GREAT NORTHERN DIVER OR LOON.

†*COLYMBUS GLACIALIS*, *Linn.*

PLATE CCCCLXXVI.—ADULT MALE AND YOUNG MALE.

The Loon, as this interesting species of Diver is generally called in the United States, is a strong, active, and vigilant bird. When it has acquired its perfect plumage, which is not altered in colour at any successive moult, it is really a beautiful creature; and the student of Nature who has opportunities of observing its habits, cannot fail to derive much pleasure from watching it as it pursues its avocations. View it as it buoyantly swims over the heaving billows of the Atlantic, or as it glides along deeply immersed, when apprehensive of danger, on the placid lake, on the grassy islet of which its nest is placed; calculate, if you can, the speed of its flight, as it shoots across the sky; mark the many plunges it performs in quest of its finny food, or in eluding its enemies; list to the loud and plaintive notes which it issues, either to announce its safety to its mate, or to invite some traveller of its race to alight, and find repose and food; follow the anxious and careful mother-bird, as she leads about her precious charge; and you will not count your labour lost, for you will have watched the ways of one of the wondrous creations of unlimited Power and unerring Wisdom. You will find pleasure too in admiring the glossy tints of its head and neck, and the singular regularity of the unnumbered spots by which its dusky back and wings are checkered.

I have met with the Great Diver, in winter, on all the water-courses of the United States, whence, however, it departs when the cold becomes extreme, and the surface is converted into an impenetrable sheet of ice. I have seen it also along the whole of our Atlantic coast, from Maine to the extremity of Florida, and from thence to the mouths of the Mississippi, and the shores of Texas, about Galveston Island, where some individuals in the plumage characteristic of the second moult, were observed in the month of April 1837. Indeed, as is the case with most other species of migrating birds, the young remove farther south than the old individuals, which are better able to withstand the cold and tempests of the wintry season.

The migratory movements of this bird seem to be differently managed in the spring and autumn. In the latter case, a great number of young Loons

Great Northern Loon.

are seen to alight on the head waters of our great streams, on which, without much exertion, being aided by the current, they float along, diving at intervals in pursuit of the numerous fishes, as they proceed toward milder climes. The few old birds which, at a later date, appear on the same water-courses, frequently take to wing, and shorten their way by flying at a considerable elevation directly across the great bends or peninsulas. These modes of travelling are also adopted by those which advance along the Atlantic coasts, where, indeed, the birds have the double advantage of meeting with food and obtaining repose, on the rivers and on the sea. I think, however, that this maritime course is followed only by such of the Loons as have bred in the more immediate vicinity of the coast. But whether you are in the interior, or on the coast, it is seldom that you see at a time more than one Loon travelling at this season; whereas, in spring, they proceed in pairs, the male taking the lead, as is easily ascertained by observing that the bird in the rear is the smallest.

Although its wings are rather small, its flight is strong and rapid, so that it is enabled to traverse a large extent of country on wing. When travelling, or even when only raised from its nest, it moves through the air with all the swiftness of the other species of its tribe, generally passing directly from one point to another, however distant it may be. Its long transits are at times performed at so great an elevation, that its form can scarcely be distinguished, and yet, even then, in calm weather, the noise of its wings striking the air comes distinctly on your ear. I have seen them thus, on their way towards Labrador, passing over the head waters of the Bay of Fundy, to cross the Gulf of St. Lawrence. Whenever it chances to alight on the water, in the course of its long journeys, it almost immediately dives, as if to taste the water, and judge whether it contains food suited to its appetite. On emerging, and after having somewhat raised the fore part of its body, shaken its wings, and by a strong shiver re-arranged its plumage, it emits its loud echoing call-note, to induce, perchance, some traveller of its tribe to alight for awhile, that they may communicate to each other their experience of the past, or their hopes of the future. There is an absurd notion, entertained by persons unacquainted with the nature of this bird, that its plaintive cries are a sure indication of violent storms. Sailors, in particular, are ever apt to consider these call-notes as portentous. In the course of a voyage from Charleston to the Florida Keys, in May 1832, I several times saw and heard Loons travelling eastward; but, notwithstanding all the dire forebodings of the crew, who believed that a hurricane was at hand, our passage was exceedingly pleasant. Although I have heard the notes of the Loon in rainy and blowy weather, yet I never heard them so frequent or so loud, both by day and by night, as on the Ohio, during that

