}{8}$ inch.

Toes not connected by membrane at base, hind toe small; legs

pale greenish-yellow. General colour, head, neck, back and coverts dark sepia, the edges of each feather margined with a lighter or rufus brown. The rump sooty-black, reaching to end of closed tail, which is margined with rufus. Primaries, secondaries and tertiaries blackish, edges light, which, with white shafts, gives the appearance of a faint white line down each feather. Wing coverts edged with white; faint dark line from mouth through the eye; a broad faintish-brown collar about the breast; beneath, to end of tail, white; bill blackish.

Another shot 20th September, 1880, at Digby, gives—

Length, $6\frac{1}{4}$ inches.

Length of bill, $\frac{3}{4}$ inch.

Of tarsus, $\frac{3}{4}$ inch.

Wings spread, $11\frac{1}{2}$ inches.

Colour: forehead, neck, back of neck, shoulders black, more or less, but each feather with an edging of light ferruginous, on neck and head less, but greater upon shoulders, wing coverts and tertiaries, the whole effect being black spots with a decided ferruginous wash. The rump and middle tail feathers black, a little white showing on either side of rump; the edging of tail feathers ferruginous, the side tail feathers lighter than middle ones. Chin, and obscurely above eye, whitish, a very obscure dusky line from bill to eye; neck to breast grey, pencilled black, forming distinct colour. Below white to vent. The outside shaft in the first primaries white.

A Sand Peep shot at same time, 20th September, 1881, measured:—

Length, $8\frac{3}{4}$ inches.

Length of tarsus, 15-16 inch.

Length of bill, 1 inch.

Stretch of wing, $16\frac{1}{8}$ inches.

Though the greater size showed directly a different species, yet I could find no difference in colour betwixt these than that the wing coverts above the secondaries in the smaller were more broadly edged with white. The bills in both were alike and black nostrils basal, upper mandible with a sulcus running half way to tip. Legs and feet in both dark brownish, four-toed and

palmated; hind toe slight and inserted above the palm. In their figures coloured they resemble each other in the well stained neck and front, absence of ash and hoariness, and presence of ferruginous tints. Thus I must conclude that I have two species akin in all but size, one ranging from five to five and a half inches, the other from seven and one-half to eight inches, both four-toed and without webs. Richardson, under the species *pusilla*, may mean the last one as well as Wilson, by the size.

But amongst these flocks I found a third sand peep, which was not only semi-palmated, but different in colour from the others.

Shot 5th Sept., 1881. Bay of Fundy:—

Length, 6 inches.

Spread of wing, $11\frac{1}{4}$ inches.

Length of tarsus, nearly 1 inch.

Length of bill, $3\frac{1}{4}$ inches.

Colour on back and top of head, shoulders and wing coverts greyish, interspersed with black streaks and spots, spots more on back and shoulders; rump black, tail greyish, the upper and lower tail coverts nearly as long as the tail. A small white streak behind the eye, and spotted line of dusky from bill to eye; throat and all beneath white, bill black, legs black with olive wash; toes palmated, inner web smaller than outer. In comparing this species with those shot 20th Sept., and nearly of the same dimensions, but not semi-palmated, we find no ferruginous tints, rump not so black, breast whiter, and with very slightly marked collar, colour of legs more olive. In this specimen the shafts of both primaries and secondaries are white, also the tips of the wing coverts. But upon the nonsemi-palmated, both greater and less, we find the white bar upon the wing, broader, and formed not only by the wing coverts, but also the primaries and secondaries, as it was joined in the white mark. This bird has come down to us "semi-palmatus," from Hutchins, Wilson, Richardson, Nuttall, and Buonaparte; yet Coues gives it as *pusillas*, without giving his reasons. It certainly is the only semi-palmatus I have found frequenting the Nova Scotia shores in a study of years; is very well marked, which shows more when the coloured drawings of each are opposed to each other.

The next birds which may be said from their numbers to modify our landscape are the plover, the green or golden plover, and the larger beetle heads. They usually migrate together, and are seen with us from August and September, a few lingering till November. Heavy south-west gales confuse them, and mass them in numbers as they prepare to light, during the gale, in the fields and on the shores. The large kind rather affect the fields, the smaller kind the shores. It is very seldom you meet a male in full plumage, or black breast and belly. Their usual colour is spotted greenish on the back, with black splotched beneath. Coues denies the greenish or yellow wash upon the larger species, but my note, Sept. 20th, 1881, gives this yellow wash upon their backs. I have also observed a black spot beneath the wing, near the shoulder, as typical of the larger species. The fourth toe, or nail, in the larger, wanting in the smaller, is the best mark to determine the young from each other as they approach each in colour and size. A very handsome male in full nuptial plumage, with deep black breast and vent, may be seen in the Halifax Museum, of the larger species. Though in the thousands which annually pass us during the autumn, I never have found one.

