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SHORT CUTS AND BY-PATHS



A BY-PATH.

SHORT CUTS
AND BY-PATHS

BY
HORACE LUNT
AUTHOR OF
"ACROSS LOTS"



BOSTON
D LOTHROP COMPANY
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TO THE MEMORY OF

Elizabeth Lunt McEntire

WHOSE SOUND PRACTICAL SENSE, BENEVOLENCE
AND EXALTED CHARACTER GAVE TO HER
WOMANHOOD A LASTING INFLUENCE

*This volume is most reverently and gratefully
dedicated by the Author*

PREFACE.

THE papers contained in this book, with the exception of those entitled *Trees in Undress*, and *Leaves in Winter Quarters*, respectively published in *The Christian Union* and *The Independent*, and a few sketches in the *Garden and Forest*, *Cottage Hearth*, and *Golden Days*, have never before appeared in print.

The author is aware that not much of scientific value has been demonstrated in these pages, and that there have been few wonders in animal or plant life described, which have escaped the sharp eyes of the specialist.

If, however, he has transmitted to his lines any of the enthusiasm which he himself felt while beholding these scenes, such as may lead the young folks, or the general reader, to draw the curtain aside and see more of Nature, his object has been accomplished.

HORACE LUNT.

BOSTON, 1891.

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A FORWARD MARCH.

SHORT CUTS AND BY-PATHS.

I.

A FORWARD MARCH.

THE March of 1889 seemed not like ordinary Marches. He came into the world playful and bleating, like the lambs; with purling, flowing sounds, in harmony with the bluebird's note, as if he no longer cared to herald war with his trumpet blast and stentorian lungs, but played on the low, sweet flute instead. On the very first day of his reign, the tiny snowdrop bells, in sheltered gardens, were swung on their slender pedicels by troops of fairy zephyrs — strangely gentle legions for the god of war to be marching in. For a week or more this clement administration continued. The moths, ephemerae and blue-bottles came out to enjoy the warm air and sheen. The catkins of the pussy willows gleamed in the sun

like bits of white wool, and the grasses, in warm, springy places, lifted up to the first call of the sun their fervent, impetuous blades. How promising and hopeful are these firstlings! It seems irreverent to kill or pluck them now, they are so exultant. The most sensitive hylodes, I dare say, were allured from their hibernacles by the blandishments of the weather, to strike the keynote of Spring.

Not only are the first days of March bright, but the nights also are resplendent with millions of suns! Each evening a new picture is painted on the screen of the western sky, with variety of cloud designs and changing colors. No sooner does "Old Sol" hide his face behind the curvature of earth than he begins to throw up the rich hues and dash the vapors with gorgeous tints. Scarlet, rose, orange and purple scraps of mist are lined with shining gold. Long before the grand illumination has paled in mellow twilight, the faithful ranger shoots his beams of light across to Venus that goes careering down the sky after her lord and master. How radiant and full-blown is her beauty! "Like some fair lady in her casement," she turns her sparkling eye down to view her sister's earth-plodding children.

To-day (the 20th), groups of people are gathered at the street corners to catch a glimpse of the little planet, as did Æneas the Trojan prince, and

his followers, more than two thousand years ago. She is sufficiently near to us now to be seen by daylight, shining softly out of the dome. It is not easy for us to realize that this speck of silver, this pearly dot, set in the blue, is a vast globe of rock and gravel, dirt and soil, swinging in "its eternal circle" around the central fire. Are there stargazers in the streets of its cities looking out to-day through twenty millions of miles of space, to see our shining disk?

If the axiliary inclination of Venus nearly corresponds with that of earth, as is the opinion of some of our learned modern astronomers, it is reasonable to suppose that her northern and southern regions at least are habitable, and agree in climate and condition with those of our torrid and temperate zones. Plants, then, must be growing there! Birds, perchance, are trooping up the curvature to their nesting-places, northward, and insects are zigzagging and buzzing in the light of a larger sun. How we burn with extravagant curiosity in our desire to view her landscapes, to compare the families, genera and species of her flora and fauna with those of our native revolver!

But in the ethereal ocean the splendid world sails on, till, like a ship in its course, it comes again in daylight eye-hailing distance, and then recedes as before, without giving answer to our vaulting questions, or throwing out one longed-for

signal. The rambler, however, need not fly to other worlds for entertainment. Nature is here. Her catalogue of beauties and wonders is not soon exhausted, and the book is held up at every step, for him to read.

March, after a short bluster, settles into good temper again. Even the sunny spirit and humor of May shines into many of his latter days. The revival of the year has already been announced by the sweet voices of the red-wings. Ah! the soft, mellow contralto of this gay, epauletted starling is the very expression of mild spring weather. When he strikes the right key-note, and does not slip into cracked, discordant tones, as he is apt to do at the slightest cause, not even the blue-coated poet himself surpasses him in tender, elysian melody. In the sunshine I sit entranced at the sound of an unusually persistent sweet singer. He reminds me of the veery when the spell is on him. "Og-a-lu-e-e-e! Ol-eagle!" he says, rolling the mellifluous notes out of his throat and over his tongue, as if he liked the taste of them. It is the music of the purling ripples of a clear, cool brook to the thirsty, way-worn traveler. For a half-hour he continues to pour forth his delicious strains that melt in the ear as the richest confections dissolve on the tongue. As far as seen, there are no females in this flock. Each one has his red-gold fringed shoulder-ornament sharply

defined against the black. Do the sexes fly in separate flocks while on their southern wandering? Probably they do not. When the migratory impulse northward is felt, the males, which I believe are permanently mated — the older ones, at least — have a day when they leave their spouses and perhaps the younger males behind. If so, how curious is this habit of holding conventions near the time of their departure, agreeing to meet again in certain localities hundreds of miles to the north!

Looking over this swamp, where the red-wings are singing, I imagine what wonders the sun will work in it, during the coming months. What beautiful color he will paint it with his pencils of light, and what miracles he will perform, in resurrecting from egg and pupa and hibernacles, insects and reptiles, now lying dumb and quiescent within their tombs. These brown cat-tail stems are like thousands of distaffs standing uprightly along the reedy plain. The tow that was tied to them last Summer is ravelled out by the Spring breezes, and appears like bits of wool on sheep that feed in scrubby pastures. How prolific are these plants! It would be an almost endless task to count the fruit, grown on a single head. One is interested in seeing how abundantly Nature has provided the means by which the seeds are dispersed. I count twenty-five plumous

bristles attached to one of the minute, long-stalked nutlets, scarcely larger or heavier than one of these downy wings. How far away they must be blown, farther than Boreas travels or the south-wind flies. They are the sport of every gale or zephyr. Eastward, westward, hither and thither, like shuttle-cocks, they go, the winds playing battledore with them.

The old war-god, on the twenty-ninth day of his supremacy, orders his batteries into the armory, "the cave of the winds," and welcomes his subjects at his morning's door with a calm and smiling face. People everywhere are praising his extraordinary good nature. The young inhabitants inquire of the oldest ones if they remember seeing such a mild March. Passers-by, instead of asking the usual question, salute each other by complimenting the weather, and take it for granted that all who are out, inhaling the tonic air, are well, or on the road to health.

Such a beautiful spring-tide morning brings to us waves of birds. The air is full of bluebird music wreath-notes, and the song sparrow discourses pleasantly. A party of red polls are lisp-ing in the alders by the stream. They cling to the twigs almost invariably with their backs downward; and nod and cant their heads, and peer between the thick, black woody scales of the last year's fertile catkins, as if they were considering the best

method of extracting the seeds. They are of a grayish ash color and variously streaked with white. Their tails, which are spread out like fans when they are in the inverted position but closed when they are upright, are deeply notched, and their crowns are ornamented with a large, dark, blood-red patch, while the breasts and flanks of a few individuals are tinged with carmine, like the males of the purple finches.

How hearty are these feathered mites! Alder seeds are evidently their favorite dish in winter. They had come from the high northern latitudes where the dwarf birches and alders form clumps and thickets, by the streams that flow into the Arctic Seas and Hudson's Bay. Perchance this greedy fellow, who turns his pretty, watchful eye toward me, between his prying and pecking, has seen the swarthy Chippeway or the Esquimaux within a month, and will line his nest next Summer with the hairs of the Marten or the Caribou.

These hardy visitors, in their journeyings, had met by chance their southern cousins, the song sparrows, in Massachusetts, where they exchanged congratulations, sang of the weather, and talked of the prospects of the seed crop another year.

It is certainly uncommon to see so early in the season so many bridge pewees, or Phœbe birds together. Five or six of them are flying about the "pudding stone" quarry, alighting on the

rocks, flirting their tails, and peering into crevices, as though the gallant husbands, coming on before their wives, were prospecting for building sites.

Not only has the sun quickened the blood and put the songs in the throats of the early birds, but it is sending the beams into every cranny, chink and rift, and resurrecting the butterflies. Several are started up as I walk along the sunny, wooded slope. They alight on the dead leaves, slowly opening and shutting their ornamented wings, and appear to suck the moisture with their siphon-like tongues. What splendid hues has this insect! Where in the world did it get that gold paint, and what artist designed and executed such delicate gilding, such elegant marking?

Besides the antiopa I spy another specimen in the genus Vanessa that has come out to try the air. It is a size smaller, with angular, bright fulvous wings which harmonize nicely in color and shape with certain rusty, damp, oak leaves that rest partly on their edges, so that the light shines on them. It has the action of its brother, but is more easily alarmed. How readily these insects see you! Although I approach it with the greatest caution, it does not allow me to come within ten feet of it, and flutters away, like a scrap of brown paper blown off by the wind. Sunlight, air and dew only seem to be their tenuous nourish-

ment, so soon after their resuscitation, and yet how vigorous, nimble and full of life they are! What prevented these delicate creatures from freezing outright, during the cold winter days? The frosts, when the ground is bare, must have easily invaded their slight hibernacles, yet in some mysterious way the small spark of life within the dorsal vessel or heart must be always glowing. Caterpillars, grasshoppers and spiders are quite often seen moving about even in the mild winter weather, showing how quickly the sun's rays penetrate their lodgings and stir their vital embers into flame.

This is also a real field and gala day with the crows. Over the high hill yonder, a large flock of them are holding a kind of love-making carousal and jollification. Such queer, magpie-ish actions, such aerial gymnastics and lofty tumbling, afford a genuine entertainment. How their black backs glisten in the sunlight, as they shear and curve in the air! With hanging legs they hover over the cedars, and in the very spirit of fun, try to light on the tip of the slender main sprigs, which under their weight bend over in the shape of bows; yet they cling to them for a moment and flap their wings, or extend them as artists sometimes represent "the spread eagles" on flags and armorial bearings; then they all take flight again and play "tag" in the air, amidst a general chorus

of laughter and vociferation. Their cawing now is the very expression of rejoicing and frolic, very different in tone from their harsh, querulous clamor while tormenting the hawks. It is astonishing what variety of feeling and emotion these birds can express in that single word. After a half hour or so of merriment, they fly off, one after another, in a sober way to the woods, as though they had suddenly recalled to mind some important business enterprise that ought to be attended to, and soon all is silence over the hilltop.

I like these crows, they are such characteristic birds and so intelligent withal. No doubt they can distinguish a gun, at a long shot distance, from a cane or spy-glass. Farmers say that they can smell the powder in the barrel. Why should not the wisest, oldest heads among them, the half-century living ones, at least those that have been so long associated with the prejudiced world and its firearms, learn from experience to nicely discriminate between the observer who walks abroad without reserve, and him that stealthily creeps up to wall and tree with a murderous fowling-piece in his hand?

Mr. Trowbridge, in his humorous poem "Watching the Crows," after telling the story of how the farmers outwitted these "cute" birds by firing from an ambush, makes the neighbor's boy say :

“You’re as knowing a bird as I know;
But there are things a little too deep for a crow;
Just add one to one, and what’s the amount?
You’re mighty cute creatures, but then you can’t count.”

But is it altogether fanciful to suggest that as mental evolution in animals goes on, these sagacious fowls, by “a protracted series of experiences,” may not in the future have the faculty of determining in some way the true situation of affairs behind the screen, and so will not be deceived by any such artful dodges as “Jack Haskell” practiced? At any rate, these shrewd, clear-sighted individuals seen to-day overhead, within an hour’s flight of the Charles River, “the Classic Shades,” and the gilded “hub,” are on the high road to learning; for they already are pronouncing their names in Latin — “*Cor-Corvus-Cor*,” almost as plainly as Linnæus did when he gave to the crows their family titles.

The twenty-ninth of the month was, after all, a “weather breeder.” The crow antics, bird songs, butterfly waverings, and the balmy air and light were hatching a storm. On the last day, from their cloud nests overhead, the snow flakes came flying down to earth; first in the form of little woolly pellets; then in broad, white slices and feathers; and later, in the last hours of his rule, March went out in a storm of tears.

APRIL AWAKENING.

II.

APRIL AWAKENING.

THE lover of Nature will feast on the peculiar dainties which the gracious days of April are offering. One cannot afford to miss her flowers, her odors and her sounds, for there is in these something delightfully fresh and tender and delicate, that cannot be enjoyed at other seasons of the year. The earth now appears promising and youthful; yet, as there are special characteristics in gentle childhood corresponding to those of mellow age, so there are certain aspects in the first blush of the month—lights lingering over the woods and hills—that have the semblance of Autumn.

The hasty, almost premature work of trimming the bare branches of the early trees and shrubs with flower tassels, plumes and clusters, is curious. What brilliant crimson knots appear on the young swamp maples! How pretty the catkins are!

The poplars have thrown out a profusion of plush necklaces. The hazel bush, viewed against the sun, "snatches a grace beyond the reach of art." Its minute, fertile flowers, excreted from the tip of the scaly, bud-like catkins, are of a rich carmine hue, and when disposed along the shoots, in the midst of the pale yellow, drooping aments, present to the rambler, beautiful specimens of Nature's festooning.

Long before the bough trinkets have disappeared, the concerts have begun in the lowlands. The hylas peep. What a pure, delicate sound is that which comes from the reeking mire! It is the signal trumpet for the frog band to awake and tune their instruments for the Spring jubilee. The leopard frogs hear it and come out of the black mud, dressed in bright green coats, faced with gold and jet. As evening approaches, they are marshaled along the shores of the pond, and in the shallow places, to hear the call of their leader. At first a few faint whistles are sounded, in perfect measure, from under the green algæ; then the nearest members chime in and play a brief overture—a kind of aquatic ditty, before the real opera begins. A small glee club, in front of their water-grass music-racks, sing an Easter carol. Soon the band strikes up in good earnest. The waters are fairly alive with chirps and trills, flute and fife notes, that are as musical

as those of the robin who has caught the spirit of the occasion in yonder maple. Almost every individual member seems to play on a different instrument. There are ocorina and bag-pipe, piccolo and cymbal players among them. Occasionally a big brother with his protuberant eyes and wide mouth above the green scum, tries to perform a base accompaniment on his trombone, but it is, at the best, a discordant croak. At intervals the toads strike in, and splash the chorus with trills and quavers, which give a pleasant variety to the music of the swamps. Long after the robin has given up his song and gone to sleep, these water-loving minstrels continue the entertainment; for it is a real serenade to the female batrachians, who utter faint peeps of approval, or sit in silence at their star-reflecting windows, far into the night.

By the pond one is interested in watching the movements of the numerous aquatic creatures. A gentle stamp will cause, as if by an electric touch, hundreds of small circular ripples over the surface. These are produced by the water boatmen and beetles that skurry quickly to the bottom. It shows how sensitive they are to the slightest surrounding disturbances. The skaters jumping about and gliding on the water are very curious, with wherry-shaped bodies and long legs. As one drifts by I see six indentations which it

makes with its feet. The water bends only under its slight weight, as jelly might under the tread of a mouse. Its under parts are densely covered with fine, grayish hairs which form a perfect waterproof vestment. It has sucking mouth-parts and preys on other insects by catching and holding them with its forelegs, which are especially formed for the purpose.

The shells of fresh water bivalves, scattered along the shore, are also objects of interest. How fragile they are, compared with those of the seashore, or the salt-river bottoms! The rays of the light, when they are held before the eye, are transmitted as readily as through a fine piece of porcelain.

The muskrats who have burrows in the banks, evidently indulged in a clam supper last night, as a change of diet. But few of the shells are broken, and lie unhinged, with the rounded sides down, showing the delicate bluish-white lining and the beautiful iridescent hues. The platters have been licked very clean, and the question is suggested, How have these rodents, with no special tools for the purpose, managed to open the tightly closed valves so neatly? It appears that the remarkable intelligence of the creatures directed them to place these mollusks on the dry banks and wait till the valves begin to yawn for their native beds, when the acute furry fishers pull

them further apart with their claws and devour the contents.