delightful and peculiarly American autumnal season called the Indian summer; when, although not so much as a cloud was seen for weeks, I have frequently observed the passing birds checking their flight, or heard the murmuring plash which they produced on alighting upon the placid water, to rest and refresh themselves.

Another strange notion, not deserving of credit, although you will find it gravely announced in books, is that, when the Loon is breeding, it will dart down suddenly from the air, and alight securely in its nest. I have never witnessed such a procedure, although I have closely watched, from under cover, at least twenty pairs. On such occasions I have seen the incubating bird pass over the dear spot several times in succession, gradually rounding and descending so as at last to alight obliquely on the water, which it always did at a considerable distance from the nest, and did not approach it until after glancing around and listening attentively, as if to assure itself that it was not watched, when it would swim to the shore, and resume its office.

The Loon breeds in various parts of the United States, from Maryland to Maine. I have ascertained that it nestles in the former of these States, on the Susquehanna river, as well as in the districts between Kentucky and Canada, and on our great lakes. Dr. RICHARDSON states that it is found breeding as far north as the 70th degree of latitude. The situation and form of the nest differ according to circumstances. Some of those which breed in the State of Maine, place it on the hillocks of weeds and mud prepared by the musk-rat, on the edges of the lakes, or at some distance from them among the rushes. Other nests, found on the head-waters of the Wabash river, were situated on the mud, amid the rank weeds, more than ten yards from the water. Authors have said that only one pair breed on a lake; but I have found three pairs, with their nests, on a pond not exceeding a quarter of a mile in length, in the State of Maine. One that I saw after the young had left it, on Cayuga Lake, in 1824, was almost afloat, and rudely attached to the rushes, more than forty yards from the land, though its base was laid on the bottom, the water being eight or nine inches deep. Others examined in Labrador were placed on dry land, several yards from the water, and raised to the height of nearly a foot above the decayed moss on which they were laid. But, in cases when the nest was found at any distance from the water, we discovered a well-beaten path leading to it, and very much resembling those made by the beaver, to which the hunters give the name of "crawls." The nest, wherever placed, is bulky, and formed of the vegetable substances found in the immediate vicinity, such as fresh or withered grasses and herbaceous plants. The internal part, or the true nest, which is rarely less than a foot, and is sometimes fifteen inches, in diameter, is raised upon the external or inferior mass to the height of seven or eight inches.

Such was one found on the 5th July, 1835, in Labrador, and which was placed within three yards of the edge of a considerable pond of limpid water, supposed to have been produced by the melting of the snow, and upwards of a mile distant from the sea. Of the many nests which I have examined, I have found more containing three than two eggs, and I am confident that the former number is that which more frequently occurs, although many European, and some American writers, who probably never saw a nest of this bird, allege the contrary. The eggs average three inches and three quarters in length, by two inches and a quarter in their greatest breadth, and thus are considerably elongated, being particularly narrowed from the bulge to the smaller end, which is rather pointed. They are of a dull greenish-ochry tint, rather indistinctly marked with spots of dark umber, which are more numerous toward the larger extremity. The weight of two of these eggs, containing young nearly ready to emerge, was ten ounces and a half. In Maine the Loon lays fully a month earlier than in Labrador, and about the same period as on the Wabash.

