THE LEAST SANDPIPER DURING THE NESTING SEASON IN THE MAGDALEN ISLANDS.

BY ROBERT THOMAS MOORE.

Plates XIII, XIV.

The habits described in this paper were noted in the Magdalen Islands, Gulf of St. Lawrence, during the period, June 17 to July 2, 1911. Most of these days were spent in the vicinity of Grosse Isle, the fishing village at the northeast end of the "Lagoon." This peculiar body of water, twenty-five miles long by two or three wide, is bulwarked against the sea on both sides by a narrow stretch of dunes, wind-tossed mile after mile to weird and mammoth shapes of sand, but here and there blown flat into low areas. One of these just east of Grosse Isle has taken the form of a salt marsh and has become the chief nesting-locality of *Pisobia minutilla* for the eastern portion of the islands.

The marsh itself is a large one, for here the distance from gulf to lagoon is over a mile, the whole of this width, save for the dunes on the gulf-side, being covered by its surface. In the other direction it is irregular, being invaded here and there, and in places almost bisected, by tongues of solid earth, sufficient to support a growth of stunted spruces and bayberries. On our arrival no conspicuous flowers flaunted bright colors in any part of this area, for the Blue Flags had not yet bloomed on the edges and the Buckbeans (Menyanthes trifoliata) so profuse in a deeper marsh at East Point, were entirely absent. The whole surface was sombre. absolutely unrelieved, all in tones of gray and dark green. dreary waste of water and muck can hardly be imagined! Fully a third is water distributed in shallow patches, the rest watersoaked hummocks, dry only on the grassy tussocks that tuft the marsh here and there. On these hillocks the Wilson's Snipes conceal their nests, but the Least Sandpipers place theirs in tufts of short marsh grass surrounding the larger tussocks.

As one slops over the marsh the little Sand-peeps begin to pipe anxiously and soon one whirls up into the sky to repeat over and



1. Adult Least Sandpiper, identifying nest concealed by Sticks.



2. Young Least Sandpipers about three days old.

over a pathetic little flight song. By this time the more abundant and more vociferous Wilson's Snipes are hurtling about in tumultuous excitement, those, concerned with young near at hand, making spectacular dives to earth, there to grovel and flutter, while others are cutting eccentric figures overhead and ever and anon sharply plunging down the skies to the accompaniment of their wild wingsongs. Other species, too, are demanding attention: the Savannah Sparrows buzz on all sides, Rusty Blackbirds hoarsely rasp from the marsh-edges, Blackpolls clink their pipes in the bayberry clumps, and Fox Sparrows innumerable bell from the surrounding hills. Nevertheless the Sandpiper and the Snipe seem the rightful owners of the marsh, the only ones that require just such a wet situation and no other for the setting of their homes.

All told we found five nests of the Least Sandpiper, four of them close together at the southwest end of the marsh, in an area not over a hundred yards in diameter. The fifth nest was discovered by my companion, Mr. Wm. L. Baily, in the damp end of a grassy field, where it borders the marsh along its southern margin. of the nests were in damp situations and those in the marsh were on ground so sponge-like that one could not kneel without getting Adequate protection from the dampness was afforded three of the marsh nests by a layer of dead, chocolate-colored leaves, presumably secured from the bayberry bushes. The lining of the fourth nest consisted of narrow strips of glistening white Eel-grass, Zostera marina, which not only bottomed the nest-concavity, but also curled its surplus of satin strands out and around the grassy tuft into a most conspicuous and charming decoration. Conspicuous as it was against the dark background, it was not absolutely tell-tale, for similar curls were scattered about the neighborhood and decreased the danger of discovery. The field nest was lined with grass which harmonized perfectly with the standing grasses that met above and made detection difficult. The customary lining seems to be leaves, and nests, so lined, though couched in short grass and open to view, are in reality well-concealed, for the chocolate-blotched eggs are almost invisible in their dark setting.

Four eggs were ultimately the complement of all the nests, though one when discovered, contained but a single egg. These were indistinguishable in shape and size, but varied considerably in amount and arrangement of markings. One set was so heavily blotched with varying shades of dark brown that the background was hardly visible at any point, while a second set was blotched only about the larger end and spotted on the sides and small end. The general appearance of the second was buffy, while that of the first was chocolate. Still a third set differed from these in having two dark eggs like the first and two light like the second.