Of the various other birds of this family that pass us in numbers, there are so few that the sportsman or naturalist only observes them. We may notice the Sanderling whose appearance at Digby I note during September, in his usual grey dress. The Killdeer very rare, having a single notice of him during March, at Halifax. The Turnstone cosmopolites, appearing everywhere, are seen at Digby during September. The Avoset I saw at St. John, killed there, and in Mr. Carnal's collection. The three different kinds of Curlew I have determined. The larger great billed Curlew seen by myself Sept., 1870, at Windsor, N. S.; the Esquimau Curlew, and the smaller Esquimau Curlew, distinguished from the last by its size, and not having the wings beneath barred as in the last.

My notes give September for all these species. The cape Curlew I have noted Halifax, October. *Tringa subarquata*, Schinss sand piper, I note Halifax, Oct., 1864, but I am not cer-

tain. The pectoral sand piper Sept., 1865, Halifax, and afterwards at Digby. The buff breasted sand piper I note Provincial Museum, Halifax, and the purple sand piper at Halifax. The knot or ash coloured sand piper, Sept., 1880 and 1881, in winter plumage. The semi-palmated Snipe or Willet, Digby, June, 1877. Both species of the yellow shanks, the larger and the lesser, are both common in September. Of the tattlers, the solitary or green rump tattler is common; barn snipe as it is called from its solitary haunts about barn pools, and the spotted tattler, is common everywhere. Of Bartram's tattler, or the grass plover, I note one specimen, and that from Sable Island, 1868. This brings us to the Godwits, both species of which, Marbled and Hudsonian, I have noted, the Hudsonian shot, in August. The brown or red breasted snipe is the last autumn visitor I will mention as noted in September.

I have never met with the Dunlin or Ox bird in Nova Scotia, nor do I mention the Phalaropes, though I have seen them and think we have two species, certainly the rose colored one, but am not able to identify them. Wilson's snipe and the Woodcock are common residents, breeding here, the latter plenty, though it requires a good dog, gun, and quick shot to find them. I have seen a bag of twelve or thirteen couple made by my son in a few hours, besides grouse and hares, when he combined all these attributes at one time. A wounded woodcock that I kept by me was lively at night, and always kept its tail spread and crested like a fan over its back. In this paper I have given only my own personal observations of what was seen in Nova Scotia. No doubt many species of North American birds do not pass our shores. In endeavouring to clear the vexed story of the peeps or sand pipers I have thought it best to describe the only three well marked species that I have noticed; and to say that however numerous or varied other North American species may be, I have not found them here. To attempt to class our species here with those of Wilson, Nuttall, or Richardson, is to immediately fall into a crowd of stints, pigmies, lesser pusilla, minor sand peeps, all of which seem to have the same measurement and colouring. Amongst these the semi-palmata seems to stand out boldly

in different colour and semi-palmated feet ; yet Coues returns this bird under the name of *pusilla* to the old group, and without giving his reasons, which no doubt are good, if known, but unknown cannot stand before Hutchens, Nuttall, Richardson, Wilson and Buonaparte. In his key of North American birds had he put the first discoverer's name to the specific, as he has done to the generic name, it would have added much to the value of a very useful work. Naturalists owe him much for sweeping away the too numerous genera in the gulls and penguin ducks as Darwin calls them. I mean the very restricted genus of *Scoter* so like in colour, bills and habits.

List classed after Dr. Coues.