On approaching the female while sitting on her eggs, I assured myself that she incubates with her body laid flat upon them, in the same way as the domestic Duck, and that, on perceiving the intruder, she squats close, and so remains until he is almost over her, when she springs up with great force, and makes at once for the water, in a scrambling and sliding manner, pushing herself along the ground. On gaining the water, she dives at once, emerges at a great distance, and very rarely suffers herself to be approached within gunshot. Sometimes they swim so deeply immersed as scarcely to be perceptible, and keep as much as possible among the rushes and other water plants. When the eggs are on the eve of being hatched, the mother, when disturbed, often cries loudly and dismally for some time, but seldom flies off. At other times, when I found the eggs to have been recently laid, the bird, on reaching the water, and diving, swam lightly, flapping its wings, drank once or twice, and moved about at a respectful distance. On such occasions, should you persist in watching it, it rises on wing and flies off. Should you not mark the spot in which the nest is, but leave it to go in pursuit of the bird, you may search for hours before finding it, for the path leading from the water to it is generally covered over by the herbage. Once while approaching a spot in which I knew a Loon to be engaged in forming her nest, I was disappointed at not finding her at work: her keen sense of hearing had apprised her of my purpose, and cunningly must she have slipped away, for, on finding her absent, although I had not heard any noise, I happened to look toward the water, and there she was, gliding off in the quiet manner usual on such occasions.

The young of the Loon are covered at birth with a kind of black stiff

down, and in a day or two after are led to the water by their mother. They swim and dive extremely well even at this early stage of their existence, and after being fed by regurgitation for about a fortnight, receive portions of fish, aquatic insects, and small reptiles, until they are able to maintain themselves. During this period, grey feathers appear among the down of the back and belly, and the black quill-feathers of the wings and tail gradually elongate. They are generally very fat, and so clumsy as to be easily caught on land, if their retreat to the water be cut off. But should you miss your opportunity, and the birds succeed in gaining the liquid element, into which they drop like so many terrapins, you will be astonished to see them as it were run over the water with extreme celerity, leaving behind them a distinct furrow. This power of traversing the surface of the water is possessed not only by the young and old of this species, but by all other kinds of swimmers, including even Gallinules and Coots. When the young are well able to fly, the mother entices them to remove from the pond or lake on which they have been bred, and leads them on wing to the nearest part of the sea, after which she leaves them to shift for themselves. Now and then, after this period, the end of August or beginning of September, I have still seen the young of a brood, two or three in number, continuing together until they were induced to travel southward, when they generally set out singly.

Having given you a figure of a young bird, taken in October 1819 from a specimen obtained on the Ohio, I will not here trouble you with its description, but merely state that the young undergo their first moult in December, when they are seen singularly patched with portions of new plumage beautifully speckled with white, on a bed of almost uniform ash-brown. I was told, while in the State of Maine, that if the young were caught soon after being hatched, and before they had been in the water, they would, if thrown into it, immediately follow a paddled canoe anywhere; but, as I have not myself made the experiment, I cannot speak of this as a fact.

Although it has been generally asserted that Loons cannot walk or run in an efficient manner, I feel assured that on emergency the case is very different. An instance which occurred to my youngest son, JOHN WOODHOUSE, who accompanied me to Labrador, may here be related. One day, when he was in pursuit of some King Ducks, a Loon chanced to fly immediately over him within shooting-distance of his enormous double-barrelled gun. The moment was propitious, and on firing he was glad to see the bird fall broken-winged on the bare granitic rocks. As if perfectly aware of its danger, it immediately rose erect on its feet, and inclining its body slightly forward, ran on, stumbled, rose again, and getting along in this manner actually reached the water before my son, who is by no means slow

of foot. The space traversed was fully a hundred yards, and the water to an equal distance was not more than ankle-deep. The bird and its pursuer ran swiftly through the water, and just as both reached a sudden break about four feet in depth, the Loon, which had been wounded elsewhere than in the wing, expired and floated at the disposal of its enemy, who brought it on board the Ripley; when I entered this anecdote in my journal.