The perch and bream feel the influence of the April sun, and are having a kind of dumb carousal in this little sea, by splashing, "cutting eggs," and rumpling the smooth surface into a thousand ripples. In the shallows, little schools of minnows ruffle the face of the pond, like cat-paw breezes. It is curious to see how cautiously they wriggle toward the shore in the warmer water. They are so watchful of danger, that the least movement or jarring sound sets them instantly shooting off into greater depths. The blasting of a ledge, half a mile away, is like a slight electric shock to them. Simultaneously, they frizzle the water in numerous spots and streaks, which seem like the wind-puffs shooting over the pond.

The earliest of the arum spathes advertise themselves to the wild bees: "Our doors are open to-day to all who want bread, and it can be had, by calling on us early." The wise insects read this in the air, as they peep from their winter lodges and rub their antennæ. So the pollen gatherers lend humming wings to swell the April melody.

That low slender sedge (*carex Pennsylvanica*), in company with the early rock saxifrage, is now in full bloom, on the dry, wooded hillsides. The hairlike stems and leaves of this species would be

quite inconspicuous, were it not for the sudden appearance of those large yellow anthers, which are in such striking contrast to the brown-purple spikes.

Nature has been as painstaking in devising means for the reproduction of this funny plant, as she has for that of the towering pine tree. How delicately adjusted on the fine, pliant stylus are the long pollen cases, now stuffed full and bursting open! The slightest breeze swings them to and fro and scatters the fertilizing grains on the pistillate flowers which are on separate heads, situated just below them on the same culm. The stigmas that have pushed themselves out between the maroon scales, appear like tiny feathers when viewed with the magnifier, and the little vegetable tentacles, with which they are thickly beset, will catch any chance pollen grain that comes within their reach.

How different is the growth and fructification of these common "horse-tails," growing in the sandy soil, by the stone wall, farther down the hill! Hundreds of pale, succulent fruiting stems of these curious plants are springing up from the grass, like sprouts from the potato pen. They have been lifted from the ground very quickly by the genial sun. No sign of them was visible a week ago, and in a few days they will disappear as suddenly as they came. Though not brilliant in

color, they readily attract attention by their odd appearance, and are interesting to consider.

These singular cone-crowned shoots which precede the barren stems or branches, growing so abundantly all through the summer, are the only flowers that such plants have. Pluck the tallest one and notice the grooves along its length and the whorls of dark brown teeth which surround the joints at regular intervals. Examine the cone-like spike; it is composed of shield-shaped scales which indeed, at first might be mistaken for those kinds of flowers that are found in the catkins of birches and alders, but look beneath them carefully and you can see neither stamens nor pistils. There are only thin, yellowish white membranes, each one of which is folded not unlike a toy paper whirligig, in six even folds. These are the spore sacks, some of which have already opened and discharged their contents on the ground; others are yet closed, but when shaken and ruptured, tiny clouds of dust are seen, for an instant, floating in the air.

If you drop some of this dust on a glass plate and view it with a microscope you will see that each one of these minute grains is a quite large, globular, roughened body, at the base of which are attached four long threads or hairs which are extended when moist but as soon as they become dry they are tightly coiled about the

spore. These filaments no doubt serve as kinds of hooks or fingers, by which the spores are entangled, thus preparing them for fertilization. As soon as they sink in the moist ground they push out irregular cellular roots or sprouts, on the lobes of some of which, are developed certain organs, that are allied to the anthers of common blossoms, which contain curious minute spiral filaments and perform the same offices as those of ordinary pollen grains. On other sprouts are organs which may be compared to the stigmas and ovaries of flowering plants. At a certain stage of growth these anther-like cells burst open and the singular threads begin to wriggle like worms, and are not at rest until by the aid of rain or dew-drops, they have been carried to the ovule-like sacks, when, in a mysterious way, fertilization is effected. It is by some such method as this that all flowerless plants or cryptogams, as they are called, are reproduced.

By the streams and low-lands the bird vanguard instinctively halt to bathe and obtain a greater supply of larval and seed food. A flock of fox-sparrows alight in the wooded swamp. They appear, this year, in the role of April singers. They perch on the low boughs and herald their good fortune with sweet-toned bugles. Their introductory notes are clear and prolonged, like a diminished prelude to the bugler's reveille. Three

or four mimic blasts at first are sounded, then the tune is continued to the end in a series of crotchets, minims and trills, which no human performer can imitate. Their instruments are louder than those of the song sparrows, yet their chant is much the same. Indeed there appears to be a similarity of chirp and twitter in all species of these plainly dressed birds. They seem to have many words in common. As various races of men pronounce nearly alike special words, so this group has attained, by inheritance, certain accents and inflections that, no doubt, once belonged to a remote ancestor. The swamp sparrow tells us in his song, how closely he is related to *Melospiza*, and the bay-wing bunting gives us a brief genealogical history at his vesper service. Yet each of these birds has variations peculiarly its own. Good music runs in the blood of the finch family.

The trim, clean-cut figure of a pigeon hawk gracefully sailing "head on" toward a tall beech near where I am sitting, readily attracts my attention. Perhaps a minute before the bird had made up his mind to alight on this tree. If so, we were probably the only creatures on earth, at the time, that were regarding it. How easily he lifts himself on his pliant wings and settles down on a branch, as if he were only a bunch of feathers lodged there by the breeze. After fixing his long

pinions carefully over his back, he casts quick, wistful glances down to the stream as though he longed to play a good talon and beak on a plump frog or mouse. But he only sees game too large for him, with which he dare not "enter the list," and soon hustles off toward the oak woods, the next station on his air line, where refreshments are likely to be procured.

How light and easy his flight is compared with that of the crow! He carries more sail in proportion to his weight and size, while that long, broad tail helps to buoy him up, as he wheels and dips and rolls on the aerial ocean. As he inclines to one side, like a graceful yacht sailing on the wind under full press of canvas, I can make out with a glass his ashy-blue wings, marked with black and white.

It was not long before that this same robber was seen in the character of a bushranger. He flew down like a rocket from an oak near by into an elder bush for some small birds which had been feeding on the ground amongst the shrubbery, but which, as they became aware of the hawk's presence, immediately huddled themselves together at the foot of a thick bush to protect themselves. The highwayman made three unsuccessful attempts to capture a dinner; each time rising about two feet above the bush and then darting down, swiftly as an arrow shot from a

bow, into the snaggy shrub that threw out its numerous pointed wooden spikes above him in all directions, like a *Cheval-de-frise*. The white throats, song sparrows and bay-wings, although frightened and screaming with all their might, were too cunning this time for the artful robber, who flew away directly, as if ashamed of his blunders and disgusted with his calling in life. Probably he had fallen in with these finches while migrating, and followed them northward, taking every opportunity to waylay them and practice his rapacious tricks in the clumps and thickets along the route.

How he managed to save those long wings and come out of the dense bush barricade with a whole skin, remains a mystery to me. Nature has given him this facility of flight, as she has to many other birds that are often seen playing games of tag in the woods, and that zigzag here and there through the interstices of the thick undergrowth with marvelous rapidity. Quickness of sight and dexterity of wing are required to clear the thousand obstructions that grow in their pathway; yet there are times, no doubt, when accidents occur, and their gambols end in disaster.

April has no fresher or more invigorating sounds than the clear, ringing laughter of the northward flying wild geese. It is the tonic or

keynote which generates, as it were, the music of the month's jubilee. How heartily and exultantly the trumpet notes are thrown down to us, as the winged trains go sweeping by! Our eyes and ears are now on the alert, and we would have the latest news from the South, by the air-line. Hark! did we hear a faint mellow *honk* from somewhere out of the southern sky? Yes, the arrow-headed elevated express is surely approaching. That peculiar baritone call from the engineer, ahead, and the response of the tenor voices in the rear, are unmistakable. Straight on they come, as if by an aerial track, a laughing vociferous troop of passengers indeed. We half expect the papers, from Vera Cruz or New Orleans, will be thrown down to us. "Halloo!" they call, "have you studied your geography? How far off are the great lakes, the Labradors and the Newfoundland coasts? Ha! ha! honk, honk!"

As the train moves down the curve, we listen to the melodious babbling, as we would listen to the dulcet strains of a retreating band, till the last muffled note steals on the ear, and the pleasant murmurings of the jovial, hopeful crew are silenced by the distance.

So April's melody, the sweet prelude to the concert of the year, is heard. The constant sun is the performer. With his magic rays, he touches deftly the minor keys, from which issue

tones to which the human ear can not respond. The ephemeræ dance; the sap flows through millions of stems, and the earliest leaves and petals unfold at last, that the "fickle month" may be adorned, to welcome the arrival of her merry sister May.

THROUGH LEAFY PATHS.

.

III.

THROUGH LEAFY PATHS.

WHEN the army of white-throats and Savannah sparrows, in their migrations, have flown further northward, and the "chippies" have become more abundant; when a few "chebecs" and "towhees" are heard introducing themselves to the passers-by, just before the bobolinks and orioles arrive, it may be called the misty season in the woods. You can name no special date when it is at its height, for it comes from the buds so gradually and ends in the larger, coarser spray with such slowly measured growth; but while it lasts the view of the young foliage, lingering on the tangled network of twig and branch, like variously colored scraps of vapor is, indeed, charming.

No system of color language can describe accurately the various shades of the early dresses of the trees. Many of the hues are softened and subdued, in contrast to the gaudy colors of autumn. Green, in its many tints, is from the

first put on numerous species. How becoming are the Alders and the Birches in their fresh new trimming! The leaves of the Oaks, Maples and Hickories, just unfolding from the buds and flecking the sky with the mellow stains of yellows, reds and browns, are especially attractive. The conditions and surroundings of the trees have much to do in painting the foliage before the chlorophyll has dyed it for its summer's work. The saplings and sprouts of the White Oak are decked with scraps of maroon velvet cut into the regular established patterns, while the leaves of older trees of the same species, on higher ground, are often the color of amber or of half-ripe lemons. The evenly plicated leaves of the Wild Cherry shine like bronze in the sun. Here and there the Large-Toothed Aspens have arrayed themselves in white silky-wool attire, and, as they rise like clouds in fleecy masses amid the early spring foliage of the hard-wood trees, form conspicuous objects in the forest.

How exquisitely tender and transparent is the new leaf of the American Basswood! I can hardly bear to look through it at the sun. When it is closely laid on paper, writing can easily be seen through it. Viewed in the light, it assumes a yellowish cast, and you not only see the slender forked veins, extended at regular intervals from the midrib, but hundreds of gossamer cross-lines,

like those of spiders' webs, which form the framework of the delicate structure. Its shape is beautiful, with sweeps and curves, and its edges are fringed with the finest teeth. What special wood fairy has been appointed to give it such elegant proportions, and to cut all of the leaves of the *Tiliaceæ* into the peculiar oblique, heart-shaped pattern? The largest lobes at the bases are invariably placed toward the young shoots, and the leaves are arranged upon them so as to secure the greatest amount of light and air.

The Beeches answer to the call of the sun a few days later than the Basswoods. A copse yonder on the hill-side is just beginning to put out its broidery. Little mouse-ears of leaves, clothed with silken hairs, are unfolding from the brown, rusty scales and lengthened buds; yet, curiously enough, the leaves on the twigs of a few saplings that touch the boles of the larger trees are already more than half grown! Was it the partial shelter in which the buds were placed during the winter that caused them to gain such a start? The Beech-leaves are formed into the most elegant designs. How fresh and beautiful these premature ones appear against the smooth, ashen-gray bark of the old trunks. They are ovals, pointed and evenly scalloped. The straight, prominent veins on the under surfaces, running out to the very tips of the salient teeth, are drawn

as with a rule. The arrangement of these ribs, however, is inclined to vary. In some specimens these nerves are opposite along the basal half of the midrib, but become alternate toward the point. Some are alternate at the base, but become opposite half way up, while on other leaves the ribs are alternate or opposite throughout the entire length.

The Dogwoods, or Cornels, too, are putting out. There is a peculiar physiognomy about the leaves of the species, though it can hardly be described, which at once shows to the observing rambler their *Cornus* blood. All of them have entire margins and are oval-shaped and pointed.

Along the swampy shore of a pond, where on one side rises abruptly a rocky slope studded with tall, straight Chestnut-trunks, I have paused to note a small tree among the boulders which is not very common in the northern and middle New England woods. It is the flowering Dogwood, *Cornus florida*, a big brother to the dwarf Bunchberry. With the exception of its humble relative it is the only species here that has its flowers in close heads. These heads are surrounded by four large snow-white, corolla-like, heart-shaped leaves that appear sometime before the little greenish yellow flowers open, and, when viewed amidst the young foliage or against the gray background of boles, ledges and the dead leaves of the forest-

floor, present a very striking appearance. It is a notable example of those kinds of plants that throw out their signal flags to the honey-gathering insects. It knows the importance of showy advertisement. Were it not for these conspicuous flyers the early bees and moths would pass them by unnoticed, and thus, by the neglect of cross fertilization, render the seeds and fruit less healthy and vigorous. But how quickly the leaf-builders work. Before May has ended many of the leaves have attained their full growth and spread themselves along the branchlets in huge green flakes and slanting pinnacles that swing in the breeze as if they delighted in their luxuriousness; every shrub and tree yields foliage after its kind. There are patterns of hearts, rounds, ovals, spattels, spears and shields. Some are smooth and polished, others hairy and crimped, some with their edges entire or cut into hundreds of different pretty borders; each species of plant taking on the form, size and texture of leaf according to its "peculiar structure and organization, habits and requirements."

As the foliage grows, the birds look about them for building sites. How they delight in the leaves! They afford covers for their roofless houses and shelter from the scorching rays of the sun. They are screens and curtains for them, and form thousands of little crypts, lurking-holes

and back-stair retreats. A warbler, flying into a thick-leaved maple or beech for safety, is as completely concealed as the loon that dives in the lake. In the early spring, it is curious to see the sparrows, feeding in the open field, instinctively take to the bare trees and bushes along the borders, for protection; their habit of flying to their natural hiding-places has become so strongly fixed. Yet, if they stopped to consider, they would be more effectually hidden in the russet stubble lands.

How interesting now is the ceremony of the woods, and how inspiring to worship in "the temple not made with hands." "Let us open morning service by reading the leaves," says the hairy woodpecker, as he gives a few taps upon a beechen trunk. Immediately a rustling is heard among the oaks and maples, as in the congregation when the minister announces a hymn. The pines and hemlocks wave their branchlets in perfect time, as they sing in undertones. The brook plays the organ, and the thrushes, as they flit through the aisles, chant psalms in mellow voices :



"The things that be
Are verily
More than — more than — you see."

It is a large auditorium and there are many pleasant vestibules, chancels and cloisters, with

pillars trimmed with vines and perfumed with the incense of mint and balm ; where the flies are trying their tuning-forks, the bees are humming busy, contented airs, and the gay butterflies are zigzagging with noiseless wings through the leafy ways. Here are rocks and fallen trunks for pews, softly cushioned with mosses, lichens and liverworts. Who has ever seen richer or more beautiful upholstery ?

If the worshiper is observing, he will find many of the leaves are real folios on which are nicely mounted many a curious little knob, rosette and spangle, which are prepared by the sylphs and gnomes of the woods. Perchance he may read a most interesting page on caterpillar weaving, with a living, moving illustration before his eyes. A naked larva has feasted well on the green pulp and now, as it feels the pupal sleep approaching, is busy in making its bed. Through the fine, transparent web the little worker regularly moves to and fro, its magic shuttles drawing out and fastening to the leaf yards of the delicate silken thread, as white and as lustrous as new silver.

Everywhere are seen grayish-white blotches and crooked trails, on the oak leaves, that are quite conspicuous objects against a dark-green background. These are made by a tiny leaf miner, the larva of a delicate little "Micro,"

named *Lithocelletes*. It is quite nearly related to the destructive caterpillar of the clothes-moth, but luckily for the housekeepers, it has taken to a vegetable, instead of a woollen diet. As soon as it is hatched from the egg, it begins to make a home for itself by separating the upper cuticle of the leaf, beneath which it is protected from the greedy birds, and where it finds an excellent larder. By what special sense does the little moth, winging her way among the foliage, know the difference between the leaves of the oaks and those of the maples and hickories? If the stray flutterer should by accident deposit her ova on other kinds of leaves, it would be interesting to know if her progeny would prosper. On the under surface of this oak-leaf are several clusters of black specks so minute that they appear, to the unassisted eye, like blotches of granulated powder. Under the magnifier, these specks are seen to be little bottle-shaped eggs, finely polished like jet, and cemented to the leaf at regular intervals. There is a whitish spot on the top of each, like the scar on seeds, which, at a certain stage of development, is ruptured and forms a passage, through which the larva escapes.