All four of the marsh nests were found on June 17, when three possessed the full complement of eggs. By June 22 the nest, which had on the 17th but one egg, now contained four. On this same date, the 22nd, eggs of one of the marsh nests hatched and these chicks left the home before the morning of the 24th. 24th also witnessed the discovery of the field nest, which at that time contained four eggs somewhat incubated. These hatched between June 25th and July 1st. It appears from this that some of the females must have begun laying as early as June 5, and on the other hand, one certainly did not start much before the 16th. It must be remembered that this season, as far as the Magdalen Islands were concerned, was late and unusually wet. nately I have no dates, other than those given above, from which to calculate the length of the incubation period. All that I can definitely assert is that it lasts longer than seven days. Not until the clutch is complete does incubation begin, for all the eggs in one nest hatched within a period, not longer than twenty-four There is a possibility that two broads are reared, since one female, collected on the 24th after she flushed from the set, not completed till the 22nd, exhibited a red-centered condition of four of the ovaries, which made the laying of a second set potentially possible.

The young are certainly precocious, leaving the nest at least by the first day after birth and, thereafter, being able to find their food and take care of themselves. At sunset, June 22, the first egg of one clutch hatched before my eyes and forty hours later on June 24 all of the young had left the nest. The parent who had brooded them was walking about, within a few feet of the deserted home but despite diligent search, no trace of her young could be discovered. At this early stage of development their various shades of cinnamon and brown render them inconspicuous and their small size completes

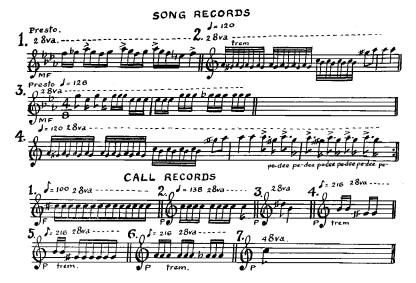
an equipment sufficient for absolute safety, as long as they remain in the dark marshes. That they do not stay there long, I feel confident, for a parent and two young, not over three days old, were discovered by us on July 2 in a stretch of sand, bordering the beach and a long distance from a possible nesting-locality. Here against this white background, relieved only by spikes of grass, they were very conspicuous and the lack of protection made the parent frantically anxious. Piping a frenzied flight song, she whirled over our heads and dashed to earth, there to trail excitedly in a vain effort to confuse attention. To protect, to warn, to guide in the search for food, these seem to be the chief parental functions at this stage. That the young are able to find food and water for themselves, we had evidence the next day, for these two were kept over night and, when they were let loose, ran at once to a stream of water coursing across the beach, boldly waded in and drank deep. Quite as adept they were in finding food. Our attempts to recatch these nimble youngsters brought to light a use of wing, I would not have credited to two-day old chicks. At the moment of imminent capture they would raise their featherless flippers and flap them vigorously, as if anticipating a surer method of escape in the near future!

Interesting as this precocity was, it did not appeal to me so much as the guileless disposition of the adult birds. customary gunner's experience with Shore-birds I expected these abused Sand-peeps to be extremely shy in their northern homes. The truth was a revelation of gentleness of character, apparently inherent in the whole species, in astounding contrast with the bitter treatment, accorded them on our southern beaches. Never have I known any birds more docile, more absolutely free from the resentful instinct, than these wee fluffs of life. My caged canary when suddenly disturbed, pecks and scratches, but these wild Sand-peeps permitted themselves to be caught and handled without once resorting to natural weapons of defense. Indeed all their actions about the nest in the presence of human beings indicate a nature at once bold and gentle, fearless and tame, combined in a disposition about as lovable as that of any wild creature I know, and this despite the fact, that they are as consistently "collected" on the nesting-grounds, as they are shot on the migration beaches. It is surprisingly easy to get on friendly terms with them and, once a friendly relation is established, the revelation of life-secrets follows as a natural consequence.