These birds are so very strong and hardy that some of the old ones remain in Maine and Massachusetts until all the fresh waters are frozen, first leaving the quiet lakes and ponds, then the slow streams, and lastly the turbulent pools below waterfalls, which latter they do not quit until they are overhung by icicles and deserted of fish. On the other hand, this species returns northward at a later period than most others that breed in high latitudes. I have witnessed the arrival of some on the coast of Labrador, after they had crossed the Gulf of St. Lawrence, as late as the 20th of June, after which they had scarcely four months to seek out a breeding place, lay their eggs, hatch and rear their young, and with them remove southward, before the rigour of winter commenced.

The Great Northern Diver is a heavy-bodied bird, and generally swims rather deep in the water, more especially if apprehensive of immediate danger, when scarcely more than two inches in height of its back can be seen above the surface. As its body is more flattened than that of the Cormorant, this circumstance might seem to favour the action in question; but other species less depressed exhibit the same peculiarity; and I have thought that in all of these the internal structure alone can account for this peculiar faculty.

With the exception of that most expert of all Divers, the Anhinga, and the Great Auk, the Loon is perhaps the most accomplished. Whether it be fishing in deep water amid rolling billows, or engaged in eluding its foes, it disappears beneath the surface so suddenly, remains so long in the water, and rises at so extraordinary a distance, often in a direction quite the reverse of that supposed to be followed by it, that your eyes become wearied in searching for it, and you renounce the wish of procuring it out of sheer vexation. At least, this has very frequently happened to me; nay, I have at times abandoned the chase when the bird was so severely wounded as to be obliged to dive immediately beside my boat, and had it not died of exhaustion and floated near enough to be seized by me, I felt as if I could not have pulled my oars any longer, and was willing to admit that I was outdone by a Loon.

In Labrador, where these birds were abundant, my son JOHN one day shot at one on wing, which fell upon the water to appearance quite dead, and remained on its back motionless until we had leisurely rowed to it, when a

sailor put out his hand to take it up. The Loon, however, to our surprise, suddenly sprung up, and dived, and while we stood amazed, watching its appearance, we saw it come up at the distance of about a hundred yards, shake its head, and disgorge a quantity of fish mixed with blood; on which it dived again, and seemed lost to us. We rowed however to the spot in all haste, and the moment it rose, sent another shot after it, which terminated its career. On examining it afterwards, we found it quite riddled by the heavy shot.

If ever so slightly wounded, the Loon prefers diving to flying off, and all your endeavours to kill it are almost sure to prove unavailing. You may shoot at it under such circumstances, but you will lose both your time and your ammunition. Its keenness of sight defies the best percussion-locked gun, for it is generally deep in the water before the shot reaches the spot where it has been. When fatigued with diving in the ordinary manner, it will sink backwards, like a grebe or a frog, make for some concealed spot among the rushes, and there lie until your eyes ache with searching, and your stomach admonishes you of the propriety of retiring.

Loons are now and then caught in fishermen's nets, and are soon drowned. I have also caught them with hooks fastened to lines laid across the Ohio, but on no such occasion have I taken the bird alive. A method of shooting these birds, which I have often practised, and which was several times successfully employed by our Labrador party, may here be related. On seeing a Loon on the water, at whatever distance, the sportsman immediately places himself under the nearest cover on the shore, and remains there as carefully concealed as possible. A few minutes are allowed to pass, to give the wary and sharp-sighted bird all due confidence; during which time the gun, charged with large shot, is laid in a convenient position. The gunner then takes his cap or pocket-handkerchief, which if brightly coloured is so much the better, and raising it in one hand, waves it three or four times, and then suddenly conceals it. The bird commonly detects the signal at once, and, probably imagining the object thus exhibited to be one of its own species, gradually advances, emitting its love-notes, which resemble a coarse laugh, as it proceeds. The sportsman imitates these notes, making them loud and yet somewhat mellow, waving his cap or kerchief at the same time, and this he continues to do at intervals. The Loon, in order to arrive more quickly, dives, perhaps rises within fifty yards of him, and calling less loudly, advances with considerable caution. He shews the signal less frequently, imitates the notes of the bird more faintly, and carefully keeps himself concealed, until the Loon, having approached within twenty or even ten paces, dives, and on emerging raises itself up to shake its wings, when off goes the shot, and the deluded bird floats dead on the water. Many species