The insect that deposits these eggs is a most singular hemipterous "bug." Its abdomen, thorax and head above are entirely covered with thin gray scales, netted, veined and margined with

sharp spines. It is not over an eighth of an inch long, and appears like an animated bit of dry leaf, as it slowly crawls along, and seems unwilling to quit its roof.

Here is a hickory leaf rolled up as regularly as a cigarette by a leaf-rolling caterpillar! The inhabitant after a long spell of feasting fell asleep and then woke up to find itself with wings, to make a part of the summer's day. Its parent deposited a single egg in the expanding bud, early in the season. As soon as the young larva appeared, it became necessary for it to eat; but it must eat in safety. So nature, knowing its needs beforehand, provided the means. Under its skin were placed two long pockets (silk glands) stuffed full of the needed material. With its curious spinneret, which is really its under-lip formed into a short tube, it began, like a conjurer, to draw from its mouth line after line of the silken thread, and glued it at intervals along the edges of the young tender leaf. All the guys being stretched and in their proper places, the little work-worm took its position midway along them, and performed a series of contortions—pulling, wrenching and jerking until the leaf was furled as neatly as a sprit-sail. Then the little glutton, hungry after its labors, gorged itself with the green pulp. The curled leaf, after awhile, appeared with almost as many holes as a grater, but before the little

inhabitant ate itself quite out of its home, it secured another leaf growing by its side which it rolled up in the same manner. So it continued to roll leaf after leaf, until it had reached its full measure of caterpillarhood, and was ready to take its pupal nap. How well it had managed to protect itself from the sharp-eyed birds, which have not yet learned all the tricks and designs of the cunning moths!

THE CITY OF THE BIRDS.

IV

THE CITY OF THE BIRDS.

“HALF our May’s so awfully like mayn’t!” sings “Hosea Biglow.” If the pastoral poet had written this line in regard to the uncertainty of New England’s spring weather in the year 1888, he might with aptness, if not with good measure, have said three-quarters instead of half, for the pleasant days were the exception. But now the month of “perfect days” has come. It really seems as if the arbitrary line between Spring and Summer, so long established by man, had at last become a veritable material boundary, and June, standing within the limit of her tenure, had with sunny face and sweet breath and uplifted voice, exclaimed against her predecessor, “Depart! blow not your cold winds and rains upon the world.”

June is the month well adapted for the reproduction of the birds, and in New England, at least, many of the species lay their eggs, hatch them and feed the young during her reign.

now more than ever inspired and glowing with the master passion.

On a road that crosses a swampy wooded tract I have suddenly halted to listen to a full, round, mellow warble, sounded almost overhead high up in the branches of an old willow. For a long time the singer remains there, repeating his roundelay at half-minute intervals, but he is so hidden by the thick foliage that it is impossible to obtain a good view of him. What skillful minstrel is this, playing upon such a silver-toned trumpet? Surely I have never heard the like before. In what colors is he dressed? Is he a straggler from the South or West, ranging these woods to surprise the natives? These questions I try to answer by various manœuverings, when a small bird emerges from the thick leaves, and with wavy flight wings his way to the top of a white birch, a short distance off. He is so full of music that before he has fairly reached his next perch some of the liquid notes have drifted from his bill into the air. From this angle of vision, and in a good light, he is caught at last. A bird with black cheeks bordered above with light gray, a yellow throat, an olive back and a rounded tail. Why, it is the Maryland yellow-throat, after all! Who would have suspected that he could have learned such delicious strains, or that the habit of this humble warbler of bush and brake could

become so entirely transformed? Truly a change, and the cause of his unusual hilarity is the tender sympathy he has for his spouse, down there on her nest in some sedge tussock by the stream, who, perchance, with nice discernment, compares its laughing ripples with those of her devoted mate above her, in the topmost boughs.

A half dozen lively salutes from as many yellow-throats greet me as I walk along the edge of the wood, but the supplemental song, such as that just listened to, is not heard. May there not be among the Oscines, as in persons, particular individuals with glottis and larynx peculiarly formed by accident, which make them exceptionally good singers? One frequently comes upon song-sparrows, distinguished by having an extra prolonged trill in the midst of their tunes, and many of the towhees shake out, for effect, a few additional quavers after introducing themselves. Observers have given interesting accounts of the supplemental serenade of the Oven-bird (*Siurus Auricapillus*) a brother to the wag-tail that feeds by the streams earlier in the season. Mr. Burroughs says, "He launches into the air and bursts into a perfect ecstasy of song, clear, ringing, copious." One suspects, however, that these extraordinary singers are comparatively rare, and the additional performance is given only by certain few individuals, who know their musical powers.

Through a colonnade in Birdsville flows a beautiful stream. It has many phases and tones. Here, where it slips over flat, moss-covered rocks, are whispering and purling sounds. Further on, hollow laughter is heard, as the water runs under mimic caverns. Smiles ripple over the transparent faces of little pools, then the waters break forth in high glee and skip along on their journey. Suddenly there comes to you a sound as of the clapping of myriads of tiny hands, as the merry drops splash on the boulders and go dancing and whirling in winding column to the Charles.

On the banks of this stream, half hidden in an alder clump, I often linger to watch the bathers.

The different species of finches and thrushes are confident and bold in their approach to the bath, but many of the wood warblers draw near with the greatest caution, flitting like shadows amongst the shrubbery, and peering at me with many graceful turnings of their pretty heads, and daintily choosing steps of every convenient little twig, in their descent to the stream.

There are, however, in some species exceptions to this rule. The black-and-white creeper, for example, hops along the bank till he finds a suitable place, where he plunges in, and seems to be as cool a bather as the common song-sparrow.

After following the course of the stream, I turned to walk across an old pasture, toward a

swamp fringed with sedge hummocks, and overgrown with brier and arrow-wood. It is the haunt of several kinds of birds, in one of which I am especially interested.

Drawing near, I hear again the song, which is expressive of alarm; not an outcry of terror, but a forcible, impetuous note, rather calling to arms for defense. One is reminded at first of the startled note of the wood-thrush, or the cat-bird in some of his fantastic moods.

Chip-cher-we-e-e-er! blows the bugler, among the leaves of a young white birch. Notwithstanding his clear and vehement challenge he takes precious care to hide himself.

For a while he is silent, during which I move cautiously, on hands and knees, to a position from where every interstice of leaf and twig is closely examined; but still no signs of the bird. It is a game of hide-and-seek, in which the singer has thus far the advantage.

Just as the would-be interviewer is about to relieve his cramped limbs, the bugle is sounded again from an arrow-wood bush some yards away.

How the musician got there without being observed, is a mystery. Yet there he is, piping as loudly as ever, but this time on a different key as if another kind of tactics was to be adopted—*chum-we-e-e-er-chu-which!* a solo full of trills, quavers

and vibrations, admirably performed and repeated at half-minute intervals.

Resolved to know the trumpeter, however annoying this selfish, ill-mannered peeping may be to him, I settled myself to await developments.

At last, a glint of ash and white, borne on dark wings, comes out from among the leaves; but again vanishes like a shade, a mere tuft of feathers, blown rapidly past, and only seen for an instant.

The bird strikes up another kind of tune, not heard before, in a shrub twenty feet away. It is so full of demiquavers and sudden transitions, corresponding to his violent emotions, that it is impossible to write it in syllables.

The squall of the cat-bird is introduced, as if he had just caught it from his neighbors, and used it as a means to frighten one away.

After much turning of neck and head, the minstrel is seen. A dark-green bird, nearly the shade of the leaves, with ashen breast, white underparts, light-yellow sides, and a marking of dark yellow on the frontal feathers and along the cheeks.

The iris of the eye is white, and gleams like a fifer's as he shakes the fragments of notes from his throat. The curious white circle which surrounds the pupil is an exception to the general color of the eyes of birds.

In the majority of perchers, at least, the iris is

dark. So this is the key that enables me to unlock the mystery. It is the white-eyed vireo—a stranger which I have often heard, but have never seen before.

So different is he from other members of the family, in song and action, that his relationship was not at first suspected. Most of the vireos have soft, pleasant voices, but this little species, scarcely five inches long, is so noisy and harsh at times as to lead one to believe, if the bird is not seen, that the sound comes from a much larger throat.

No wonder that he appears anxious, for right below where he is now piping is his home—a miniature gunny-sack, suspended from the fork of a slender wild-rose twig, not more than two feet from the ground.

It is a large, deep nest for so small a bird, and strongly lashed to the bush with tough roots and grass spears. On the outside are bits of moss and a small scrap of newspaper, on which is printed "Rooms to Let"—as if the builder had given notice to the cow blackbirds—and withes of sedge, drawn tightly round and crossed as bands, to keep the nest in the proper shape.

Within the cavity, which seems to be lined with no softer substance than fine grasses, are four white, brown-dotted eggs.

I look upon them with feelings akin to those of

the miner, who finds his nuggets of gold after long and weary searching, and yet as treasures that must not be taken away.

Here is the very essence of the bird's life concentrated in this little nest; the result of a thousand miles' journey, and much sharp searching for this particular fork; the cause of exultation and song, and weeks of watching and anxious concern.

Now that I have discovered the home, the mother — who, by-the-way, resembles her mate, and sings as well as he — makes no effort to conceal herself, but hops about the bushes near by, uttering a series of exclamations and *ahs!* much in the tone of the mother who forbids her child handling any costly or easily-broken article. There is an expression in her tone and action hard to resist, and, as I withdraw, she immediately flits to the edge, looks down on her precious casket of pearls, and finally settles upon them, for the incubating fever has evidently taken possession of her.

In how short a time the eggs are hatched, and how quickly the nestlings grow! Hardly a fortnight has passed since these little white-eyes were lying quiet and dumb, and exquisitely arranged within the nest.

Nature, though she has made a thousand enemies that prey on just such defenseless house-

holds, has also provided means for their protection, not only in the consummate skill of hiding their nests, but in the rapid development of their young.

They must not remain too long in the same locality, however well concealed they may be, for the prowlers would be sure to find them out at last. So they are brought into the world at the time when crawling and flying insects most abound, that the little gluttons may be generously fed, and hastened into strength of body and wing necessary for escape.

It is a notable picture that I see on the rose twig under the arrow-wood. A flower has blossomed near the doorstep, and the anxious mother stands transfixed at the edge of her nest, as if some taxidermist had prepared and wired her to the spot; yet her unwinking eye, with its odd white circle round the pupil, gleams with the light of parental solicitude which a round bit of painted glass could not send forth.

It is evident that the bird is remaining thus motionless, and trusting to her harmonizing colors for concealment, for it is not till I have drawn near enough to have touched her, and just when my attention for an instant is given to a dozen blood-thirsty mosquitoes, that she flies off to begin her scolding.

None of the young birds are missing. Four

voracious, wide-open mouths are upturned to receive the insect morsels.

Their necks are hardly strong enough yet to support the large, heavy, shot-eyed heads, that, in their strained, ill-balanced positions, wobble about blindly for a moment, and then sink down in the bottom of the nest, an exhausted and palpitating mass.

The male, that was so brave at first, is now not seen—a mean, worthless fellow, thus to fly away at the least sign of danger! Indeed, I believe this ignoble trait is a characteristic of the vireo husbands—very attentive in the honeymoon, to-be-sure, but taking no part in the house-building, and leaving the trial of incubation and the care and support of the young entirely to the devoted mothers.

His near relative, the red-eyed vireo, is strongly suspected of this irresponsible manner of getting through the season. His low, contented *pre ree*, *pre re-o*, *pre r-e-e-e*, high up in the branches of the trees, is heard, as though he had not a thought even of his hungry wife, now confined to her eggs, down there in the willow.

Within the cool shade of the hemlock wood, where among the needle-leaved branches overhead the light breezes play weird tunes, and through the skylights moving shreds and blotches of sunlight are here and there thrown on the moss-

covered ledges that form the steep acclivity of the forest floor, I pause awhile to listen to the pathetic piping of the veery, the drowsy song of the black-throated green warbler that has lodged his nest somewhere in these dim arches; or to watch the gray squirrels as they scamper from tree to tree and disturb the solemn service of the temple with strange, unordered barkings.

Here on a slope, in a narrow niche of ledge where a drift of dead leaves has blown in, I discover by mere accident the nest of the black-and-white creeping warbler. The bird is on and does not stir, though I stand within three feet of her. How still she is, and what bravery and hardihood shines out of her full black eye! She does not even wink, and in breathing I can not see a feather move. She might be mistaken for the various lights and shades on the ground, or a bit of gray ledge projecting from the leaves.

Nature has been wise and far-seeing in giving to ground-nesting birds the colors which nearly simulate their surroundings, and the instinct of remaining quiet on their nests when danger is near. If the mother birds fluttered off at the approach of every footstep or wing shadow, how quickly their homes would be discovered by the numerous enemies that are lurking above and below for a stray dish of omelette, or a mess of well-picked, fresh young fowl! At last, when

every contrivance that Nature has provided, with the exception of wings, has failed her, she takes to them for protection, flitting away as silently as a shadow.

It seems as if the bird, with well-considered forethought, located her nest where the common biped or quadruped stroller would not be likely to tread upon it. How exquisitely the little cavity is formed in the side of the sloping drift of leaves, as if a small cannon-ball had been pressed into the mass, leaving there a nicely-moulded hollow! On the highest side of the incline the builder has, with much skill and sagacity, pulled out from beneath the solid heap many of the leaves, so that a half roof or gablet is formed, and one looking down, directly above the nest, can not see it. The leaves within are broken into fine bits and well packed and trimmed with breast and wing, and neatly arranged around the rim. To make her bed more elastic, and also to keep the leaf-scrap in place, the careful little architect has woven in and glued to them, in the most ingenious way, a number of black and white horse hairs, as if she had chosen these particular colors to suit her own. Where did she find them? Not in the stables or city streets nor open fields, for she is rarely or never seen in such places. Not in these woods, for no kind of cattle visit them. On distant wood roadsides and scrub pasture-lands, perhaps, she has

flown and searched sharply for them, in places where dull-sighted mortals could not have found a single spear in a month.

In this admirably wrought spring mattress, are four eggs, three of which are small, oval, cream-tinted and marked with quite large, chestnut-colored blotches. The fourth is disproportionately larger, and so unsuited to the character of the tiny nest that, though dumb and quiescent, it plainly tells a story of uncivil intrusion and ill breeding. Ah! this is the egg of that uninvited guest, the cow blackbird, a veritable tramp and parasite among the birds. She never takes the pains to build a house of her own, nor shows any signs of maternal love, but skulks here and there about the woods and fields, invariably choosing the nests of birds smaller than herself in which to practice her impositions, and trusts to luck for a successful issue. Notwithstanding her lawless, vagabond ways, she is very cunning, and knows that if she lays more than one egg in a single nest the enterprise would prove disastrous. The brothers or sisters to this shelled scapegrace that appears before me, helpless and innocent enough, perhaps lie in four or five other nests.

The red-start and Maryland yellow-throat, down there in the swamp, have one apiece to take care of. The lesser fly-catcher takes the responsibility under protest, and the vireos, in their good-

natured, sweet-songed, contented ways of life, are sure to be imposed upon by this shameless interloper. It would be interesting to know how she had found this half-concealed nest; whether she had watched, with her large eyes, from a distance, the progress of building and the deposition of a certain number of eggs before she ventured near, or had come upon it by accident.

How curious is this aberrant habit of the cow-bird! Perhaps the ancestors of these blackbird tramps were, as Mr. Darwin suggests of the cuckoos of Europe, once legitimate builders, but in the course of time they found out by occasionally laying eggs in the homes of other species, that they "profited by it, through being able to migrate earlier, or some other cause"; the young thus reared would be apt to follow by inheritance the habits of their mother, till at last these birds have lost the art of nest-building altogether, and shifted the labor of rearing their young on distant, well-disposed relations.

For a week all went well with my sitting bird, but one morning, when I had determined to visit her ledge and relieve it of the alien egg before it should become a big gormandizer, thus starving out the rightful owners, I was grieved by seeing the mourning weeds and cypress about the door, and a deserted nest. Some keen-scented foot-pad squirrel or weasel, a crow or jay highwayman, had

passed along and eaten the luckless creeper out of house and home.

In the neighborhood, the presumable head of the bereaved household is flying hither and thither, perching on the boughs, lifting his head and opening and shutting his slender mandibles, like the movement of a pair of delicate scissors, as he cuts the air with his sharp insect-like voice. Whether this is meant as an imprecation, a cry of lamentation, or a song of hopefulness, I cannot say. It is likely the mother-bird will set about at once to prospect for another building site. How interesting it would be to follow her various methods and attitudes of investigation, her final decision in choosing a locality and her way of making such a dainty home. But there are so many things to hide her when she is on private business, that one can not expect to be entertained by such a delightful peep-show.