The birds do not flush directly from the nest like many groundnesting species, but invariably walk or run fifteen feet or more. before flying. This habit was characteristic of all five brooding birds, particularly at the time of nest-discovery. Later it was modified by increasing familiarity, indeed two birds became so tame that they would not leave, unless threatened with foot or With them flight was a premeditated action, rarely incited The customary response to the stimulus of man's presence was as follows: At a distance of fifteen feet from me the brooder would raise itself an inch from the nest and watch my approach. If my movement was extremely slow, it would drop back on the eggs, but at my third or fourth step later would rise again and walk a foot away, stop, and gaze at me doubtfully. This action was performed in erect attitude with no attempt to crouch or conceal. The next move was to run swiftly off fifteen or twenty feet and launch into flight (sometimes accompanied by song), provided it was the initial meeting. If she was used to me, she would circle about among the hummocks approaching again from various directions. At this point, if I remained motionless, she would invariably return by short running hitches and boldly gather the eggs under her. My next step would start her again and a sudden movement would produce one of two results: Either she would flutter up a few feet into the air, like a slow-flapping moth, and drop again a few feet ahead, or else she would trail and vibrate the "broken wing." All the birds used the latter trick at one time or other, but they did so sporadically, rarely employing it at the moment of leaving the nest. A marked feature of this manœuvre was the wide-spreading of the tail fan-shaped, showing a conspicuous amount of white. A supplementary action was to grovel in some mud-depression and flutter the half-shut wings rapidly for several seconds, or else to slide slowly forwards on the belly. During this performance a high call-note was constantly uttered resembling the cries of young birds. record No. 1.)

So far the actions described were common to each Least Sand-

piper and would incline one to believe they lacked individuality. Quite the opposite was true; each one was highly individualized, so that it could be distinguished easily by some marked trait. For instance, one bird on leaving the nest invariably ran directly towards me, no matter from what direction I came or how close I was, and walked about my feet in imminent danger of being trod



upon, if I confined my attention to the camera. Though two others were much tamer, neither showed this surprising trait. The action was not threatening, but anxious or merely nervous. A second bird developed a habit of lifting the grasses, we trod down about its nest, a third was quite shy and two others were extremely tame. Furthermore the flight songs of the three brooders I heard sing, were characteristically different and easily distinguishable.

Discovering how guileless the two tame parents were, I naturally devoted most of my time to them. One was the owner of the Eel-grass nest in the marsh, the other of the grass nest in the field. This bird hereafter designated the "marsh bird," was disclosed to us by a village boy, who was trying to catch her with his cap, a trick which he probably would have accomplished. Even while

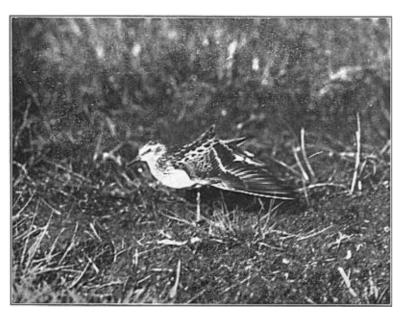
Mr. Baily was focusing his camera within three feet of the nest, she walked up to it and covered the eggs as unconcernedly, as if we were miles away. There were three of us present, talking and conversing, yet she walked right up to our feet and slipped between the tripod legs. Indeed when a time picture of the eggs was required, one had to prevent her from walking in and spoiling the picture. That she was perfectly at home with us, was proved by the easy, unconscious attitudes she took, often preening her feathers or stretching her wings in the most serene and graceful manner. One foot held up the wing, the other balanced the bird. Poising in this airy fashion she seemed some automaton of a fairy world, rather than an earthly intelligence. (Plate XIV, fig. 4.)

And she was very intelligent! On June 20 I watched her solve three problems, one provided by the crowded condition of her nest, the others by human interference. Her custom was to run straight into her nest without stopping at the edge. Without hesitation she would step directly on the eggs, each foot on an egg, and then. try to slip the feet between them before settling. But the eggs were so large and the nest so small, that there was little room for The right foot went down quite easily, but when the left tried, it squeezed and shoved in vain. Realizing that she would not succeed in this way, she made use of her bill, inserting it between the offending eggs and turning the small end of one Then she shoved the lining away to the side of the nest near the small end and having made a hole, inserted the foot. next move was to coerce a refractory egg under her feathers and then to tear out a piece of Eel-grass that annoyed her. content she sank into a wide-spread fluffy condition, the bill sunk, the eyes relaxed, and assumed that glazed appearance, which denotes a brooding bird unconscious of surroundings. (Plate XIV. fig. 3.) And all this happened while my head was within three feet of hers!