of Ducks are procured in nearly the same manner. The male Turkey, in the gobbling season, and the stag in autumn, may also be drawn within shot by the same means. I once "tolled" two Loons with my hat from a distance of nearly half a mile, and although they were at one time so near to me that I could clearly perceive the colour of their eyes, I had no sure opportunity of firing at them, as it was in the pairing season, and they never once dived, or raised their wings to flap them, so that, knowing the extreme agility with which they disappear when they have heard a gun snap, I judged it useless to shoot. Until my visit to Labrador I had supposed, agreeably to the common belief, that the Loons always repose at night on the water, which, however, I have since assured myself they rarely if ever do.

Colonel MONTAGU, than whom none has written more correctly on the habits of the birds of Great Britain, having procured a wounded Loon, placed it in a pond, and observed the manner in which it made its way under the surface of the water. "In swimming and diving," he remarks, "only the legs are used and not the wings, as in the Guillemot and Auk tribes, and by their position so far behind, and their little deviation from the line of the body, the bird is enabled to propel itself in the water with great velocity, in a straight line, as well as turn with astonishing quickness." This I have no doubt was the case with the individual observed; but that this is not the usual mode of proceeding of the species is equally true. Having myself seen Loons pass and repass under boats, at the distance of several feet from the surface, and propel themselves both with their feet, and their half-extended wings, I am inclined to believe that when not wounded, and when pursuing their prey, they usually employ all the limbs.

My friend THOMAS NUTTALL, who kept one for some time, gives the following account of its manners while in his possession. "A young bird of this kind which I obtained in the Salt Marsh at Chelsea Beach, and transferred to a fish-pond, made a good deal of plaint, and would sometimes wander out of his more natural element, and hide and bask in the grass. On these occasions he lay very still until nearly approached, and then slid into the pond and uttered his usual plaint. When out at a distance he made the same cautious efforts to hide, and would commonly defend himself in great anger, by darting at the intruder, and striking powerfully with his dagger-like bill. This bird, with a pink-coloured iris, like albinos, appeared to suffer from the glare of broad day-light, and was inclined to hide from its effects, but became very active towards the dusk of the evening. The pupil of the eye in this individual, like that of nocturnal animals, appeared indeed dilatable; and the one in question often put down his head and eyes into the water to observe the situation of his prey. This bird was a most expert and indefatigable diver, and remained down sometimes for several minutes, often

swimming under water, and as it were flying with the velocity of an arrow in the air. Though at length inclining to become docile, and shewing no alarm when visited, it constantly betrayed its wandering habits, and every night was found to have waddled to some hiding place, where it seemed to prefer hunger to the loss of liberty, and never could be restrained from exercising its instinct to move onwards to some secure or more suitable asylum."

The same valued friend has corroborated the result of my observations respecting the number of eggs usually laid by this species, by stating as follows: "About the 11th of June, through the kindness of Dr. J. W. HARRIS, I received three eggs, which had been taken from the nest of a Loon, made in a hummock, or elevated grassy hillock, at Sebago Pond, in New Hampshire."

The range of this species is immense. It occurs on the waters that fall into the Pacific Ocean, and has been observed on the Columbia river. In the Fur Countries it is plentiful; and, as I have already stated, it breeds in many parts of the United States. It is found equally in Europe, and the northern parts of Asia. In all these countries it moves southward on the approach of winter, and returns when the mild weather commences in spring.