The fact that birds, when their nests have been rifled, should immediately lay a new set of eggs, strikes one as very curious. If all had gone well with this creeper, more than a month would have passed before the mother would think of raising another family, or perhaps she would be content with only one brood for the season. But no sooner has the accident occurred when, by the will of the mother, other imperfect ova are rapidly developed and ready for deposition by the time a

new nest is built. The female golden-winged woodpecker offers a remarkable example of evolving immature ova at pleasure, and if robbed of her treasures will continue to produce several successive litters, appearing as inexhaustible as the conjurer's hat. Nature has made this special provision with the birds generally, knowing full well how many of the children, in their greediness, are disinclined to remember the sixth and eighth commandments.

A few days after this tragedy I chanced to find another creeper's nest, but it told the same old story; a fraudulent cow-bird had been playing her tricks again. There within the exquisitely-moulded cavity, lay the young tramp in creeper's skin, nearly fledged, and four reddish, blotched, cream-tinted eggs, still unhatched. Evidently the credulous mother is tired of sitting, and devotes her time in feeding the roguish little glutton, who, with eyes wide open, looks up, I fancy, in a kind of cow-birdish way, as if half ashamed to be seen in such a place. The deluded creeper's acting is a phenomenon of great interest, and under the circumstances has in it a kind of pathetic humor. How hard she tries to entice me from the nest that is profaned! How well she assumes the character of a wounded bird—the creeping, limping step and the trailing wing are almost perfect. It is curious, after she has

dragged herself out of sight, as she thinks, to observe how quickly she drops the part she has been playing. She flies on the trees and scampers, sprightly enough, along the branches and up and down the trunks, manifesting her solicitude in the natural way, after her character performance has failed in its purpose. When and how did these mother birds learn to impersonate so perfectly? They seem to understand clearly that people think they are pretty and wish to get nearer to them, or hold them in their hands, and so, from some unaccountable source, they have conceived the idea of adopting this artifice to tempt one to follow them, whenever their nests are in danger of being discovered.

Considering how wise they are in this respect, one would suppose they could not be played upon so easily by the cunning cow-bird.

It was my intention to be present when the young scapegrace should leave the nest, and to ascertain, if possible, whether the foster mother still continued to feed it; but its development had been so rapid that it escaped, probably a short time previous to my return to the spot, the next day. Although the little impostor could not be found, I am quite confident that the creeper knew where it was and had an occasional eye and worm for it, for she was seen flitting here and there above the trees in the neighborhood, but with the

air of a bird, I imagined, that was beginning to think there was something wrong.

What were her feelings when her suspicions became fully aroused? Anger and disappointment? Or was she a little stoic, submitting without a sorrowful or querulous "*chip*" to the inevitable?

The circumstances connected with the final misfortune of this ill-fated nest-hold are curious. Nature, after all, appears to have been in league with the indolent, though by no means shiftless, mother cow-bird, and encouraged her in her artful, knavish habits. Her egg, laid in this nest, evidently required a shorter period of incubation, and when it was hatched, the poor deluded mother, who was no doubt surprised to find a nestling stirring beneath her so soon, immediately began to feed it, thus leaving her own eggs, now in a critical condition, to spoil. The embryos within the legitimate eggs, now deserted and chilled, were scarcely more than half grown, and had become decayed.

Here in the open upland woods I saunter in little by-paths to admire the zigzag course of a tiny moth whose wings are painted with the hue of the hepatica, and the quick, jerky motion of that large black and yellow butterfly — *Papilio Turnus* — that wanders everywhere as if in search of something it never finds. The remarkable

skill that all these kinds of insects possess of changing their course in flight so quickly every instant, and of hiding themselves so suddenly, has been given them for the purpose of protection.

Along the green and brown forest floor are scattered, like brilliant figures on a dusky and rumpled carpet, little plots of partridge berry blossoms, into each tube of which has been stuffed a bit of pink wool, redolent with the odor of Mitchella. Here is a pod of a starflower, in which is a round dozen of angular, rough, white-coated seeds. How compactly and neatly Nature stows away her grains until she wishes to sow them!

But the rarest thing shown to me in this ramble, is the very interesting and characteristic nest of the golden crown thrush. As I pass by a drift of dry leaves lodged in a scanty growth of whortleberry bushes, the mother bird shoots out from the brown mass, and appears for an instant, like a dark, tremulous streak along the ground, and then disappears amidst the foliage of the surrounding shrubbery. A thorough search among the various little bosses and hummocks brings to light, at last, after much peering and prying, a house built by a pair of these ingenious architects. A miniature Dutch oven it seems on the exterior! A perfect little bird hut, with a roof made of several layers of dry leaves well

cemented together. On the summit of the dome has been placed longitudinally a number of weed stalks, stripped midribs and pine needles, as a kind of finishing touch to the work. Altogether it is not unlike the thatched roof of an African hut, or a "cap" that farmers place over their shocks of wheat and corn to protect them from the weather. Besides, the leaf-tent has been well lashed down with hairs and fine roots, close around the edge of the real nest, which, as I peer into the small opening left for the entrance and exit of the builders, I can see is lodged in a hollow, so that the brim is even with the surface of the ground. It is so dark within, and the cavity so deep, that the contents can not be seen. Accordingly, half ashamed of intruding and prying into the affairs of their private history, I gently insert my finger within the oven and feel four or five tiny eggs, which will soon be done, no doubt, into as many golden crowns. Singularly enough, the birds do not scold me for my indecorous conduct, but the male, as I hurry away from the spot, utters his "*teacher, teacher, teacher,*" in a suppressed tone, as if half afraid of being heard, but yet not entirely able to withhold an expression of glad relief from the brief but severe season of anxiety.

Day by day the mystic spell of incubation took firmer hold of the mother. My few subsequent

visits near the charmed spot during the critical period, never disturbed her. Once I stopped directly in front of her house and saw just a patch of her yellowish olive-green wing through the door, but who would have suspected that it was a part of a living bird in that mass of dead leaves? Not even the squirrel scampering along the branches over her head knows it, nor have those sharp-eyed, black oölogists, the crows, that are stalking about dangerously near, taken the hint. Every day I trembled for her amidst so many perils. When heavy showers descended and beat upon the leafy dome, I thought of her steadfastness and sublime devotion. News soon came from the nursery that all but one of the little golden crowns had strayed from the parental roof. One child, however, seeing a loose end of a horse hair, had, in his greediness, no doubt, mistaken it for a worm, and in trying to swallow it, it had stuck fast in his throat. The other end was so strongly woven within the nest mass that it was impossible for the little fellow to free himself. A wonder, indeed, that the crows had not stolen a march, and made mince-meat of him long ago. What a fever of excitement the old birds were in, as I drew near and saw the situation of affairs! They threw themselves at my feet and trailed their wings and snapped their bills, and uttered such loud cries of distress that they brought every

small bird within the neighborhood to see what was the matter. The veery chirped peevishly near by; the chewink left his scratching for a while to see if he could offer any assistance; of course the vireos came to gratify their curiosity; a black-throated green warbler spun out a fine note of sympathy, from a low limb. Madam Cat-bird spread her fan and rustled her feathers in high temper and scolded from her window, "Such a disgraceful proceeding, carried on in our city!"

The fledgling's plumage was the exact shade of the dry leaves around him. There were to be seen no traces yet of the golden feathers that would crown him later in life. His wide gape was edged with yellow, and his legs of the same bright color seemed almost as long and stout as those of the full-grown birds. As I held him in my hand to sever the last cord that bound him to his home, I pondered on the subject of his first migration, and the difficulties that would beset him on every wing. In how short a time this awkward weakling must gather strength to journey through the trackless air, far Southward, over mountains, rivers, lakes and seas, to Central America, the West Indies or Bermuda Islands, where these kinds of birds are seen in the Winter!

It was while walking in this bird metropolis that I first became acquainted with the field-spar-

row. Perhaps I had seen him a hundred times before, and carelessly passed him by, thinking him to be our familiar little chippy, which he so much resembles; but now as he is scolding me so hard, I pause to look him straight in the face with the glass, and find, to my great interest and satisfaction, that he is not the hair bird at all, but his brother; a sparrow, as Mr. Minot truthfully says, not so well known as he deserves to be. Now that I have been introduced to him I can readily discern the characteristic differences which the scientific classifier has pointed out. He has no clearly-defined light lines about his chestnut crown, he lacks the black forehead and eye stripe, his bill is reddish brown, not black, as is that of the chippy, while his tail is longer, not having such a deep notch at the end. Besides these special dissimilarities, there are certain peculiarities of habit and temper, a *something* in his actions, easily seen, but difficult to describe, that distinguishes him from his near relation.

Chippy always, I believe, builds either in the shrubs or on the lower branches of the trees, but his brother often chooses a building site on the ground, under a juniper, or in some low bush. Chippy's eggs are bright bluish green, thickly scrawled and dotted with dark purple, while the field-sparrow's are smaller, grayish white and sparsely marked with brown blotches.

On the corner of a wild cherry clump and bramble patch, Mrs. Chestnut-sided Warbler sits all day long, guarding her jewels by a curtained window. What a time for quiet bird contemplation! Perhaps she thinks of the bees buzzing over her head among the raspberry blooms, for nectar, or the soft rustling of scores of moths and butterflies' wings; wings as white as snow-flakes, as blue as the June sky; sooty, flame-colored and yellow wings, rising and falling aslant or fluttering "topsy turvy" down through the thick leaves close to her nest. Sometimes a breeze sweeps through the bushes, and rocks her house "from pillar to post," but she understands the riotous wind and clings the closer. If it were possible for a hand to shake her tiny structure in such a way, how quickly she would fly from it. But she is a sturdy little bird, and it is only when you have carefully lifted up the last leaf that conceals her back that you hear her slip away through the thickly-growing stems, out of sight.

The cup-like nest, composed of tough grasses, fine bark strips and weed stalks, is securely lashed on one side to a raspberry shoot and on the other side to a small choke-cherry sapling, while a number of slender under-growing stems beneath, help to support it. Madam is an excellent designer, but looking at the nest at first, one might suppose she slighted her work, after the frame had been

put up. She is not such a good chinser as her near relation, the yellow warbler. Beside the trusses and girders, there is a lining of hair and fine roots, so sparingly laid on the inner side of the south-western walls, that one can easily see through them. It would seem, however, that this side of the nest was left unfinished for a purpose, and not through any lack of faithfulness of the builder. In the few nests of this bird observed by me, a thin spot in walls has always been noticed. Evidently the peculiar physical condition of the young of the chestnut-sides demands a good ventilation while they are being hovered.

In the nest are five tiny white eggs, somewhat abruptly tapered and marked with dark purple spots and blotches around the larger end. How curious are the hieroglyphic characters that have been traced on the eggs of the warblers! They are speckled, scrawled, brindled and clouded with the various shades of browns and reds. Strangely enough, in the majority of cases, the crowns of the eggs are more thickly blotched and spotted! In reading the descriptions of the different eggs of this family of birds, I came upon the following phrases: "With reddish spots or blotches around the larger end." "Marked around the larger end with a wreath." "Grouped in a ring about the crown." "Clouded delicately at the larger end

with purple and lilac," etc. Who has questioned nature closely enough to know how and why she has pictured them so? From what mysterious vesicle has she mixed her colors, or in what portfolio does the magic pencil lie?

As I sit here, where the sunlight scarcely breaks in through the thick evergreens, listening to the various sounds, and looking at the little clusters of red and yellow toad-stools that have sprung up as if by magic through the mosses, and the pretty scalloped water pennywort leaves, some of which are as white as snow, but quite fresh, and growing like the green ones, my eye chances to fall on a bird, perched on a low, small limb near a tall, decayed birch stump, in which a pair of titmice or chickadees had chiseled out a home. The door is quite conspicuous and appears like a round, black spot painted on the white, gleaming background. It is evident that a family of young birds are within, for the mother, with a fat spanner in her beak, now flits down through the leaves and eyes me suspiciously. It is interesting to watch all her ways, her bright, strategic plans, and her little games of deception in trying to enter her door-way without being seen. Finding me unwilling to stir from my post of observation, she flies away, making a wide circuit among the thick branches, and approaches the nest from another direction. There is a struggle in her plump

breast between the maternal affection and the worm appetite, but the love for her children conquers. In her beak she still holds the tasteful caterpillar, the ends of which dangle as she turns her head again to see what frightful robber of the woods she has to deal with.

Again she moves away with short, mincing flight, as though she had not a chick in the world to care for, and pretends to hunt among the boughs for food. It is amusing, and a subject for much reflection to observe the art this little "tit" displays, in assuming a half-hearted, careless role, that is so different from her real feelings. Where and when did she learn to act so well?

At last, when it becomes painful for me to longer keep her away from her hungry children, I turn my face from her, when she instantly flies back to the door and goes in.

It is a breach of good manners thus to intrude on her privacy, but curiosity conquers civility and leads me up to the very portal. I peer into the darkness, but nothing can be seen; then I am ungracious enough to listen, by placing my ear close to the entrance. This proves too much for the bird's equanimity, and she protests against such conduct with a contemptuous hiss, which sounds in the echoing cavity like the discharge of a boy's pop-gun. The fact that the small singing birds are capable of firing off such squibs is

entirely new to me. That this spitting, hissing sound, as an expression of contempt or rage, should be resorted to by all animals, from the low reptiles to even man himself, is something curious.

Have not the birds, generation after generation, gradually acquired much of their cleverness of invention and knowledge of the world, we may say, through the training of many centuries? Their skill in hiding their nests, their assumption of the character of crippled birds whenever they are approached, and their different methods of dissembling, seem to indicate a pretty good understanding of the over-curious, inquiring human. The other day I came upon two clear cases of bird trickery! The performers were the females of the indigo bird and the bobolink. The former, as I regarded her, lighted in full view on a bush, and began suddenly to whisk her fulvous tail and turn her body this way and that, with that quick, alert motion which only birds are capable of. She canted her head and looked at me. Altogether it was a double-faced proceeding, but very amusing, and pardonable under the circumstances. After beating about the bush in this manner for a while, she began another little piece of acting, by pretending to watch for a favorable opportunity to dive into another thick shrub, which, with strict attention to all the details of the action of a shy

and discreet mother, she gave me to understand was, to her, the dearest of all places in the world. At the proper moment, she disappeared among the leaves, and, no doubt, when she was at a safe distance and saw me pushing aside the branches and searching for her nest, she laughed in her wing, or in some other bird way, at the success of her counterfeit presentment.

The other actress was in the meadow, where it was probable I passed quite near her nest. At first she flew overhead, as the redwings do whenever their homes are approached, evidently much distressed, and sounded notes similar to those birds. Then she alighted on the ground, quite near, and pretended to be busy with the grass heads, but always keeping a sharp lookout for her interviewer. She soon wearied of this kind of by-play, however, when she saw how well it was received, and, as if she had just thought of a more effective ruse, she suddenly lifted herself on her wings and flew far away over the waving daisy and buttercup heads, out of sight. Doubtless she came back again, in five minutes, and said to herself, "There are some things even too cute for these humans."

It would be curious to know if these birds would have acted in just this way if a crow, jay or other low-nest robber had been in my place. Or did they consider the greater intelligence of

man, and so were more painstaking in the performance of their little monodramas?

Many of the scratchers have a peculiar adroitness in concealing their nests, which they well stand in need of. How cunning even is the domestic biddie when she yields to a wild instinct and privately stalks forth across the field to the nearest woods, with the intention of stealing a round dozen of eggs from her owner! She half suspects that some one may be watching her, and so she appears particularly absorbed in the pursuit of worms and grasshoppers; but, by indirect paths and many circuits she reaches the wood at the appointed time, and hastens, like a miser, to her secret casket, to gloat over her treasures. It is a chance if they are found, till some fine morning, Madam Speckle, with her responsible *cluck*, brings out a motley brood of downy balls, that go bouncing along through the leaves and grass culms, as they are slowly driven home.

Perhaps there are no scratchers' nests more difficult to find than those of the quails. Though the meadow and shrub-land hereabout now are fairly jubilant with the crowing and whistling of the male birds, their wives, the silent partners, have well learned by experience the knack of secreting their jewels in many a leafy and briery drawer and recess, which the eyes of weasels and men are very apt to overlook.

It was rare good fortune that directed me one day to visit the Arboretum, and to be shown a quail's nest which the mowers had recently discovered by accident in the border of the meadow. The deep cavity was most daintily and ingeniously lodged in an oblique or sloping direction amidst the twisting, snaggy roots of an old stump, overgrown with golden rod and steeple bush. It seemed as if the end of a smoothly-shaven, round-topped post, six or seven inches in diameter, had been pressed into a mass of dry grasses and weed stalks and then carefully removed after the stems and culms had been well moulded into the proper shape. How neatly the bird had packed her little store-house with a "baker's dozen" of clear, white, bright eggs! It must indeed have seemed a precious lot to her. This remarkable productiveness is natural with her, as with all of the scratchers. As soon as the young are free from their prison shells, they can run about and pick up many an insect and seed tidbit which their mothers know nothing about; so they can afford to have a larger brood than the smaller birds whose nestlings lie helpless for many days in their cradles, and must depend on their parents to supply them with whatever food they have.

