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NOTES ON A CAPTIVE HERMIT THRUSH.

BY DANIEL E. OWEN.

JUNE 26, 1896, while exploring a small patch of mixed growth in search of birds, I fell in with a young Hermit Thrush, accompanied by its parents. The young bird was just from the nest and had such ill control of its faculties and muscles that, ultimately, after a laborious flight of seven or eight yards, it alighted at my very feet. I captured the youngster, by dropping my hat over it, and having tied the bird, loosely, in my handkerchief, carried it home in my collecting basket. For the next five weeks, the Thrush was my constant study companion, and during this period discovered so many attractive traits that when I came to restore my captive to its native wood, the parting was, to one of us, the occasion of real regret.

I domiciled my little orphan in a large, old-fashioned canary cage which was allowed to stand, most of the time, on the sill of an open window. At first the Thrush objected to this durance vile, expressing its distaste by ejaculatory 'peeps' which, June 28, attracted to the roof, near the window, a sympathetic Chipping Sparrow, and caused a Robin in a neighboring tree to sound a loquacious and protracted alarm. But the imprisoned bird



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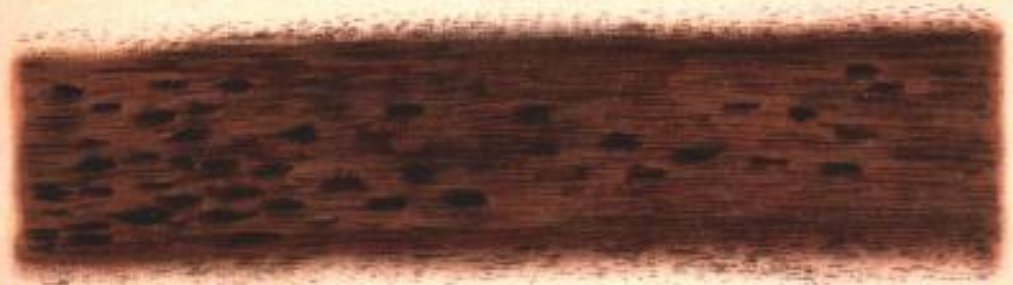
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INDIVIDUAL DICHROMATISM
IN THE SCREECH OWL.

seemed soon to realize that remonstrance was of no avail, and by June 29 its impatience had given way to a philosophic serenity and composure that rarely were disturbed during the remainder of our acquaintance.

It was astonishing to see how quickly and well the Thrush adjusted itself to novel conditions. By the twenty-ninth of June, that is, after three days of confinement, the bird was not only on the best of terms with me, but we had learned to communicate. I found that a very gentle kissing sound, made with the lips, at once attracted its attention, causing it to ruffle its feathers, as young birds do on the approach of the old ones, and giving rise to an expectant attitude generally. Having secured its attention, I had then only to open the cage door, when the bird would come out, hop into my lap, and open wide its mouth. In a few days more, the Thrush had learned my step and my whistle. Its recognition of these sounds was voiced in a succession of chirps, which, usually, had an imperative tone, or a coaxing one, and indicated an empty stomach. If my absence had been rather long and the bird's meal unduly delayed, its piping voice took on a mandatory key which bordered on imprecation. When well fed and comfortably at rest on its perch, the little fellow had a habit of trilling softly, as if talking to itself. This trill had a remarkable property of ventriloquism that led me, at first, to ascribe the notes to a bird out of doors; but I soon learned their author and came to take pleasure in their assurance of genuine contentment.