Unlike the Cormorant, the Loon usually swallows its food under the water, unless when it happens to bring up a shell-fish or a crustaceous animal, which it munches for awhile before it swallows it. Fishes of numerous kinds, aquatic insects, water-lizards, frogs, and leeches, have been found by me in its stomach, in which there is also generally much coarse gravel, and sometimes the roots of fresh-water plants.

Although the flesh of the Loon is not very palatable, being tough, rank, and dark coloured, I have seen it much relished by many lovers of good-living, especially at Boston, where it was not unfrequently served almost raw at the table of the house where I boarded.

A female bird particularly examined by me presented the following appearances. From the point of the bill to the end of the tail it measured 34 inches; to the claws 41; the extended wings were 71; the bill measured 5 inches along the gap; the breadth of the body was 8 inches, its depth only four; the wings were 2 inches shorter than the tail; and the weight was 10 lbs. 11 oz. avoirdupois. The first primary was longest. The trachea, which was even and flattened, being in diameter about $\frac{5}{8}$ of an inch by $\frac{1}{2}$ inch, was 16 inches long. The eggs were numerous. The gizzard was moderate, and contained many large pebbles. The intestines were 7 feet long, and about the same size as a Swan's quill. Every bone and sinew was strong and tough. The tongue resembled in shape and size that of the Ivory-billed Woodpecker. The bones of the wing and leg were almost solid, the cavity

for the marrow being very small. All the bones of this specimen were presented to Mr. THOMAS ALLIS, of the Friends' Retreat, near York.

My friend Captain JAMES CLARK ROSS, of the Royal Navy of England, once placed at my disposal a specimen of the Loon procured in a very high latitude, and which, having closely inspected it, I found to differ from the one represented in the plate, only in having the point of the bill slightly elevated or recurved, and of a fine yellow tint. Dr. RICHARDSON informed me that, on one of his arduous northern journeys, he saw a very large and handsomely crested Diver, which, although somewhat prematurely, I propose honouring with the name of *Colymbus Richardsons*.

GREAT NORTHERN DIVER OR LOON, Wils. Amer. Orn., vol. ix.

COLYMBUS GLACIALIS, Bonap. Syn., p. 420.

COLYMBUS GLACIALIS, *Great Northern Diver*, Swains. and Rich. F. Bor. Amer., vol. ii. p. 474.

LOON OR GREAT NORTHERN DIVER, Nutt. Man., vol. ii. p. 513.

GREAT NORTHERN DIVER OR LOON, *Colymbus glacialis*, Aud. Orn. Biog., vol. iv. p. 43.

Adult, $32\frac{7}{8}$, $57\frac{1}{2}$. Young Male, in winter, $31\frac{1}{4}$, $54\frac{1}{2}$.

During winter dispersed over the United States, in Texas, as well as along the coasts of the Atlantic, and the north-west. Breeds from Massachusetts northward to very high latitudes. Common.

Adult Male.

Bill as long as the head, straight, stout, much compressed, tapering to a point. Upper mandible with the dorsal line descending and slightly convex towards the end, the ridge convex, narrowed towards the point, the sides convex beyond the nostrils, the edges sharp and considerably inflected, the tip narrow and sharpish. Nasal groove short, nostrils basal, linear, direct, pervious. Lower mandible with the angle extremely narrow, and extending beyond the middle, the dorsal line straight and sloping upwards to the point, the ridge convex and narrow, the edges sharp and involute; the tip attenuated.

Head of moderate size, oblong, narrowed before. Neck rather long and thick. Eyes of moderate size. Body elongated, much depressed, of an elliptical form viewed from above. Wings small. Feet short, rather large, placed very far back; tibia almost entirely concealed; tarsus short, exceedingly compressed, sharp-edged before and behind, covered all over with reticulated angular scales; hind toe extremely small, connected with the second by a very small membrane; the anterior toes united by articulated membranes, the fourth or outer longest, the third a little shorter, the second considerably shorter than the third, all covered above with very numerous

narrow scutella, the second toe with a free two-lobed membrane; claws very small, depressed, blunt.