The quail is like the barn fowl that wanders away and steals her nest. Now that is found, she silently submits, and does not appear at all anxious

about her treasures, as the finches, starlings and warblers do, whenever their homes are approached. Not a hide or feather of her is seen, though several males are heard whistling as merrily as ever in the neighboring copse. If one is quite near them he hears in addition to the usual "*Bob White*," a few introductory notes, as though the birds were clearing their throats, and the last word, "*white*," or "*wet*," is uttered with a hissing sound, like the "swish" of a whip-lash, when it is forced rapidly through the air.

On the second visit to the rare spot, I found another egg had been added to the store, and all had been differently arranged. They were now carefully piled, one above the other, in a single layer, quite high against the walls of the nest, so that the cavity appeared paved or embossed with enormous pearls. It would have been a most interesting sight to have seen just how madam, with her claws and beak and wings, managed to set her house in such regular order. Evidently she had prepared it for the sitting season, and was looking forward to the time when her treasures would take to themselves legs and run away.

When I called again on her ladyship I stood before a deserted house. Alas! it is with birds as with mice and men, their best-laid plans

Quails sometimes "count their chickens before they are hatched," and it happened so in this case. Her possession had indeed departed, but they went away too soon, and on feet that belonged not to those of the partridge family.

Nicely lodged in a patch of "bear bed" by the edge of a young growth of oaks and birches, is the home of the towhee bunting. A low blueberry bush spreads its leaves over the roofless house and a sprig or two of prince's pine grows before the door. The dry fallen leaves immediately surrounding the nest appeared to have been pressed down and glued together, and the odds and ends close to the finely finished rim are well fastened with saliva, as though the bird liked to have everything trim and tidy around her dwelling. In the quite deep, exquisitely-turned cavity, lined with pine "spills" and old fruiting moss stems, lie four eggs, so thickly covered with light pinkish specks, that the dirty, white ground-color is scarcely distinguishable unless the shell is closely examined. *

The female is sitting, and so firmly does the strange spell of incubation hold her that a very near approach is necessary to compel her to break it. If your foot passes beyond a certain boundary line, however, she considers the act a violation of the towhee law, and so leaves you alone in trespasses and sin, by gliding through the saplings,

lifting her wings over her back and faintly protesting "*tow-he-c-c, tow-he-c-e,*" after she is concealed among the leaves. But as you move off again she is instantly down to her eggs, as if they were so many magnets. How closely she hugs the nest! Though you may be near her, it is not until you have become quite used to the spot, that you can distinguish the outlines of her brown back from the shadows, the various moss tufts and the leaves that surround her. Her long, dark tail, perked up from the nest can readily be taken for a dead twig, stuck at an angle in the ground. If that whortleberry bush had eyes and ears what interesting scenes it could witness, what curious towhee talk it might hear! One is almost desirous, at times, to take on the form of a rock or bush or tree that he may learn all the secrets of the birds about him. Where does the male station himself at night? Does he feed his mate while she sits? While gathering pieces of this hair cap moss for lining material, how did she manage to break the quite tenacious fibres from the leafy stems? Did she rest at night on the nest, before the incubating season? I would that this enchanted shrub might communicate to me the full history of the towhee couple, since they first decided to locate their home under its branches.

The male now has various moods. Sometimes

he is inclined to be silent whenever his nest is approached, and one can not see a hide or feather of him. Perhaps the next day he takes it in his head to be talkative and tells you in plain English, his name, over and over again, so many times that the monotonous refrain becomes wearisome and dull. Again he is over confident. He assumes a jaunty, free and easy air, as though the object of his affections was not within a hundred yards of him. He perches on the limb of a neighboring tree, in full view, and reels off from his throat quite a long string of notes, as if he had been taking lessons of the grosbeak. It is amusing to hear him, he tries so hard to oversing himself, to strain a point and pass beyond the limits of the piece of music which Nature had composed for him. Then, as if all his celestial thoughts had suddenly departed, he descends to the ground in a kind of serrated, angular flight, as though tripping down an aerial stairway, to engage in the more earthly pursuit of worms and bugs.

On the fourteenth day after the discovery of the nest, there were young in it. How curious is this law of incubation! That a certain degree of heat on the egg, without any apparent development of the young, for a special duration of time, should be so efficacious in calling forth life, seems indeed like a miracle. A few hours ago these twisting, gaping, weak-necked, short-

eyed little towhees were as snugly packed within the round shells, as the leaves were in the buds. For a brief period while they were breaking through their prison walls, it became necessary for them to breathe, so in some mysterious way, a little air cell in the end of each egg had been previously formed for this particular purpose. How much they had grown since they had been released! Through the dark plumbeous shocks of down which sparsely beset their pot-shaped bodies the skin appears as if it were tanned, and is only a shade or two duller than the color of the feathers on the flanks of the old birds. But one can not linger long over the young family, for they are shivering, and appear to be in need of sheltering wings; besides, the father and mother are in a world of distress as they flit from bush to bush, almost within reach. Both the male and female now utter the same notes, "*You shan't have—towhee-e-e.*" The introductory words of this assertion come from their sharp-pointed tongues in creaking discordant tones, which almost sets the teeth on edge, they are so harsh, while the last note has a kind of dismal, pathetic intonation. Nature has given to the birds the power of eloquently expressing their strong emotion. Human parents could not express with a more effecting voice their anxiety for their children, than do these towhees for their nestlings. But as I

move off again the mother is relieved and sets about at once trimming her feathers, which no doubt have been much neglected during the long confinement. After a little combing and brushing she seems to search for tender spanners among the leaves for the hungry little throats.

With the exception of the brown thrasher, the song and Wilson's thrush—whose vespers and matins I often attend as I would a band concert or a sweet human singer—the purple finch is the most tuneful of our sylvan minstrels. There is such a rich, clear intonation to his voice, such an unmistakable expression of joy and delight in his prolonged warble, that it is sure to hold the listener spellbound, whenever he happens within the charmed precincts.

Moving away from a thrasher's nest, through the cedars and oaks, interspersed here and there with thrifty pines, whose thousands of light-yellow sterile catkins are now shining out from the deep green bushes of the needle leaves, all exhaling the fragrance of *pinus* and scattering innumerable pollen grains, that appear, when shaken by the breezes, like clouds of resin smoke, curling out from the branches, I come full upon the purple songster. Through the rifts in the spray I see him perched sideways, one foot above the other, seventy feet from the ground, on the topmost young shoot of a pine. His position seems to be

a very uncomfortable one, yet he remains in it a long time, discoursing the lines of his pleasant pastorale at quarter-minute intervals. While he is performing, the parting in the center of his breast is like a deep, narrow, longitudinal gash which closes and expands with every throb and quaver, until it appears in danger of bursting, and thus spilling the music from his cheerful little heart. Frequently in the pauses he bends his head to examine with his conical beak the parting for parasites, or stretches out his neck and half opens his wings, as if about to fly away, when other birds come near him, but finally he thinks better of it and begins his serenade again. His weed and root house is somewhere about these evergreens, but the secret of the particular locality is his own, and I trust safe, although it would be delightful to just look in upon him, if he should be so gracious as to give me a special invitation.

I am suddenly impressed with the diversity of styles of architecture adopted by the different species of the birds, and the various locations in which their nests are placed. This mere bunch of sticks lodged in the branches of a scraggy hawthorn by a pair of grosbeaks, and the swinging hammock of the oriole on the slender drooping twigs of the elm across the way, suggest the question: What is it in the nature of these two kinds of birds that has caused them to build so

differently? The nest of birds belonging to the same genus, even, have their peculiar places and mode of construction which can be quite readily distinguished by the practiced observer. The yellow, the chestnut-sided and the black-throated green warblers, for example, so common in the vicinity of Boston, and brothers, we may say, in the extensive genus *Dendroica*, have special ways of turning out their cups. That even these little woven masses of down, weed and grass-strips, hairs and caterpillars' webs, show in their construction specific differences almost as plainly as do the markings and colors on each of these birds, and generally can be as easily identified by the specialist, is something strange and interesting to contemplate. What was it in her life experience that taught the yellow warbler to build a deeper and more substantial nest than that of the chestnut-sided, and why has the black-throated green taken it into her head to fix her tiny home in the branches of the pine and hemlock trees, so much higher than those of her near relatives? The influences that induced the barn swallow to place its nest on the beams and rafters, that caused the cousin, the cliff swallow, to fasten its mud retort under the outside caves, or told still another cousin to burrow like the chipmucks in the sand-bank for a nest, are certainly too curious and subtle for even the little birds to tell us about them.

It would be indeed a most interesting ornithological history that could give the year when the "republican" swallow fixed her nest under the eaves, or could treat of the circumstances and conditions in her life that led her to abandon her native cliff for a barn. There was a day when a specially observing and intelligent female, as she was skimming over the field of some early settler, "canted her bullet head" up to the sheltering eaves and thought, "Ah! there is a good place for a nest. I will prospect at once." And what a curious book on bird lore it would be that could discourse on the law that compelled the warbling vireo to hang her purse-like home high on the elm, or told her sister, the white-eye, to fix hers to the lowest brier! What prompted the golden-crown thrushes to form such perfect roofs over their houses? Minot says they do not invariably build so. But those individuals with antiquated notions, that model after their ancient ancestors, only neglect to form the necessary covering, for it is pretty safe to conclude that this pine needle and leaf tiling is comparatively a modern style of architecture among the majority of these wise birds. Had they not learned by sad experience during the past ages that a roof protected them much better than an open nest from the weather and their numerous enemies?

Many other birds, of ground-building habits, have partly learned the roofing trade. The meadow lark is fairly a good mechanic in this respect; the Maryland yellow-throats that take to the swamps and lowlands are necessarily substantial foundation builders, and sometimes arch their nests, and the black and white creepers pay more or less attention in making a kind of gablet over their homes. One often wonders why these last-named birds, that pass most of their time in climbing about the high trees in the wood, should be so terrestrial in their nesting habits. Why do they not, like the brown creepers and titmice, whose ways of life theirs otherwise much resemble, choose some deserted woodpecker's tenement, or a hollow bough or trunk, for a building site? A close observer of the birds says they do rarely build in the holes of the trees. Perhaps those that locate in such exceptional places are still the followers of an old custom, or it may be they are a few representatives that are beginning to find out that log cabins are safer to raise families in than ordinary unshielded nests under foot. The sparrow and bunting ground-builders, although most skillful architects, have evidently never thought of making roofs. That they are more likely to suffer from the thieving snakes, weasels and crows in consequence, can not be doubted. Yet after all there is some protective, maintaining power at

work among these finches that makes them a well represented successful family.

Speaking of certain characteristics shown in the make-up of nests of several species of warblers, and the way they have of sometimes departing from the usual style of building, I am reminded to describe a bit of bird architecture which puzzled me for a long time. This nest, nearly a foot from the ground, is lodged among and supported by the stout culms of a dense tussock of herd's grass, over which hangs a sheltering branch of a cornel bush. The quite bulky outside structure is clumsily put together and is composed of coarse pieces of grass and weed stalks, with dead leaves woven in or glued here and there about the walls; but the builder gradually refined her work as she approached the inner nest. With wings for calipers, a bill for a shuttle, and her body and eye for line and rule, the bird, with finer, more flexible material, wove and pressed it into a perfect circle, till the cup-like cavity, two and three-fourths inches in depth, and the same in diameter, is, at last, exquisitely finished and finely upholstered with elastic grass strips and horse hairs. In this dainty hollow rest three pink-tinted eggs, marked with a wreath of reddish brown blotches about the crown, and with spots of the same color sparsely distributed over the entire surface. The nest seems not to be made on the *Dendroica*

plan, or on that of any of our common warblers. It has certain distinctive features which are almost as plainly exhibited as the peculiarity of colors, toes and tarsi of the builder herself, if she were stretched upon a dissecting board for our inspection. Yet it is beyond a doubt the work of some member of the family *Sylvicolidæ*. Which one? I asked, as I sat watching, half concealed behind a neighboring bush. It is evidently a timid and suspicious one, at least, for an hour passes and still the bird can not be named. Once or twice I hear a sharp "chip," a violent bird oath, which clearly and forcibly expresses alarm and displeasure at seeing such an uncivil intruder; and catch just the glint of a pair of wings, as they flutter between me and the glare of the sunlight, amidst the thick foliage of the shrubs.

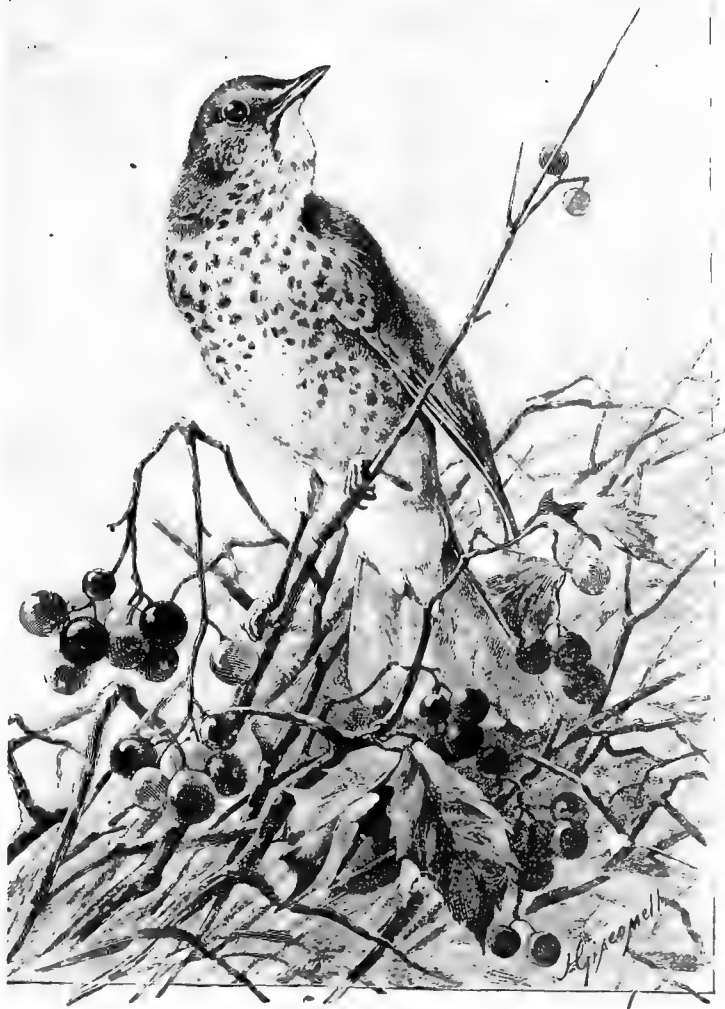
How surely blood tells, even with the birds! The majority of our common species have come to understand mankind, and are quite used to his ways. The chestnut-sided yesterday stuck like a little Trojan to her nest, as I bent over her, and no doubt I could have fed her with flies, as Mr. Torrey did his white-eyed vireo; but this tiny feathered recluse, whatever her name, has the true wildness of Nature running in her veins. She does not like to be interviewed, and "there is a kind of magic in her actions which stupefies your powers of observation." Patient waitings

seem to be of no avail. They always end in imperfect or dazzling views and scoldings. Even the surroundings appear to be charmed, and in league with the bird. Every thing is arranged in the proper order for her concealment at the shortest notice, and however cautiously her house is approached, or whether the calls are made in or out of season, she is always on the watch and invariably slips like a wee shadow from the back door.

However, in two or three fortunate seasons, from several visits, were gathered two or three important facts about my unsociable little hermit, namely: She is a small bird, darkish above with no conspicuous markings on the crown or wings, and has a deep yellow throat, as if it had been dyed with the inner bark of the barberry stems. These colors, together with the shape and marking of the eggs, and the character of the nest, are taken home in the mind, and with but a single exception are found to agree with the "Manual" description of the Nashville warbler. The nests of this last-named species have been described by several writers, and all agree in saying that they are placed on the ground and sunken so that the rims are level with the surface. Be that as it may, perhaps there are individuals, I said to myself, that occasionally depart, as those in other species do, from the usual method of locating

their nests. But one day, when the young fledglings had fluttered from their home, and the parents had become less shy and flew out from the thick-leaved shrubbery, so that the true color and form were plainly seen, I found that I had been completely deceived. My precious bird was none other than the female Maryland yellow-throat.