When captured, my Thrush was unable to feed itself, so I had to make my bungling fingers do the work of a mother-bird's dexterous bill. Knowing that it would be a good deal of a task to furnish, altogether, food of the same nature as that provided by the parent birds, I made the experiment of substituting, to some extent, for grubs, earthworms, and insects, raw beef cut into bits about one centimeter long by half a centimeter wide. Before inserting the pieces of meat between the young bird's gaping mandibles, I dipped them in water by way of lubrication, in order that they, readily, might slip down the bird's throat. This was the more necessary because the bird, often, would refuse to swallow unless the food had been placed far back in the mouth, at the very entrance to the gullet. Moreover, it seemed well to supply

water, in some way, to the digestive tract of the Thrush, which for many days refused to drink. Although the bird bathed almost daily, and once, at least, bathed twice in one day, up to July 31, when observation was discontinued, it drank in my presence but three times. These exceptions to its rule of abstinence occurred during some hot weather toward the end of its confinement.

The young Thrush took kindly to its diet of meat. June 28, between 8 A. M. and 7 P. M., it was fed eight times and swallowed 27 bits of meat. June 29, between 8 A. M. and 8 P. M., it was fed ten times and ate 25 pieces of meat. In order to get a more definite idea of the appetite that demanded this amount of solid nourishment, I began, July 4, to weigh the bird's food, as well as the bird itself. As this little investigation proceeded, it became apparent that the bird's weight fluctuated greatly within a space of twenty-four hours. Thus July 4, at night, the Thrush weighed 30 grammes, while in the morning of July 5 it weighed but 25.5 grammes, a loss during the night of 4.5 grammes. To appreciate the significance of this variation, let it be noted that the loss in a single night was 15 per cent of the total weight, so that if a 150 pound man were to suffer the same diminution in avoirdupois, between going to bed and rising, he would lose no less than 22.5 pounds.

In order to get comparable figures, I made it a practice, therefore, after July 5, to weigh the bird in the morning. For the five days, July 4 to July 8, inclusive, the bird's average weight was 27.7 grammes, and the average weight of meat eaten daily, 13.56 grammes. These figures do not convey a strictly accurate idea of the bird's appetite, because I was absent from my study several hours daily, and the Thrush, undoubtedly, would have eaten more if assiduously tended. For example, July 7, between the hours of 11.30 A. M. and 8.45 P. M., being constantly looked after, the bird ate 12 grammes of meat, nearly as much as its average for a whole day; and although my record indicates that it ate about 50 per cent of its weight in meat, yet I feel certain that under the most favorable conditions it would have made way with at least its own weight of raw beef, daily.

While meat formed the staple diet of my Thrush, during the first weeks of its confinement, and was used, more or less, throughout,

I began, early, to experiment with such food as I thought likely would have fallen to the lot of the Thrush had it been left to the care of its parents. Thus, July 1, I fed to the bird a number of earthworms. For convenience' sake, I cut a few of the biggest worms into two or three pieces, each of which was as large as an ordinary worm. Counting these pieces as whole worms, and this is legitimate, considering their size, the Thrush ate 19 worms between the hours of 8.30 A. M. and 1 P. M., four hours and a half. This is at the rate of 4 worms per hour, or one worm every fifteen minutes. These figures, again, do not represent the capacity of the bird truthfully because I had not become expert in feeding, and after I had made several unsuccessful efforts to thrust the wriggling object in my fingers down the bird's throat, it often would shut its mouth in disgust and refuse the worm.

July 3 came the discovery that the Hermit Thrush is fastidious in its diet. At 1.45 on that day, the bird weighed 25.2 grammes. At the same hour, I weighed out 7.5 grammes of worms taken from a manure heap. In 30 minutes, the bird had eaten four grammes of the worms. If it had continued at the same rate, it would have eaten its own weight in worms in 3.15 hours; but it soon appeared that the bird did not relish the flavor of these dunghill delicacies. It made a great splutter in eating the worms and frequently rejected them with every symptom of nausea and abhorrence, wiping its bill on the nearest object, which was, generally, my hand. So I threw away the remainder of this lot of worms and renewed the experiment with five grammes of worms taken from cool, black, garden mould. These the bird dispatched, with evident relish, in just 30 minutes more. At this rate, it would have eaten its own weight of acceptable worms in about two hours and a half! My record of later experiments, however, indicates that the Thrush would not prove quite so voracious a songster. Just how long it would take the young bird to eat its own weight in worms, I never accurately ascertained. To know this would, indeed, be interesting, but it would be of small scientific value since the conditions of captivity differ widely from those surrounding a bird in the wild state.