Plumage short and dense; of the head and neck very short, and blended; of the lower parts blended, short, with slight gloss; of the upper compact, glossy; the feathers in general oblong, those of the upper parts with the extremity abrupt. Wings proportionally very small and narrow, curved; primaries strong, tapering, the first longest, the second almost as long, the rest rapidly graduated; secondaries broad, and rounded. Tail extremely short, rounded, of twenty feathers.

Bill black. Iris deep bright red. Feet, tarsi, and toes, of a livid greyish-blue, their inner sides tinged with pale yellowish flesh-colour; claws black, lighter at the base; webs brownish-black, lighter in the middle. Head and neck dark greenish-blue, with purple reflections. On the throat a small transverse patch of white, longitudinally striated with dusky; about the middle of the neck, two large patches of the same, separated in front to the distance of an inch, behind continuous, but when the feathers are laid close, appearing as if separated by a longitudinal dark band about half an inch in breadth. The under parts glossy white, excepting the feathers on the sides under the wing, which are black, each with two, three, or four elliptical white spots, a faint dusky band across the vent, the lower tail-coverts, which are brownish-black tipped with white, and the axillar feathers and larger wing-coverts, which have a dusky streak along the middle. The sides of the neck at its lower part are longitudinally streaked with black and white, there being two oblong spots of the latter on each feather towards the end. The upper parts are glossy black, variegated with spots of white in regular transverse slightly-curved lines having the convexity backwards. These spots vary in form and size, being small and roundish towards the neck and sides, larger and somewhat four-sided along the middle of the back: largest and rectangular on the scapulars, very small and roundish on the hind part of the back and tail-coverts. The upper part of the wing is similar, with smallish spots; the alula and quill brownish-black, a few of the inner secondaries only having two white spots at their extremity. Tail brownish-black, paler at the tip.

	Adult Male.	Adult Male.	Young.
Length to the end of tail,	32 $\frac{7}{8}$	36	31 $\frac{1}{4}$
. claws,	39 $\frac{1}{4}$	40 $\frac{1}{2}$	36
. wings,	31 $\frac{1}{4}$	—	29 $\frac{3}{4}$
. carpal joint,	16 $\frac{3}{4}$	—	16 $\frac{1}{4}$
Extent of wings,	57 $\frac{1}{2}$	52	54 $\frac{1}{2}$
Wing from flexure,	15 $\frac{1}{2}$	—	14 $\frac{1}{4}$

Depth of body,	—	6	—
Breadth,	—	$9\frac{1}{2}$	—
Bill along the ridge,	—	$3\frac{4}{12}$	—
Gap-line,	—	$4\frac{1}{2}$	—
Tarsus,	—	$3\frac{3}{12}$	—
Hind toe,	—	$9\frac{1}{2}$	—
Its claw,	—	$\frac{2}{12}$	—
Outer toe and claw,	—	$4\frac{1}{2}$	—
Middle toe,	—	$4\frac{1}{4}$	—
Inner toe,	—	$3\frac{9}{12}$	—
Tail,	—	$29\frac{1}{12}$	—
Wing from flexure,	—	$14\frac{1}{2}$	—
Weight,	$8\frac{3}{4}$	$8\frac{1}{2}$	9

The female is generally smaller, but in all other respects resembles the male. Weight 10 lbs. 11 oz.

Young in winter.

Bill pale yellowish-green, the ridge and tip of the upper mandible dusky. Iris brown. Feet dusky externally, pale yellowish flesh-colour internally, webs dusky, but yellow in the middle. Claws yellowish-brown. All the upper parts are of a uniform dark greyish-brown, each feather margined with lighter, the lower parts white; the sides of the neck at the lower part whitish, streaked with dusky; the sides dusky, without spots.