The declining sun lengthens the shadows of the spires of the evergreens on the eastward slopes with many a streak and dash—a map of the closing day. Shadows are deepening in the City of the Birds. On brook and copse avenues, are many cathedrals, and the vesper services have already begun. A mellow note wavers down from the leafy gallery, as you walk along the carpeted aisles and take your seat. It is a musical celebrity who sings to-night, *Turdus Fuscescens*, the star tenor of the woods. There is something in his nature which makes him love the quiet twilight hour and give it voice. Listen now to the elevating, soul-calming music. *Plu-re-re-e-e, sphere-r, sphere-e-e, ale-c-or, cher, cheery*. The pure, sweet tone is the very expression of shady woodland ways, of trusting joy, contentment and peace. His fine trills, which usually prelude his hymn, and which are always sprinkled, as it were, between the words, remind you of waterdrops falling in echoing cisterns, of tiny bells of the purest metal, tinkling in the trees, or



AT THE VESPER SERVICE.

of silver coins scattered on marble slabs; and yet they are not like those sounds, for the real life and thrush spirit are lacking in them. The noted melodist, however, is chary of his music; he becomes instantly reserved, or his song at once relapses into an irritable, peevish chirp, if he has the least suspicion that you are regarding him. These are his halcyon twilights, and his mellifluous notes, in the season of his honeymoon, are the overflowing of his blissful moods, or are intended only to soothe and comfort his wife, who is now hatching another brood of songs down there in the bush.

Now he makes a willow his chantry and begins to sing his mass. But when he discovers that he is entertaining strangers unawares, he abruptly pauses, gives two or three chirps like those of a lost chicken, and flits like a shadow, a rufous ghost of a bird, through the leaves down to the edge of the brook. Is he lingering there a moment to get once more the key-note from the water that ripples over certain pebbles?

BY THE SEA.

V.

BY THE SEA.

A VIEW of the sea-shore, such as can be had from the summit of Mount Agamenticus, in York, Maine, is indeed attractive. From the dim shores of Massachusetts, along eighteen miles of the New Hampshire coast, far down on the Maine sea-board, the assisted eye follows the long, sinuous line, where the land and ocean meet. Rivers stretch their broad ribbons of silver far inland. Boon Island is a mere speck on the sea. The Isles of Shoals, nine miles from the shore, appear to be separated from it only by a narrow strait, and the broad Atlantic lies below you, like a huge piece of ruffled blue silk, upon which numerous crafts, in miniature, sail slowly by, as in a diorama.

But as delightful as a bird's-eye view of this vast, serpentine track appears, with its surroundings, a ramble on any of the beaches, where the tide-waves for ages have advanced and retreated,

presents to the observer phenomena no less wonderful and entertaining.

To Norwood's bluffs, or the long stretch of sandy beach, I go to study the wonders of the shore in detail, and to obtain a nearer view of the ocean's wrinkled face. It has character—its face is sterner and more imposing and expressive than the face of an inland sea. Its voice is "The eternal bass in nature's anthem," and its breath has a healthful savoriness, a briny flavor, as refreshing to the scent as the perfume of flowers is to the homeward-bound sea voyager.

The winds play with it till it becomes impatient and beats itself against the rocks. Its plastic lips are wrought into a thousand gnarls and convolutions, as they curl through the fissures and caverns, while its foamy tongues, licking the stony bluffs as they recede, leave behind them many pretty cascades that flow gently down the slopes, till the waters mingle again with the incoming waves.

As there are lulls in the wind on a breezy day, so at intervals, as if exhausted with its fury, the sea by the shore becomes suddenly almost calm. Only gurgling, purling sounds are heard for a minute or two, as the wavelets lap the edges of the rocks. But it is gathering strength for another onslaught. Far out, the seas are running high again. A long procession of them swell up

from the waters and roll toward the shore at the rate of four hundred feet in thirty seconds. I watch the leader rising higher and concaving as it comes rapidly on. Its crest undulates and throws up streamers of spray, like the flying hairs on the mane of a galloping horse. Now the climax is reached. The sharp edge bends in graceful curves, tumbles over and breaks with dull, heavy roar into a long line of foam, that shoots swiftly up the steep, shingly beach; then, as it retreats, rolls back a thousand stones, which, as they strike against each other, make a cracking, rattling sound, like the snapping of musket caps by a regiment of soldiers.

The observing rambler while walking along the shores is impressed with the view of the regular alternation of jagged cliffs, and the gracefully-curved shingle beaches. The latter, which invariably front swamps or low tracts of land, that were ancient coves and arms of the sea, are arranged in a succession of shelves or terraces, the highest of which are often twenty feet above low water level.

Here the mills of the Ocean "grind slowly, but grind exceeding small." The surf is continually undermining the rocky abutments on the outer points, and the frosts and rains breaking off rough, angular fragments, which the waves take between their rollers, fashioning them into lap-

stones, ovals, small, round pebbles, gravel and finally into sand and mud, as they are whirled over and over again toward the coves.

Occasionally one picks up pebbles rounded like marbles or eggs, that belong to other kinds of rocks than those from the adjacent ledges.

Here is a piece of white quartz which, perhaps, the waves have broken off from some protruding dike, miles away, and after a long process of rasping and scouring, have at last formed into a perfect oval, and, in a storm, have flung high on the beach for a curiosity, or a decoy for some overcredulous bird. At Donnell's cove I discovered innumerable small grains of garnet that glistened almost like rubies amidst the dull-colored pebbles. Who could tell how far they had traveled or from what part of the coast they had come? Were they the remains of the crystals from the heart of some decayed granite boulder, or had they been washed ashore from distant beds of iron ore, where this kind of mineral is often found?

While climbing over the rocks I came upon a most remarkable example of conglomerate. Large fragments of granite and other light-colored stones had been firmly cemented in a mass of the dark, gray ledge; the surface of which, worn smooth by the action of the waves, suggested a huge piece of nut caramel with its cut edge turned up to view. This would seem to prove

that the ledges here, which now form such a solid sea-wall, were once a soft bed of mud and sand, in which the small boulders, by some means, had been deposited; in the long course of ages, the plastic layers had gradually become hardened and raised up bodily out of the sea.

The shingle beaches are the seashore barrens. Excepting in times of high winds, when the waves pull up from the ocean's bed, and roll on the terraced ridges huge wads of various sea weeds, no species of marine animal or plant life are found on them. The germs could not fasten themselves or live on the ever-shifting, moving boulders. But in comparatively sheltered places, between tides, where the ledges are thickly padded with wracks and mosses; in pools and crevices, and close to the water, where the rocks, between the last ebbing and the first flowing tide, remain uncovered but a short time, the brown line is fairly swarming with life, and affords a rich harvest field for the naturalist.

In the tide pools, or close to low-water mark, I am sure to find amongst the eel-grass, rock-weeds, etc., marks of fine pinkish threads, tangled and dripping with the shining drops as I hold a bunch of these sea-plants up to the light. A frond or two placed in water in a glass jar, and the fine threads no longer entirely cling to the coarse weeds to which they are attached at the base, but

float and swing out free into the transparent fluid, and appear at first like delicate mosses, with small stems, that give off numerous smaller branches. Indeed, it is a wonder of the sea, among the many grotesque figures which the mermaids and Neptune hand to me from the watery depths.

Viewed with the magnifier, I find here is an animal whose body is stationary, and formed much like the herbs growing in the fields; with stem and branches protected by a horny transparent bark, through which one can see tiny drops of sea water and chyme—the only kind of blood it has—flowing swiftly along the numerous channels. Arranged on the hair-like branches, as berries and pods are on the twigs and stalks of certain shrubs and herbs, are little, bell-shaped cells, in which are mouths, provided with a wreath of minute tentacles, stretched to their full length, and apparently feeling in the water for any nutritive atom that may chance to come their way.

This creature is one of the many Hydras of old ocean, and has even more heads and mouths than the fabulous monster of the marshes of Argolis. Although but a step higher than the sponges in the scale of creation, it appears to be governed by a certain amount of intelligence. At the slightest tap on the glass jar, the little zoöids or polypite berries instantaneously draw their slender feelers

within the cells. This natural movement of self-protection is not so remarkable, perhaps, but when they seem to wait for the danger to pass, and then slowly and cautiously push out their delicate tentacles, one after the other, as if they remembered the warning, and were watching with the greatest prudence to see how the water lies, it is, to say the least, an interesting instinctive action.

What gigantic species of hydras may be writhing with their long arms in the unfathomed caves! The dredge of the Challenger, several years ago, brought up from the bottom of the sea the largest hydroid that has ever been discovered. "It measured seven feet, four inches in height, and was provided with a crown of non-retractile tentacles nine inches across from tip to tip." If some wise mammal of the seas, some manatee naturalist, had been especially created to roam through the deep like its lord, and had written about its wonders as the persevering investigators have written on the wonders of the shore, we should probably have read the descriptions of even greater marvels than this among the Hydrozoa.

Ah! "the sea is His and He made it," and when He made it, He created millions of odd, fantastic creatures to dwell therein, which the zoölogist has never dreamed of, and which, if he could behold them, would appear as strange to him, as seem to me these few living curiosities that I

have chanced to collect while strolling by the ocean's edge.

What grotesque, outlandish forms there are among the small crustaceans that can be picked up almost anywhere in the tide pools and under the rank sea-weed! Here are countless barnacles incrusting the rocks that lay far above low-water mark, waiting patiently for the incoming tide to submerge them and bring them food again. Those in the higher places, with valves tightly closed, have fasted for many hours in the eye of the blazing sun. How curious it is that such water-loving creatures can flourish here! What has prevented them from perishing outright, fixed as they are on the hot, dry rocks?

Four or five months ago, many of these mollusk-like crustaceans were young, free, swimming little creatures which looked like the so-called "fleas" in our fresh ponds and ditches. For a while they skipped lively enough through the rising and falling tides, but there came a time when their roving life ended. Instinctively they all swam toward the rocks and fastened themselves upon them. Wherever there was space for building, even on the shells of past generations of barnacles they settled, and began the construction of their lime-stone houses. Day after day the strange transformation went on till the marvelous structures were completed. The shell which encloses

them is composed of several pieces, nicely joined and fitted together, with an opening lid on the top of the cone-shaped house, through which the little anchorite thrusts his hairy fingers to take the food which the overwhelming and bountiful waters bring him. At extreme high-water mark the specimens are quite small and impoverished in consequence of the brief periods in which they can feed and perform that wonderful operation of secreting lime from the sea water.

Accidentally I found another species of these curious crustaceans, much rarer on this part of the coast. It is the "Goose Barnacle," and looks more like certain mollusks than even the rock species. It had drifted to the shore on a sprig of sea-weed, and was attached to a frond by its stout peduncle, more than a half inch long. At first it resembled a tiny dam with its siphon extended from its delicately-marked and porcelain-like shells; but as soon as it was dropped into the jar it opened its valves and pushed out its six pairs of legs, which together suggested a double-fingered, finely-fringed hand, and commenced a series of grasping motions. It appeared to be clutching at nothing but teemless water, but doubtless each time it cast its net many tasteful minute sea animals were swept within the meshes, besides by this movement supplying it with fresh currents of water for breathing. If the water

began to lose its vitality, it would at intervals thresh itself about almost furiously, as if impatient at receiving such meagre fare, or swing by its muscular stalk from the pendulous to a horizontal position, in which it would remain for some time, clawing among the zoöphytes that were attached to the floating fragments of sea-weeds.

One is constantly in a pleasant state of expectancy while rambling over this wondrous boundary line between earth and ocean. He knows not what marvels may come to him at any instant, and his senses are all agog in his ardent desire to examine them. He peers and pries into every hole and corner. The stones that have sermons in them, also often have exceedingly interesting memoirs, discourses and riddles beneath them, and he eagerly turns over the ponderous tomes to read and study what may be written on the nether cover. Who would expect to find here worms with scales on their backs? Yet here is one crawling slowly along and trying to hide among the rock-weed. It is nearly two inches long, and has twelve pairs of round, dark-brown felt-like plates which are placed opposite to each other and regularly imbricated. When it is touched it immediately rolls itself into a ring, as do certain caterpillars and myriapods, but it soon uncoils as it is placed in the jar. The under parts of this curious, mud-loving sea-worm appear

to be clad in a thin armor of pearl, which, when viewed in certain lights, sends forth all the colors of the rainbow, like the inner lining of muscle and fresh-water clam-shells. It is beset with numerous bristles by which it moves, and which it uses as weapons of defense whenever the greedy cunners, at high water, push their sharp noses in its crevice-home, and nibble too closely at its prickly sides.

In the salty pools another minute species of sea-worm lives in a solid limestone tube, which resembles a miniature powder-horn glued to the fronds of various tangles. The crooked little house has a trap-door (operculum) which the inhabitant lifts up for food or freer respiration, and pushes out a delicate wreath of branchiæ or gills that looks like a tiny plume. Indeed, it is a veritable "Jack-in-the-Box," excepting that the method of appearing and disappearing is in reverse order. It puts its head out slowly, but at the least movement of the water, or even at a passing shadow, it springs back into its case quicker than the eye can follow it, and closely shuts the lid.

How many sea Jacks there are in coats of mail in different patterns and colors, scattered all about here, that the fishes will be playing with again in a few hours! Millions of shore snails of many species are lying on the wrack or lodge in the crevices of the rocks, waiting for the tide. Some

of them are vegetable feeders, while others are flesh eaters, and sharp-toothed ones! Verrill says that the *Lunatia hicos*, "and other species of its tribe, drill round holes through the sides of various bivalve shells, by means of flinty teeth on its lingual ribbon which acts like a rasp, and having made an opening, it inserts its proboscis and sucks out the contents." It is said that fishes also often dig up and devour many kinds of clams and wrinkles — a mode of operation that would be most interesting to witness. How necessary it is that the soft bodies of these worms and mollusks should be protected by thick armors of lime; for besides the attacks of their numerous enemies, they must be often beaten, or knocked about by the fury of the waves.

Now that I look on one of these univalves I am suddenly impressed with this wondrous miracle of shell-making. What magic had the little creature, that lives within, to construct such a beautiful, nicely-turned shield? From the food it swallowed, say the books. In the food was carbonate of lime, and the lime in small particles was pressed through the mantle or tender skin, forming on the outside a thin covering at first, but gradually becoming thicker and harder until a substantial house was made.

Notwithstanding these explanations, no one, I believe, has yet been sent to tell us exactly how

the shells are produced, or how the cases in which the various species live, have been moulded into such a variety of curious and grotesque shapes, so brightly polished and so exquisitely marked and colored.

But there are, on these rocky bottoms, certain kinds of mollusks, without even a trace of armorial bearing, that appear to thrive very well, notwithstanding the heavy beating and rolling of the waves. Turning over a rock which is fairly bristling with the short filaments of hydroids, and painted with numerous circular, closely-adherent purple patches of sea-scurf, I discovered in one of the little depressions what appeared to be a small lump of flesh. As soon, however, as it was placed in a jar, this shapeless mass at once came to life and revealed its real nature. It was a naked mollusk or sea-slug and one of the most conspicuous species found on this coast. Its pink foot stretched to its full length was narrow, and as it slowly glided along the glass sides, its edges were constantly curving inward as if perplexed with the strange surface on which it moved. On its mottled, dark-purple back, were arranged two rows of branchiæ or gills, resembling miniature trees or shrubs, which swayed in the water, like branches in the wind. The pair nearest the feelers or antennæ, which were also branched, were much stouter and more upright than the others,

which gradually diminished in length as they approached the hinder parts of the body.

Nature has chosen the sea, in which she may especially indulge her wayward, fanciful, almost humorous moods. Such grotesque, aberrant forms of life as are at times fished from her watery cabinet; such "Quips and cranks" as are shown in her various hydras, cyclops, hermaphrodites, sphinxes and other odd conceits, not only amaze but amuse us.

It is interesting to compare, on this wonderful boundary line, the forms of marine animal life with those that live and move just beyond the reach of the waves. Indeed, in a few species of mollusks and crustaceans, the difference in cast and mould between the water inhabitants and the air breathers, is slight. The "sow bugs," for example (which, by the way, are not bugs at all, but members of the crustacean family, like the shrimps, etc., living under damp stones beyond high-water mark), can hardly be distinguished, except by microscopic examination, from the gribbles, sea slaters and other allied species that are content to live only in the water, or in places where the tide flows over them at least twice a day.

It is a matter of much interest, also, to consider the plant life peculiar to the sea-shore; the species that are found on the littoral picket-line and

never in other places; the floral vedettes that come down on the rocks and sand and delight in occasional sprinklings of salty spray, and to snuff the saline breath from old ocean's swelling breast. Sea blight, sea lovage, beach pear, sea plantain, sea milkworts, sea rockets, one species of the golden-rod, *solidago sempervirens*, all members of different families, have for some reason taken into their yellow and purple heads, to plant themselves on this border-land, and from watch-tower and signal-post make their bows, and wave their thick, fleshy leaves in response to the swaying fronds of algæ below them.