The results of the raw meat and the worm experiments caused me to infer a rapid digestion on the part of the young Thrush. It

was not long before I had an opportunity of verifying this presumption. July 11, I was shown, in a blueberry patch, a nest which I took to be that of a Hermit Thrush. Judging that the location of this nest might imply a fondness for blueberries on the part of the Thrush, I introduced a few berries, July 13, into my bird's cage. The avidity with which they were seized and swallowed showed that my conjecture had been well founded. The coloring matter of the berries dyed the bird's excretions, and it occurred to me that this fact furnished a ready method of finding the length of time required by the Thrush to digest blueberries. The test was made July 25. At 12.56 P. M. of that day, the bird voided white excrement and was fed, at once, with blueberries. At 2.28 P. M., one hour and thirty-two minutes later, it dropped blue excrement mingled with berry seeds. If this experiment is trustworthy, and I see no reason to doubt the accuracy of its method, the time required for a blueberry to traverse the digestive tract was, practically, one hour and a half.

I have said that, at first, my little captive was unable to feed itself. Generally speaking, this is true; but the bird soon acquired a habit of picking up occasional morsels and at the time of its release, July 31, it could get along very well without assistance, although, even then, it preferred to be fed.

The bird began to peck at imaginary objects, in a desultory way, June 29. In the morning of July 1, while the Thrush was on a window sill, a favorite perch when liberty had been granted it, I put beside it a piece of earth-worm. It eyed the worm for a moment and then attacked it in dead earnest. In its enthusiasm, the bird lost its balance and fell off the sill; but later, when it had regained its equilibrium, mental and physical, it managed to get away with several worms unassisted. July 3, the Thrush spent some time on the floor of my study, running about, sometimes making short flights, and displaying, withal, a great deal of curiosity. My shoes, particularly the lace fastenings, the carpet tacks, and a pair of ring staples on a box, were all critically examined and pecked at; but the favorite subject of investigation was a small piece of waste paper that lay on the floor. The paper was red on one side and white on the other and was picked up and tossed about very frequently. July 8, the bird discovered a fondness for

house flies, to which, when placed in its cage, dead or disabled, it helped itself. Later it developed considerable skill as a flycatcher and no insect was safe within the wires of its cage. The bird's predilection for pulling over paper grew on it. It was very amusing to see it alight on my study table and essay, forthwith, to look beneath each separate sheet of paper lying thereon. This habit I took to be a display of instinct, which, exercised in the woods, would lead the bird to overhaul leaves and other similar rubbish in search of food.

The behavior of the Thrush at various times gave me several hints as to the habits of its species in the wild state. For example, it ate most greedily in the morning and at night, thus corroborating the general testimony of observers that birds take a rest in the middle of the day. Again, as dusk came on, the bird became restless and fluttered about its cage so recklessly that, at times, I was obliged to cover the cage with a cloth and set it in a dark corner. After some study of the bird's movements, I was led to attribute its unrest at evening to a desire for a high perch. To test my inference, I one evening liberated the bird. It flew about the study, close to the ceiling, and, finally, went to roost on a high picture. This proved that I had, in fact, in these nightly flutterings, an evidence of the instinct that leads birds to seek high perching places, at night, as a safeguard against many dangers. It struck me as especially interesting in the case of the Hermit Thrush which builds its nest on the ground.

My captive Thrush slept with its head under its wing, in the orthodox fashion, and took occasional naps during the day. It proved a meditative bird and would sit for half an hour at a time with an air of deep abstraction. As it dozed on my study table, June 30, I counted its respirations and found them to be from 80 to 85 per minute. When it is reflected that the rate of human respiration ranges from about 44 at birth to 15 at maturity, the fact that the bird is a high pressure organism may be appreciated.