It seemed a pity to disturb her, but I had my own problem for her. Forcing her off, I filled her nest full of sticks and waited. Immediately she came up and ran right over the top of the nest. Stopping on the opposite side, she stood stock still a full minute unable to grasp the changed conditions. Then, for the first time



3. Adult Least Sandpiper, incubating. Unconscious attitude.



4. Adult Least Sandpiper, Stretching Wing.

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this bird evinced active concern, for she began to run in and out of the tussocks, searching frantically in all directions, now and then halting to get bearings and constantly giving vent to that pathetic little call. (Call records No. 2 and 3.) Fearing she might abandon the home, I thought to relieve her, when at that moment she ran up to the sticks again, glanced at a tuft of grass four inches to the right, which seemed to be a landmark, gazed at the sticks searchingly, and at length recognized the nest. Instead of trying to lift the sticks out, she attempted to shove under them, but found them too bulky to move. So she pried them up with her bill, gradually working into the nest as she pried. (Plate XIII, fig. 1.)

Again I flushed her and determined to make as hard a problem as possible. First, I stamped down the tufted hillock which threw shadows from the setting sun and next, covered the nest completely with a mass of yellow straw. Again she overran the nest and this time seemed completely bewildered. Astonished by the disappearance of the landmark, she ran swiftly away, as if bewitched, and crouched flat in a mud-hole, her whole attitute being one of fright. But it was not long before she adjusted her ideas to the new conditions, ran up to the straw, inserted the bill underneath, and crept under. Her body struggled under the burden and disappeared; the straw shook convulsively, evidence that the home was being put to rights. For an instant it seemed she would walk off with the new roof, but finally the struggles subsided and a head popped out with a frightened look as much as to say: "What new plots are you concocting now?"

In order to secure photographs I had to disturb her a number of times and the last time, she retired five feet to the east and without warning shot up into the sky. As she flew, she sang the flight song. (Song record No. 1.) I hoped she would return, but no, she kept on ascending and singing as she climbed, repeating the song over and over with but slight pause. A certain wildness about it betokened final farewell and it certainly was final for that afternoon. Two days later contrary to my fears, I found her again on her nest, a returned songster.

This day the 22nd, I determined to catch her in order to ascertain positively that there was no webbing between the toes. Kneeling

on the ground, I gradually moved my hand through the short grass. Each time she rose from the eggs, the hand halted and waited for Sometimes I feinted with the other hand to her to drop again. As the hand got nearer, her breathing became draw her attention. heavier and the breast feathers palpitated visibly. At length my first finger touched her neck and she raised slightly only to sink again, when it stroked her. A minute later her neck was almost surrounded and she resented the uncomfortable feeling only by hunching upwards. Then, just as the fingers were about to close, she slipped out from under and was free. Keeping my hand circled about the nest I waited. Almost instantly she returned and crept under my hand. I closed the fingers and lifted her for examination. She endured it patiently and, when I let her go. flew but a short distance, straightened out the ruffled feathers. and in three minutes was back on the nest!

In the midst of this operation one egg hatched before my eyes. It broke open violently, as if by explosion, the two sections shooting to opposite sides of the nest and the new youngster burst valiantly into the world. Immediately the wet wings began to strike out vigorously and tossed the smaller section of the shell out of the nest. The mother was manifestly perturbed about her new baby, plainly concerned at my presence on such an important occasion. rushed up to the nest, hesitated uneasily, constantly uttering solicitous call-notes (Call record Nos. 4, 5 and 6), and finally Entering she stepped right on the head and neck of the precious new-born, just as she had trod on the eggs previously. Perhaps she would not have been guilty of this flagrant misconduct. if my presence had not embarrassed her. At this moment I left her and, when I returned, found her walking about some feet from the Both sections of shell had disappeared and could not be found, though I searched long. Two days later the nest was empty, the young undiscoverable, but the wee parent was still walking about as tame as ever. Again I almost caught her, getting my hand within six inches of her. Whenever I started the impercentible stalking motion, she always acted as if mesmerized and the recovery from the state of seeming paralysis was announced by tremulous call-notes.