Within a few feet of the highest wave-mark on the shingle at Long Beach, I came full upon another of these sea warders softly ringing its chimes of tiny bells in Neptune's ear. Its name is *mertensia maritima*, or sea lung wort, a distant and infrequent relation to the forget-me-not. The flowers, which are hung on slender pedicels in clusters, have creases around the tubes just above the calyx teeth, as if the finest threads, tightly drawn, had girded them. They are of the peculiarly beautiful hue of their famous second-cousins, and clearly show their borage blood in the deep four-lobed ovaries at the base of the single styles. It was remarkable what pains the plant had taken to grow here. How far the succulent roots had wormed themselves down among the coarse gravel,

till the slender tips at length could reach just a pinch of common earth and sand on which to thrive and spread their broad mats of leaves and stems on the smooth, water-washed rocks above! "Sea-coast, on rocks and sand, Cape Cod to Maine and northward; scarce," says Gray's Manual; so on account of its rarity, it is regarded with more than ordinary interest. One is at once seized with a desire to know its history. For a mile—how much further I know not—East or West of this limited area where a few mats of it grow, not a single sprig can be found. What were the agencies that brought the seeds from a distant beach and planted them here in one spot only, below the stones?

The various tribes of birds that alight on the sands, or wade in the shallow wavelets, or swim among the rocks at low water and half-tide in search of fish dinners, present numerous inviting and attractive scenes to the sea-shore rambler. The song-sparrows, bay-wings and blackbirds that have taken up their abode in the adjacent swamps and meadows, often fly down to this border-land to pick up the sand fleas and other small, juicy crustacea that the waves have thrown in. Even the kingbirds, with their habits of woods and fields reversed, come here for a change of diet. In absence of posts of observation, they accept the conditions with good grace and alight at once

on the bare, level sands, to watch patiently for a passing hopper, or awkwardly flutter along to capture it. They appear at times to stare curiously at the plovers and sandpipers that run among them so easily, and wonder why they can not do the same thing. How long since did these birds resort to such localities for food, or learn the trick of obtaining shore meals that their far-inland relatives know nothing of?

But the plovers and sandpipers are to the manner born. They know the habit and nature of the sea by heart. How adroitly they elude the tumbling surf! Now running out before the retreating waves to capture some billsome morsel; now daintily picking their way along the sinuous line of the advancing wavelets, or simultaneously displaying a white and gray line of fluttering wings as they rise before the incoming sea, amid a general chorus of tittering which might be compared to the screams and laughter of distant bathers, as the showery spray falls on their backs. How much their voices are like the peeping of the frogs. Their soft, sweet, treble piping is in response to the sub-bass of the tumbling waves; the sounding of the highest notes in nature's psalmody, with the deep profundo of the rolling surf.

On the shore, by the edge of a lodged mass of sea-weed, where the waves are taking it back again

bit by bit into the water, a flock of spotted sandpipers are running hither and thither, turning their heads this way and that, and making little tacks in pursuing the nimble fleas and shrimps that have escaped from the tangled fronds. There is no lack of food here, yet these little waders, strange as it may appear, have quick, fiery tempers, and often quarrel around the well-spread table. It is one of the oddest sights in the world to see the sandpipers fight. They spread their short tails and stretch up their necks, and turn their heads sideways like turkeys, then bow and courtesy to each other for a long time. If at length one attempts to move off, its antagonist suddenly dives at it with lifted wings and wide-open beak. At times a quarrelsome snipe seems to glide along toward some imagined offender, with tail tipped up and its finely-streaked breast grazing the sea-weed. After a brief clash of bills and wings both fall to watching each other as before, until one, tired of the affair, creeps stealthily away, like a cat. Although they are crotchety and ill-tempered while feeding, they are perfectly harmonious and orderly in flight. At a signal given by the leader, the flock rises up and moves through the air as one bird. How alert and attentive each one must be to the movements or the bugle call of their chief, as they together change their course; now wheeling and counter-

flying, now all at the same time showing their under-parts, as white as the sea foam, or turning their backs, as gray as the rocks, toward you as they fly aslant over the swelling waters. But for some reason this well-drilled flock is easily scattered and soon broken into squads and pairs. As I walk further along I see a lone bird standing motionless on a bare rock off the shore, apparently watching the incoming waves. Will he answer to the roll-call to-night at the bivouac among the rifts of the ledges, or fly inland to roost by the margin of some pond or stream to give ear again to the plaintive piping of the frogs, which he has learned to imitate so well?

From the shores of Labrador and the Hudson's Bay Country, various sea ducks, after the breeding season has ended, appear on the Eastern New England coast as early as the last week in August, to ply their fishing trades. "Dippers," "Old Squaws," "Black Scoters," white-winged and skunk-head "Coots" are seen singly, in pairs and in large flocks, paddling their boat-like bodies over the waves, or coasting along the weedy rocks, when the tide is out, in search of limpets, wrinkles, small crabs and other dainty flesh-pots, with which such places abound.

There is something peculiarly interesting in the sight of these ocean wanderers, they are so self-reliant, so wild and free, so hardy and suc-

cessful in life's race. They are born for the sea. With their boat-like bodies, powerful wings and paddle feet, they care not for its angry mood, and actually laugh in its contorted face. It is worth a journey of many miles to watch the "old salts" as I do to-day! A flock of "Scoters" are swimming along within three hundred yards of the shore, apparently under the guide of a captain. They are a busy crew, and are continually diving to capture the small fry beneath them. Practice gives them wonderful facility and grace in performing their "headers." Just how the bird disappears so quickly beneath the surface is difficult to explain. A tilt of the tail, a sudden dip of the bill, a certain twist of the propellers, and the thing is done! Only a swirl appears on the water, where the duck was an instant before. For more than a minute it is out of sight, then like a sunken buoy, disentangled from the submerged sea-weeds, it rises without any apparent struggle for breath, and rests lightly on the rocking waves. Now it lifts its under parts free from the water and flaps its wings to shake off the briny drops and, settling down again, adjusts them carefully over its back. Sometimes, without even the aid of the wings, it raises its body and sits for a moment almost uprightly on the water, as the grebes do on the shore. How it does this, without the support of its wings, and with only the water as a fulcrum,

is a mystery which the duck, if it knows, has not been sent to reveal. In what way do these surf ducks and other birds, that wander over the ocean's waste for weeks and months together, obtain fresh water to slake their thirst? Probably the rain-clouds often pour it down to them. If the clouds fail, they must depend on their great powers of enduring thirst, and the juicy nature of their food.

An old sea captain gives a very interesting account of a flock of sea birds that he saw drinking far from the land. He said: "They were hovering around and under a storm cloud, clattering like ducks on a hot day at a pond, and drinking in the drops of rain as they fell." The same observer says: "They will smell a rain squall a hundred miles, or even further off, and scud for it with almost inconceivable swiftness."

On an outlying rock, left bare by the receding tide, a solitary old drake is preening his dress in the sun. His entire plumage is deep black, in great contrast to the large, bright, orange-yellow knob at the base of the upper mandible, which gleams like a living spark as it moves among the sable feathers. How much he appears now like a domestic hybrid mallard that has strayed from the door-yard, as he stands there, turning and rubbing his flexible neck on every part of his body! The oil tanks which he always carries

with him, are placed astern over the tail bones, and are constantly supplied with the necessary lubricant. He must often resort to this oiling process, for it makes his craft slip easier through the water, and gives imperviousness to his feather-plated armor. His wild nature is soon apparent. He depends on no human hand for his food. Would he pick up corn or refuse from the table, even if it were thrown to him? As I slowly approach, he lifts his head and eyes me suspiciously, then turns to waddle down the slippery rock and gracefully launches his boat into the sea. He is, indeed, a pretty sight; this bird so alert and trim, as he rises and falls on the waves, and sidles off from the shore, like a graceful yacht sailing on the wind. But he soon returns when I am concealed behind the ledges. It is curious to see him manage his craft among the breakers. He swims into the eddy and under the shelter of the lee-wall formed by the rock on the shoreward side, and waits, as the fishermen do with their wherries, for the rising waves to lift him high and dry again on this basking and preening place which he seems to like so well.

But the day among these delightful wonders of the sea is nearly ended. From Cape Race, along the coast south-westward, as the great sun dips below the horizon, the numerous beacons, with their pencils of light, have been for an hour, one

after another, dotting the shores and recording the time of his setting. The "Nubble" lighthouse has just reported and throws against the eastern sky a fixed red light, which glows like Mars, as if Old Sol had left behind in its lantern a coal from his fiery furnace. Immediately a splendid silvery orb, like Venus, shines over Boon Island, nine miles out to sea. Further west the watch-tower on the Isles of Shoals is on time, and begins to flash its cautionary signals to the harbor-bound vessels.

As the fire at last was kindled in that highest and most steadfast beacon, the Polar Star, I rode up through the fragrant pasture lane to the Hill-side Farm, with the sweet content of a day well spent. A few of the "sea-born treasures" were confined and brought home in a jar —

"But the poor, unsightly, noisome things
Had left their beauty on the shore,
With the sun and sand and the wild uproar."

FLIES.

VI.

FLIES.

AMONG the many orders in the insect world, none are more curious and interesting in their lives, habits and the history of their development, than that of the *diptera*, or the two-winged insects popularly known as flies.

The most familiar example, the house fly, however common a vagabond and pest it may be considered, nevertheless presents a most remarkable appearance when viewed with the magnifier, as it washes, combs and brushes its legs and wings, by the half hour, in a sunny spot. It is a cleanly insect and works hard to rid itself of dust and the parasites with which its body is often infested. How it bends its head, until it seems the nape must be twisted off by such contortions! How rapidly it rubs its feet together, as one would rid his hands of soil; and with what skill it lifts the hind legs over its back, and brushes the upper and under surface of the delicate wings, that they may be free and unimpeded!

If one notes carefully this dainty bit of wing structure, he will be well repaid for his trouble, by seeing the beautiful, ingenious contrivances which strengthen and sustain the gauze-like texture of the wings and render them suitable for the performance of flight. Here is a wonderful system of venation; a framework with all its pieces nicely joined together, like the whalebone ribs of an umbrella. From the four main trunks, at the base of the wings, branch out six supporting limbs, at different angles and with various curves, lengthwise over the soft, almost transparent surface. These are called longitudinal veins, and are connected by large and small cross-veins at different places. These supporting ribs are stouter and more rigid along the front part of the wing than those on the posterior part.

One is fascinated in examining the manifold patterns and diagrams that Nature has drawn on the wings of flies! It is by studying the various designs, that the many families and genera are identified. How many species there are to be interested in, that never visit the houses, except as stragglers! Their haunts are in the deep woods, along streams and ponds, in sedgy swamps, grassy fields and wild-flower patches, and it is to these localities one must go, if he would study their actions and curious life histories.

If one walks across the fields in April or May

he will, perchance, scare up myriads of those mosquito-like flies, the daddy-long-legs, belonging to the crane-fly family, that flutter along ahead and again settle in the grass, or cling to the bushes or the lowermost leaves of the trees. The manner in which they take hold on the edges of leaves with their fore claws, allowing the body to dangle in the air, is very curious.

There is one little yellowish green species in this family—a modest fork-fly—so retiring, indeed, that it loves to hide itself from your admiring gaze. It does not hang and swing, as many other kinds do, but sets firmly its six feet on the under surfaces of the leaves and begins to vibrate rapidly, as if its long, slender legs were full of spiral springs. If not disturbed, it continues to dance in this manner for a long time. Is not this the method it has adopted for its protection? Besides the general color harmonizing so nicely with the spray of plants, has it not further resorted to this ingenious trick of deceiving the insect-eating birds, by feigning death or by counterfeiting a half-withered bit of leaf or twig, caught by a caterpillar's or spider's web, that trembles in the breeze?

Under the barberry bush, by the stone wall, a distinguished collector has established his cabinet, and a number of very dry, but quite rare specimens are seen mounted on his winding shelves.

Some of the species captured are exceedingly minute, but the human spider, like the arachnidan specialist, counts nothing lost that comes to his net; so all these little winged motes have perchance been seen before, have classical names many times longer than themselves, and, as if they were the largest creatures on earth, are honored with stately descriptions in the books.

Mr. *Theridon*, the proprietor, is modest and retiring in his habits, when visitors come to his museum. In his absence, I have purloined a brownish oddity, belonging to this same crane-fly family. Curiously enough its wings are quite thickly covered with long, fine hairs or wool. Its surname is *erioptera* (wool wing) and this singularity, together with the peculiar curve of the last longitudinal vein, which converges toward and almost touches the one above it, are the distinctive characteristics of the genus to which it belongs.

What is this singular insect that, as you search among the sedges of the bog, rises up, moving slowly through the air, or rolling along over the tall spears so oddly that one is almost in doubt whether it is an insect at all, or some strange non-descript, produced by the chemistry of the putrid water and rank vegetation? Its flight is remarkably like the aimless drifting of the dandelion pappus on the light zephyrs. Indeed it resembles, at

a distance, some little composite seed, winged with long variegated bristles, and radiating from all parts of it, so as to form a loose globular body. If you are successful in capturing one of these apparitions, and if you place it under the glass, you will find it has materialized into a crane-fly; another species, called *bittacomorpha clavipes*, generically, because it is in shape much like a slender neuropterous insect, named *bittacus*; and specifically, because the first joint of the foot is swollen or thickened, and resembles a club. It is an aberrant form, sure enough, of this long-legged family. Its silvery white head in front, in contrast to the velvety, jet-black thorax; the legs painted in sharply-defined bands of black and bright white; the antennæ, narrow hyaline wings, and the long, slender abdomen, explain why it presents such a striking appearance when flying. These curious flies are found floating over bogs, where there are shallow, stagnant pools, in which they lay their eggs, and where their larvæ live.

How Nature has ornamented and tricked up these two-winged insects! Sapphires, amethysts, rubies and emeralds, such as no jeweler has in stock. There are green, brown and japanned specimens. Some shine on the green leaves like blue bits of polished steel; purple and gold mites, on glassy wings that glisten in the sunlight as

they hover over and lap up the sweet juices of the flowers.

The disguises worn by many species of flies, for protection, are very interesting to consider. The members of the family *syrphidæ* have taken to the ways of the bees and wasps, in color of dress and manner of flight, and are the gayest uniformed soldiers in the army of the *diptera*. Watch this species on a flower, its wings extended ready to dart away like an electric spark; its purple eyes so large that they touch on the top of the crown, in gorgeous contrast to the rich golden front and antennæ, the short, oval joints of which droop over its visor, like gilded tassels. Look at the burnished corslet, the yellow legs, and striped body that throbs and palpitates and appears to make ready to stab you at the least provocation; but it has no rapier, and you need not be alarmed. It is only skillfully acting the part of the "yellow jacket," without the weapons. What is it that gives this insect such bright colors and sends it out to assume the character of the hornet? Natural selection, answer the scientists; that the fly may be guarded against the attacks of its various enemies. The wasp devours many species of the *diptera*, but coming upon this, and other kinds that mimic it so faithfully, it would be likely to be deceived, and therefore passes them by unharmed. Many of the birds have respect for the armed

insects, and not being very good entomologists, are deluded by the false appearance of these gay deceivers, and so give them a "wide berth." Thus Nature, through the operation of her laws, has painted and given to these harmless flies mimetic forms, that they may win in the great struggle for existence.

What curious life histories have many of the flies! The eggs of the different species are laid in all kinds of situations, so that when the larvæ are hatched, each may find its own peculiar food already at hand, on which it immediately begins to eat and grow. Some kinds of maggots are born in the nests of bees, and fed on the fat, tender flesh of the bee larvæ, that are carefully tucked away in the cell cradles. The fly that dares to enter such perilous places to deposit its ova, must be dressed in bee's clothing, that the little busybodies may not suspect that an interloper is in their camp. On sunny days, quite early in the Spring, if you are looking out for such intruders, you will be most likely to find a curious species darting here and there among the cud-weed and first cinque-foil blossoms, keeping its conspicuously-colored wings extended, as it hovers over a flower, as though it had learned the trade of the humming-bird. This is a bee-nest hunter. If it chances to alight, and you can capture it, you will see that its body is densely

covered with yellowish brown hairs. The honey-yellow legs are quite slender, the hinder pair being much longer and more thickly beset with bristles. The compound eyes are large and full, and the head is armed with a proboscis nearly as long as the thorax and abdomen. The base and front of the wings are brownish, while the lower halves are nearly transparent, clouded on the cross-veins and curves. The venation, especially on the front edge, is large and rigid, showing how well adapted it is for rapid flight.

This species, I am convinced, is particularly fond of invading the homes of the sand bees, for I have seen it playing up and down over a flourishing borough, evidently searching for some unguarded tunnel.

Some of the boldest and most impudent of the *diptera* actually glue their eggs on the abdomen of the adult wasp, and the larva, as soon as hatched, begins to eat its way between the segments, and there lives for several days on the juices of these armed insects.