- Squartolinas helvetica—Beetle head.
- Chavadius fulvus—Golden plover.
- Ægialitis vociferus—Kildeer.
- Ægialitis semi-palmatus—Ring neck.
- Ægialitis melodus—Piping plover.
- Streptopus interpres—Turnstone.
- Recurvirostra Americana Avoset.
- Machtoramphus griseus—Red breasted snipe.
- Ereunetes pusillus—Semi-palmated peep.
- Tringa minutella—Least peep.
- Tringa bairdis—Baird's peep.
- Tringa maculata—Pectoral sand piper.
- Tringa maritima—Purple sand piper.
- Tringa subarquata—Curlew sand piper.
- Calidris arenaria—Sanderling.
- Limosa fedora—Marbled godwit.
- Limosa Hudsonia—Hudson Bay godwit.
- Totanus semi-palmatus—Willet.
- Totanus melanoleucus—Great yellow shank.
- Totanus chloropus—Lesser yellow leg.
- Totanus solitarius—Solitary tattler.
- Tringoides maculata—Spotted tattler.
- Actiturus bartremius—Bartram's tattler.
- Tryngites rufessens—Red breasted sand piper.
- Numenius longirostris—Long billed curlew.

Numenius Hudsonius—Hudson's curlew.

Numenius borealis—Esquimaux curlew.

I have not mentioned in this list Schinze's sand piper, although my notes give him at Halifax, August, 1864. I have no distinct recollection of the bird, or of seeing Dunlin's, an enlarged copy of it, in Nova Scotia. It is very rare here or not a true species. I think there is Dunlin immature bird in the Halifax Museum. Of all the shore birds that grace our landscape, as I have before said, the peeps are the most pleasing. The great Bay of Fundy tide that has rushed in almost cataract force through the opposing traps in the gut, now expanded in the Basin fills to the utmost brim with a power though unseen yet quite as great, every rushy estuary, and every silver sand flat of the great basin. All is steeped in one bright glancing and quivering calm. The peeps are lining the edges of the flats waiting for the ebb. The great herons have come from their heronry twenty or thirty miles on the borders of a tangled spruce lake, waiting for what the ebb may leave them. The barking, and rising and falling of the crows, and squeaking of the herons from their roosts on the overhanging trees tells that the hawk (*F. Columbarius*), like a privateer, is backing and filling and waiting his ebb, too near them. These sights and sounds come down upon you as the first soft ebb floats your canoe down the bay. If you are out pot shooting, the noiseless current floats you down towards the flats, now rapidly showing out of water, and covered by thousands innumerable of creeping forms. The whole host, scared by your approaching canoe, with a sharp whistle rise, stretch landward a few rods, then rise in the air and open into a white sparkling cloud, reflecting the bright sunbeams. Now is your time; both barrels of your breech loader, and the mitraille of mustard seed shot cover the water around with the dead and dying. To slowly pick up the dead and secure the living you turn homeward. From twenty-five to thirty birds, ring necks and plover of several species, are enough to vex your cook and serve for a pot-pie. But if you are out for a pic-nic, and stowed beneath the bear robes, on the very bottom of your canoe, are your wife and little ones, and camp kettles and tea, bread, milk and sugar, and

the charming July sun tempts you, you give way for the mouth of the basin, where the huge boulders of traps stem the Bay of Fundy tides, heaping great sand beaches at their bases. Your canoe grinds upon Indian beach, you run it up amidst dozens of other Indian canoes, and scan half way up the rocky barrier a shady spot for your bivouac. Here your Indian builds his fire, two parallel lines of stones eighteen inches high, with a trench between, picks and cleans his birds, and cutting branches from the nearest tree, impales a bird on every twig, resting the whole branch over his fire. Gravely he hands to each guest a branch with its roasted fruit, who, holding the branch in one hand pulls with the other the birds from the twigs. To one who has eaten of this Abyssinian banquet there is no need to tell of their tenderness and juicy delicacy. The rigor mortis has not yet stiffened the dead birds. This comes on after a few hours and then passes off after a day or two. If you cook the grouse shot upon your tramp for your night's supper, you are surprised how tough they are, but if you hang them in your camp for a day or two you find them tender. The Indian, like the Abyssinian, chooses the almost living flesh for his feast.

ARTICLE IX.—“THE NORTHERN OUTCROP OF THE CUMBERLAND COAL FIELD.” BY EDWIN GILPIN, A. M.,
F. G. S., F. R. S. C., ETC.

(Read May 8th, 1882.)

MY object this evening is to lay before you a brief summary of the work which has been done on the northern outcrops of the seams of the Cumberland Coal Field. Some of the information is new and of importance, but for much of the work done at an early date I have had recourse to official sources.

The Cumberland coal field was for many years an unknown and unpromising district. It was accessible by water at the Joggins only, to allow competition with the coals of Sydney and Pictou. The presence of coal seams was known at several other points, but the want of any means of transportation forbade an attempt to open them.