The field bird, whose nest was discovered by Mr. Baily June 25

in a damp grassy field, was almost as tame as the marsh bird. This being the first day of sunlight we had enjoyed with these birds. I determined to catch her too and secure a good photograph. With the camera set up five feet from the nest, a ten foot hose attached, and the bulb in my left hand, I proceeded to work my right hand toward the bird. From the start she proved to be more nervous than the marsh bird and, when my hand got close, fluttered off precipitately. Then, I curved the hand about the nest hoping she would creep under it as the marsh bird had done, but she began to pull at the grasses, we had tramped down in the vicinity. At first this action had been merely protective, for she began it sitting on the nest, lifting the blades and making them assume their former upright position of concealment. Now on the contrary the act was a nervous one, for she straightened grasses some distance away and always did it, when I circled the nest with my hand. Each time I moved away she would return and incubate. It was evident that there was more chance of catching her by moving the hand towards her than by waiting for her to return. Proceeding in this fashion after an hour's effort I accomplished the trick. She struggled violently, but did not attempt to pick my hand.

Like the other Least Sandpipers she possessed a flight song and gave snatches of it from the ground. Once she rendered it entire, within a foot of my hand! It consisted of a series of trills, which ascended just one octave on a minor chord. (Song record No. 2.) The tone quality was pure and sweet and rendered pathetic by the minor chord, which served as its medium. This, however, is distinctly a flight song and, I believe, delivered from the ground only under spur of excitement. Slipping out of my hand a moment later she uttered it with a wild frenzy, as she whirled excitedly aloft. Out over the Lagoon she went, farther and farther, higher and higher, till her wee form vanished from sight, but for several minutes afterwards that pathetic ascension of sound reached my ears, constantly leaping upwards, only to return to its starting point and leap again. Three minutes later I heard it once more approaching and shortly after, she pitched down near the nest and in a few seconds was once more brooding, as if no untoward incident had happened!

Records of the flight songs of three of these brooding birds I possess and each in its notes, progressions, and even time is totally different from the others, and yet, without sight of the bird, I would instantly recognize them as songs of the Least Sandpiper. This is due to the fact that the quality of tone is constant in all being pure and sweet, the tempo is always extremely fast, the notes being delivered with great rapidity, and the pitch high. Trills and runs are characteristic and make an additional recognition-quality. All of this is shown by the records which follow:

No. 1 is the song of the marsh bird I caught, No. 2, the song of the field bird, and No. 3 belongs to a bird I was compelled to shoot, as described later. All three were rendered by incubating birds. Songs No. 1 and 2 were heard on three or four occasions each, and No. 2 was noted over and over again, both from the earth and the sky, and I have no evidence to suggest that this bird or the other two sang other songs than their own particular ones, or that they varied them to any noticeable degree. After the young were out of the nest the field bird did alternate with song No. 2, a long repetition of two call-notes (Song record No. 4) as noticed later, and changed from call-notes to song and from song to call-notes without a second's break, and yet these call-notes were so distinctly such, that they need not be considered in a discussion of the songs.

Two marked qualities the songs possess and they are exhibited, in one case more and in the other less, by the call-notes, that is they are tremulous and they are pathetic. The former is most prominent in the calls, but is at times present in the songs. On several occasions they were rendered within a few feet of my ears and at this close range trembled or quivered markedly. This tremulous quality is precisely the best medium to convey anxiety and it was most strongly present, when the brooding birds give evidence in other ways of possessing that emotion; for instance, when the marsh bird could not find her covered nest and when she found my hand encircling her nest at the instant her first chick was This quality was also conspicuous at the initial discovery of each nest. In the flight songs, when delivered at a distance, the tremulous effect could not be so easily distinguished, but when they were given on the ground at moments of anxiety, they were strongly charged with it.

The second quality, that of pathos, was perhaps the chief characteristic of the songs and to a lesser extent of the calls. An examination of the musical structure reveals the reason for this. All three songs are definitely related to the minor key. Song No. 2 is distinctly in the key of A minor, song No. 1 in the key of F minor, and No. 3, though beginning in E^b major, drops its "third" a half tone at the end, as if inclining toward the minor effect. So too, even the call records, No. 4 and 5, are distinctly minor, consisting of two notes, B and $G^{\#}$, which limit the intervals of a minor "third." It is a matter of popular knowledge that sad or pathetic songs are generally written in minor keys and so it is not surprising to find these pathetic bird songs rendered in just the best way to produce such an effect.