Towards spring the eye assumes a redder tint, and the plumage of the upper parts gradually becomes spotted with white; and when the moult is completed about the end of summer, the plumage is as in the adult, although the tints are improved at each successive moult for several years.

A fine male killed at Boston, 34 inches in length, with an alar extent of 56, presents the following characters. There is a general layer of subcutaneous adipose tissue, and the skin is very tenacious. The external aperture of the ear roundish, very small, having a diameter of only 2 lines. The tongue is 2 inches 1 line in length, fleshy, as high as broad, slightly concave and longitudinally grooved above, tapering to a horny point. On the palate are 6 rows of papillæ; the posterior aperture of the nares is linear, $2\frac{1}{2}$ inches in length. The aperture of the glottis is $\frac{1}{2}$ an inch long, with numerous papillæ along its sides and behind. The pharynx is extremely dilatable, as is the œsophagus, which is 17 inches long, passes along the right side of the neck, together with the trachea, and when distended has an average diameter of $2\frac{1}{2}$ inches, but on entering the thorax contracts to $1\frac{1}{2}$. The structure of the œsophagus in birds may be very conveniently examined in this species, the different layers being remarkably developed in it. Properly speaking, it has only two coats,—the outer muscular, its external

layer composed of transverse or circular fibres, the internal of equally distinct longitudinal fibres, which are not straight, but irregularly undulated. The inner, or mucous coat, when contracted falls into longitudinal plaits. The proventriculus is $2\frac{3}{4}$ inches long, the glandules large, roundish, simple, and disposed in a continuous belt. Over this part, the transverse muscular fibres are remarkably developed. The right lobe of the liver is $5\frac{3}{4}$ inches long, the left lobe $5\frac{1}{2}$. The heart is very large, of a broadly conical form, 3 inches long, $2\frac{3}{4}$ inches in breadth. The stomach is three inches long, $2\frac{1}{2}$ in breadth, of an elliptical form, a little compressed; its lateral muscles 9 lines in thickness, and composed of strong large fasciculi; the tendons $1\frac{1}{2}$ inches in diameter; the cuticular lining thick, its upper and lower parts marked with strong longitudinal ridges having numerous transverse fissures; the grinding surfaces irregularly wrinkled, with a deep fissure down the middle of each. The pylorus is 8 lines in diameter when distended, and is destitute of valve, but has a strong prominent rim. In the stomach were remains of fishes, and some pebbles, chiefly quartz, the largest 4 lines long. The intestine measures 6 feet 6 inches in length, and varies in diameter from 8 to 6 lines. The rectum is $3\frac{1}{2}$ inches long, the cloaca extremely large, forming a cavity about 3 inches in diameter. The cœca are $1\frac{3}{4}$ inches long, cylindrical, rounded at the extremity; one of them 7 lines, the other 9 lines, in diameter.

The trachea, when moderately extended, measures $13\frac{1}{2}$ inches in length, inconsiderably depressed, its transverse diameter at the upper part $9\frac{1}{2}$ lines, at the lower $6\frac{1}{2}$ lines; the rings cartilaginous, of moderate breadth, uniform, with a contraction in the middle before and behind, their number 134, the four lowest united. The bronchi are composed of about 20 narrow cartilaginous half rings. The contractor muscles are very broad, but thin, their fibres irregularly disposed in front; they become thicker and narrower toward the lower part, and are continued beyond the sterno-tracheal muscles, which come off from the 20th ring from the inferior larynx, to the membrane between the last tracheal and first bronchial ring.

Great Northern Loon.

Audubon, John James. 1844. "Great Northern Diver or Loon, *Colymbus glacialis*, Linn. [Pl. 476]." *The birds of America : from drawings made in the United States and their territories* 7, 282–294. <https://doi.org/10.5962/p.319593>.

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