My Hermit Thrush belied its name by being very fond of society. Occasionally, I allowed the bird the freedom of my study. At such times it preferred to keep near my chair, often alighting on my head, or on the table upon which I was writing. It would allow itself to be held in the hand, but was rather ill at

ease, and pruned itself carefully on being released. It bathed regularly, and though it kept its cage in a litter, was scrupulous about its plumage. When taken, its tail feathers had just started. They grew rapidly, and by July 31 had attained their full length. As soon as the appendage had gained sufficient length to be used in gesticulation, the bird accompanied its 'peeping' cry with flicks of the tail, after the manner of a Robin. Some of its attitudes, as it stood with uplifted tail, were very like those of the Catbird.

In concluding this record it remains to speak of the bird's method of eating earthworms, for it was method, indeed. The bird began by worrying the worm, much as a cat does a mouse, nipping, pecking, and slatting its victim violently. The attack seemed to be directed, mainly, at the extremities of the worm. Thus, in one case, the head of the worm was pecked ten times, the tail seventeen times, and the middle twice. The worm, of course, squirmed and wriggled vigorously, at first; but, after a time, lost, in a measure, the power of motion. Now and then, the bird's beak would miss the worm, or would slip off. At such times the mandibles came together with an audible snap, conveying a suggestion of the torturing pinches to which the unfortunate worm was being subjected. The pummeling and nipping having gone on for from one and a half to three and a half minutes, the Thrush would next essay to swallow the worm, beginning, almost invariably, at the tail. This mode of attack may have been prompted by a chivalrous desire to give the poor worm as much of a chance as possible. If so, its object was, in a measure, gained, for, in the case of a big worm, the process of swallowing was distressingly prolonged by the efforts of the worm to escape, in which it often succeeded so far as to crawl out of the bird's mouth almost as fast as it was drawn in. The outcome of the struggle was always in the bird's favor, although in one instance, that I timed, the head of the worm visibly protruded from the bird's throat for seven minutes and a half after swallowing began.

The fact that the Thrush swallowed its worms tail first gains something in interest when the structure of the earthworm is taken into account. As is well-known, the earthworm's body consists of from 100 to 200 rings, or segments. Every segment, except the

anterior two or three and the last, affords insertion to four groups of short bristles, to which muscles are attached, and by means of which the worm progresses. The bristles may be made to point in either direction, according as the worm wishes to advance or retreat. When pointed toward the tail, they hold the worm as it crawls ahead; when directed ahead, they give foothold for retrograde movement.

Now a person would suppose that the presence of several hundred little bristles, all pointing the 'wrong way,' would interfere with easy and pleasurable deglutition; and inasmuch as a worm, normally, crawls ahead, and not back, I expected to see my Thrush swallow worms head first, when, it is to be presumed, the bristles in question would not retard the process. As a matter of fact the contrary method, as noted above, was followed. Once in a while, a small worm was seized by the middle and doubled, or taken by the head; but careful observation, extending over several days, brought out so few instances of this kind that I am convinced it was a rule with the bird to swallow earthworms tail first. The fact that the worm often made some progress in its attempt to escape from the bird's mouth would indicate that the bristles were in working order, despite rough treatment, and that they were pointed back, toward the tail of the worm. From this we must infer, either that the bird was indifferent to the rasping of the bristles on the walls of its throat, or that the sharp resistance they exhibited added spice and flavor to the writhing morsel. But, for all that, any explanation is merely conjecture, and why the Hermit Thrush should choose to begin its meal with the tail of its victim remains a curious, though not a profound, subject for speculation.

RECENT INVESTIGATIONS OF THE FOOD OF EUROPEAN BIRDS.

BY F. E. L. BEAL.

A PAPER upon the food of the Rook (*Corvus frugilegus*) by Dr. Hollrung, appears in the Seventh Annual Report of the Experi-