The finest bit of singing I heard occurred at the close of the nest-Returning from Bird Rock, July 1st, we passed by the nest of the field bird, which had sung song-record No. 2. we walked along this flight song piped overhead and was sung over and over again with a tremulous zest. Alternating with it, was repeated for long intervals an excited call of two notes. glanced up and for the first time beheld two adult Least Sandpipers together! Alternately they flapped and soared and circled about in a rapturous fashion. For several minutes the alternation of song and call continued without break of any kind. the song was given three times consecutively and followed by as many as thirty or forty repetitions of the call, this in turn to be followed by the song again. The second note of the call was strongly accented, as indicated by the mere musical outline above (Song record No. 4). This call of two notes precisely corresponds to Nuttall's description of the "collecting cry of the old birds calling together the brood," which he rendered into the syllables, "pé-dèe, pé-dèe, pé-dèe, etc." The accent gives it an emphasis of joy not to be misunderstood and the whole performance is decidedly ecstatic. Turning to the nest I found it, as I suspected, empty and I was willing to believe that the unusual ecstasy was not unrelated to the passing of the great red-letter incident in the rearing of young, the leaving of the nest.

Focussing my glasses on the rapturous pair, I confirmed another supposition of mine, that only one bird was doing the singing.

And this brings me to the statement of a conclusion, the proofs for which I wish were more adequate, and yet they are adequate enough, I think, to warrant the publishing of what, if true, is a most unusual trait in the life-history of this species. On the 22nd of June I suddenly realized that in all my prolonged visits with these birds, lasting for several hours at a time, I had not once observed mates of any of the five brooding birds. It seemed exceedingly strange when the birds were so repeatedly disturbed, that the mates should not be called in to protest, particularly as both sexes of the other shore birds nesting in the vicinity, the Spotted Sandpipers, the Ring-necked, and the Piping Plovers were always about their nests. From this day on I made particular search for these mates, but without success. Neither about the nest, nor in the great marsh, nor even on the nearby beaches did I once discover a single Least Sandpiper, other than the five, which, despite frequent visits, kept on or close to their respective By the 24th I had come to the natural conclusion that the absent mates were males, although this involved the belief that the singing was being done by the females. For some days it had been plain beyond question of doubt that the brooding birds of at least three of the nests were always the same ones to be found each time on their respective nests, for each of these was too strongly individualized by various traits to be mistaken for other individuals. It was also absolutely certain that these incubating birds were doing all the singing we heard. On this day, the 24th, I shot the bird, which sang song record No. 3, immediately after I noted her flush from the nest, sing, and return to brood. That evening Mr. Baily dissected her under my observation and found her to be a female! On the following day I made a more determined search than ever for the "males," as we now denoted them, and under this date I find for the third time in my journal the same note: "Have not been able to locate sitting birds' mates anywhere, not even on the beaches"! Not until July 1, when all the young were out of the nest, did we observe a single mate and that was on the occasion noted above, nor after this did we again note two adult Least Sandpipers together!

From these facts and observations it seems to be a safe assumption that all of the incubating birds were females, that the females

did the singing, and that the males spent the day hours some distance from the marsh-homes and, if they incubated at all, did so at night. Two facts remain positive: that the incubating birds did the singing and that one female both incubated and sang!

I cannot close this paper without adding a just tribute to the song of these wee sprites. Of course, it cannot compare in power, melody, and rich depth of tone with the song of the Fox Sparrow. the prima donna of the Magdalens, nor can it claim attention beside the productions of the Hermit Thrush and the Song Sparrow. which however are rare, at least in the eastern part of the islands. But after these three major songsters are disposed of, it will be found to rank high up, if not at the head of those that are left, the Rusty Blackbird, Savannah Sparrow, the Kinglets and nearly the whole group of Warblers. Only two of the minor musicians present in the Magdalens, the Water Thrush and the Horned Lark, can equal the effusion of the wee Sandpiper. This is a remarkable fact, when one remembers that none of the other shore birds, at least those summering in the Magdalens.—the Ring-necked and the Piping Plovers, the Spotted Sandpiper, and the Wilson's Snipe — utter anything that even by courtesy may be termed a song! The Sand-peep, alone of his tribe, dares to contest with the real songsters and does so creditably. Indeed, after that one glorious song of the Magdalens, the Fox Sparrow's, is excluded, I will always remember longest and hold dearest this sweet rippling sky song, that somehow, perhaps on account of the aerial quarter from which it comes, perhaps on account of the sweet character of its author, touches some chord within me nearer to affection than many of the bird-songs, held up for unquestioning admiration, are able to reach.