There is a species of fly called *syrphus politus*, so cunning and accomplished, as its specific name would imply, that it hunts for yards or groups of plant-lice, and in the midst of them it lays a single egg. The little green and purple larva wakes up to find itself surrounded by a swarm of sweet-meated aphids, and immediately it stretches

out its extensile body, to seize the nearest, and extract the honey-dew. After it has drunk its fill and grown to full size, it suddenly wraps itself up in a blanket of glutinous secretion, and in a pupal state, goes to sleep on the same leaf or stem from which it has fed.

The eggs of many of the *diptera* are hidden away in toad-stools, decayed wood, moss and the like. Some are deposited in the water, and the maggots have curious devices by which they breathe the air.

A gaily-uniformed fly, with spined shield, a green coat, spotted and banded with black, yellow legs and purple eyes, searches the shores of ponds and slowly-running streams, and fastens its eggs on the aquatic plants. In due time the little footless grub is launched into the world of waters, and by the aid of a bubble, which it forms at the breathing pore by means of a whorl of bearded hairs, is kept afloat; or if it sinks, it carries with it this supply of air, from which to draw while beneath the surface. Here it feeds on the prey that comes within its reach, until it has grown to the full measure of maggothood. As it assumes its pupal character, it gradually decreases in bulk, till at last it is so contracted that it occupies half of its larval skin only, which it now uses as a boat and sails about on an aimless voyage, waiting for the sunny days when it shall cast away its swad-

dling clothes and mount on airy wings, a perfect insect.

There are many species of bot or breeze flies that are curious in their breeding habits. Each kind chooses its own type of animal on which to leave its larvæ. They are found on rats, squirrels, rabbits, in the nostrils of sheep, even on frogs, in large tumors on the backs of cattle, and in the stomachs of horses. The peculiar instinct of the species that infests this last-named animal, is especially interesting. What is it that directs this insect to glue its eggs on the very places where Dobbin is most likely to nibble, thus introducing them into the receptacle that is necessary for their development?

There are large robber flies that swoop upon other insects, and fly off with them, as hawks do with chickens and small birds. Many species in this family are seen flying about the sandy shores of ponds and rivers. They never crawl about, but if undisturbed, remain a long time in one place, turning around quickly and flirting their wings like the wasps whenever any thing passes over them. All have very long, sharp claws; the species in one genus, in addition to these, have on their forelegs stout hooked spines, which are used as birds of prey use their talons. To this group belongs that remarkably rapacious and quick-winged species, the bee killer. It is a veritable

pirate among the flies, lying in wait for and capturing the home-bound honey-laden worker, tearing open the nectarious sacks, and devouring the contents. Mr. Charles Riley, a curious and expert entomologist, says that it has been known to kill "a hundred and forty-one bees in a day."

What singular forms there are among the *dip-tera* that have deviated from the typical flies! There are degraded races that have no wings and have taken to the ways of the mites, living as parasites on various birds and animals. Their bodies are hard and scale-like, fitting them to live under the hair and feathers and gorge themselves with blood. The sheep tick is a familiar example of this group. There are also the spider-flies that closely imitate the little *salticus familiaris* (the familiar leaping spider), that trips about on its light, fantastic legs, half crawling and half jumping along in the hot sunshine after prey.

In a botanical ramble, I happened once on a dipterous oddity that fairly electrified me with surprise. Walking by an old slough-bed, where the water had evaporated and left the half aquatic plants to grow luxuriantly in the mire, I plucked a specimen of bur-reed, just then in bloom, and with a glass was about to examine the stamens, when I observed a grotesque appearing insect, a cross, apparently, between the grasshopper and fly, crawling slowly over the dense spherical

heads. The protuberant compound eyes, the hind pair of legs much longer than the others, with the femora swollen and thicker, and the long antennæ extending straight out from the somewhat receding front, all gave it, superficially considered, the appearance of a small grasshopper. In analyzing it, however, the peculiarities belonging to the two-winged insects could readily be seen. Its general color was a chestnut-brown. Six acorn strips, broken by narrower whitish hoary markings, adorned the top and sides of the thorax, and the clouded wings, which it did not attempt to use, were folded closely over the rather slender abdomen.

With self-congratulations I hastened home, elated with the thought that I had discovered a new and extraordinary species, but in searching the books, I saw that the specialist had been before me. It was recorded and described in good set terms, under the imposing name of *Sepedon fuscipennis*.¹ Evidently it is rare, for whenever I go for specimens, the search is in vain for another of these winged marvels, although other members of the family, not so singular in appearance, are often found. As far as noticed, all of them are seen among the grass and bushes in damp situations, and are quite sluggish in their motions.

¹ Clouded-winged crawling fly.

There is another most interesting family of flies, called the gall gnats. They may be generally known by their slender bodies, hairy wings, with only two or three longitudinal veins, and long antennæ, jointed and beaded like a necklace, each bead surrounded by a whorl of bristles. Although the majority of the species are extremely delicate and minute, they perform greater wonders than any other kind of *diptera*.

With few exceptions, the food and home of their larvæ is in the living tissue of plants, and it is also a curious fact that the different species of the perfect fly visit exclusively a certain kind of herb, bush, fruit or flower, on which to lay their eggs.

The peculiar irritating, poisonous nature of these maggots, as soon as they are hatched, and have penetrated a leaf or stem, produces various and oftentimes fantastic deformations, which are sure to arrest the attention of those who have eyes to see the curious things in nature. On the leaves of many kinds of trees and shrubs, these galls appear in the forms of knobs, buttons, blisters, cockscombs, etc., frequently covered with a pubescence or short, soft down, like that of the peach, and of various colors. The premature purple of the gooseberry, and the red of the currant, sometimes is the work of a single little gall-fly maggot lodged within, and living on the putrid

pulp. Occasionally, in his rambles over dry woodlands in the early summer, one sees racemes of the delicate bell blossoms of the low blueberry, transformed into a clump of tough, leathery pendants, each distorted and swollen to four or five times its natural size. This is the result of the ovipositor of a particular species that visits only this kind of flower.

On the leaves of young oaks there is a fly that makes a most extraordinary gall. It resembles a ball of white plush, ornamented with pinkish spots of delicate tint, and placed at regular intervals, as if by artificial design. Indeed this singular accretion, frequently met with, suggests the humor or caprice of a party of fair, gay picnickers that have visited the woods and stitched here and there on the twigs specimens of rosettes and tassels, from their millinery trappings.

Occasionally, in my Winter walks along the sunny side of stone walls, where huge wads of dead leaves have been rolled up by the wind, I notice swarms of small gnat-like insects out in the sunshine to try their wings. They play up and down over particular spots, as if some unseen fairy magician was having a game of cup and ball with them. They are not mosquitoes at all, nor those small flies with feathered antennæ, seen so often hovering over damp places in the early Spring, but a species of the daddy-long-legs family

(hair-horn Winter crane-fly). When viewed with the common magnifier it is easily identified by the peculiar seventh longitudinal vein. This is short and strongly bowed or incurved toward the lower edge of the wing, and is a mark, say the entomologists, unlike those of other species in the genus! The borders of the transparent wings are fringed with the finest hairs, and most curious of all, their full, compound eyes are covered with a downy substance, like that seen on certain leaves and stems. Pubescent eyes! What is the purpose of Nature in thus enveloping the visual organs with such strange pilose bandages?

The larvæ of these flies live in heaps of decaying vegetation, and in favorable conditions, burst through their masks to sport in their odd, see-saw fashion above their tombs. How wonderful that such tiny fragile bits of life can survive the rigors of our Northern Winters, for, as Mr. Fitch says, "Even when the temperature is below the freezing point, and the cold so severe as to confine every other insect within its covert, it may be met with, abroad on the wing."

TREES IN UNDRESS.

VII.

TREES IN UNDRESS.

ALTHOUGH the winds and rains have suddenly extinguished the flaming maples, the gold-illuminated elms, and hickories, birches and beeches, the glowing sumachs and tupeloes, and left all the hard-wood trees bare of leaves early in November, still there is a charm in the woodlands, which the lover of Nature will not lose sight of. The boughs, now dismantled of foliage, describe a thousand varieties of curves and angles, and each species of tree has its ingrained habit of throwing up its signal mark, and writing on the cerulean page, in many figures, fine lines and dashes, its own peculiar autograph.

What a graceful flourisher is the elm! How many sweeping strokes, deflections and cranes'-necks among its boughs, and how regularly diminished the branch lines, curving outward from the trunk to the smallest twig, as if they were

measured and proportioned to sustain a certain weight of leaf and wood!

The signatures of the long-lived, Promethian oaks have much character to them, especially if they stand apart where the winds and weather make them strong-willed and deep-rooted. What firm, vigorous lines the red oaks draw against the sky! Their branches are crooked, and the spray is stiff and coarse, as if for the purpose of supporting the heavy foliage. Is not the stumpy, thick-set spray characteristic of most trees that bear heavy burdens?

The apple and pear trees write their names in a cramped and crabbed style, and, if entirely wild and untrained, the branch lines grow into snags and thorns, so peculiar to the family.

The shag-bark hickory is another curious woodland scribbler. Its trunk is seldom forked, but the numerous boughs grow out laterally, often describing short, downward curves close to the bole. The twigs are bowed, and are more inclined to spread out sideways from the branchlets than to spring upward. The shaft, often rising seventy or eighty feet, as if grown by a plumb-line, is covered with a dark granite-gray bark, giving it a still more monumental appearance, while the singular exfoliation of the rind, hanging in loose, irregular flakes, like weather-beaten shingles on an old building, is the plaited and foliated work, the hie-

roglyphics which the boys and squirrels easily read, notifying them where are to be found the thinnest-shelled and the fullest, sweetest-meated nuts. No other tree in the genus *Carya* has such individuality, or is so characteristic in the lines and strokes of its sign manual, as the shell-bark.

What odd, fantastic sky-markers are the button-woods, when denuded of their leaves! They are made especially conspicuous in our northern woods, and along the roadside, by the action of the frosts, or by some kind of disease which has of late years attacked the young shoots at the extremities of some of the winding and twisting boughs, so that they appear at a distance like immense, rigid serpents, stayed in their contortions while rearing their heads toward the light. To give these trees a still more striking appearance, as if they were struggling to thrive, thick clusters of young sprigs are pushed out at irregular intervals along the sides of the branches, while on some of those shoots of older growths hang the long, pendulous racemes of button-balls, full of small, seed-like nutlets. The peduncles on which these persistent balls are suspended are jointed, and await the warmer sun and the flowing sap to dislocate them, when they fall to the ground.

The round tassels are then soon raveled out, and the seeds, on the under parts of which are attached fine, tawny hairs, are by these means

taken up and scattered everywhere by the winds. With the exception of the alder, no other deciduous tree hangs out its seed receptacles so conspicuously through the Winter.

The mention of the alders reminds one that these shrubs belong to a family of graceful writers. The birches, as Coleridge says, "are the ladies of the woods," and the running, flowing, sweeping lines they dash off, in variously-colored inks, against the blue, are certainly elegant and symmetrical, and add much beauty to the Winter landscape.

Usually the white birches are seen in groups on low, poor meadowlands and sandy soil. Their slim, pliant trunks, leaning at every angle and in different directions as if swaying in the dance, are dressed in pearly satin gowns, that gleam in the Winter's sunshine like new silver, in striking contrast to the fine, dark-brown spray above.

The sisters to the fair white birchen nymphs love to pose on higher, richer woodland soil, and clothe themselves in robes of different color. *Lenta* adorns herself in silken bronze, scented with the fragrance of wintergreen, and *Lutea*, a rarer, taller sister, is wrapped in a vestment of lustrous yellowish silk, with skirts fringed, tucked and ruffled into numerous flounces and furbelows, and bedecked with lichen spangles. Her graceful head, tricked out with purple and green ribbons,

is seen lifted among those of the ashes and rock maples, in whose company she often grows.

How peculiar is the bark of all these birches! What has given them their color and sheen and satin-like texture, and printed it with so many dots and dashes? The young trees are smooth and oddly marked, but as the trunks become older and grow longer the outer covering bursts and is separated from the inner fiber, in transverse bands very different from the exfoliation of the bark of the buttonwood and hickory. The thick, corky skin beneath is cracked in almost regular checks or plates, like the carapace of a tortoise, showing how Nature has provided for these fast-growing plants, as she has for the growth of the shelled reptiles that do not shed their armor-plated coats.

The members of the birch family are always trustful, in good heart and provident. Even in the preceding summer they have formed young amenta for the next spring blossoming, and all through the cold season. They seem to grow slowly. On some trees, by the last of March, the staminate flowers are nearly two inches in length, so anxious are they to be in season to scatter the fertilizing dust to the winds before the foliage puts forth to intercept and prevent it from falling on the fertile catkin.

The black or sweet birch is especially prolific in flowering, and the spray on its brush-like head is

often tipped with large clusters of half-grown fruiting tassels, rendering it very conspicuous among the forest trees in Winter.

If the birches are the "ladies of the woods," the beeches are the grim, gray old foresters. When growing somewhat apart from other trees, their trunks are gnarled, and their feet and limbs are twisted into every conceivable distortion, as if they had for many years suffered from some kind of ligneous rheumatism. The spray is short and distant, describing many sharp angles, and the tapering points of the twigs are painted and varnished with a beautiful maroon, in contrast to the light ash of the older bark. Along the sides and at the tips of the shining twigs are seen long, sharp-pointed, spindle-shaped buds, which in Winter distinguish them from other trees noticed. The light-brown, polished scales are regularly imbricated, closely set and numerous, to protect the soft, silky, embryo leaves beneath.

With the exception of the special fruit-bearers, perhaps there are no trees more attractive to those who have a tooth or a tongue for early sweets than the rock or sugar maples. Sometimes before the last Winter month has gone out, on a pleasant day, after a clear, frosty night, the farmer or his boys are afoot to tap the most forward and premature penstocks, that grow in sheltered places and sunny exposures, and quaff the sweet waters, the

first nectar of the season on draught, prepared in Nature's pharmacy for leaf and blossom.

But these trees have also, for the lover of the beautiful, sweets more delectable than their saccharine juice. It is the peculiar spirit and character of maples, adorning the hills and writing their names above, that he delights to look upon and contemplate, though he have not the power to describe. Along the roadsides, in the edges of woods and in open fields, are seen these "leaf monuments," throwing upward from their straight, solid boles many tapering lines, that, with gradual curvature, form almost regular pyramidal or haystack heads. In the midst of forests, as if their training had been neglected, and they had struggled hard for life, their monograms are not so well set or symmetrical, and are inclined to vary. Sometimes one comes upon a gnarled and crooked trunk, with limbs knock-kneed and covered with wens and tumors. Frequently they rise straight up without a bough, fifty or sixty feet, and then show their traced crowns above the tops of other trees.

The persistent life of the maples, notwithstanding the constant bleeding, is something wonderful and grand. Mr. George B. Emerson speaks of them being tapped for many years in succession, without injury, and Robinson mentions maple stumps, in Essex County, Mass., whereon were

drawn diagrams of four hundred circling years. Think of it! They were saplings when Columbus discovered the continent on which they grew. Indeed, it is the longevity of many trees that gives them character and interest above that of monoliths erected by man. They are Nature's living, growing pillars, that have stood for centuries, and year after year have thrown out their green, scarlet and golden banners, as it were, to celebrate some important event in our country's history. With what emotion we stand to look on some dignified and patriarchal maple, oak or elm, that was in its prime when the Pilgrim Fathers came, and in its nobleness, perhaps, sheltered the Concord farmers in '75!

Along the intervals, banks of rivers, low tracts of rich, alluvial soil, and sometimes on higher forest grounds, are often seen squadrons and companies of stately ashes, with colors surrendered, but holding aloft thousands of spears, which in old veteran troops appear shattered and broken, as if they had battled bravely with many a wind battery stationed on the surrounding hills. The spray of these trees is not feathery and drooping, but coarse and upright, and the numerous yellowish-gray branches usually grow upward from the trunks at very sharp angles. The bark of the older stems has a potent medicinal appearance, and is so peculiarly carved, in such curious

oblique creases, furrows and ridges, that one, even in the Winter, can readily distinguish the genus to which they belong.

The wood of the ash is used by the craftsmen for so many purposes that the tree has passed into a proverb: "The ash for nothing ill." No, "nothing ill"; for besides the good axles, oars and baskets that are made from the wood, and the healing properties that are ascribed to the leaf and bark, they serve to delight the Winter rambler, as he reads their special signets and crests on the heavens. He is pleased to note and compare these ashen boughs with those of other trees, and to ask, while he looks on all this branch variation, whence it has come about. What is the inherent mysterious law that sends upward so gracefully, with double and oftentimes with triple curvature, the branches of the aspen, that twists and zigzags those of the oak and beech, and spreads the arms of the pine, the noblest of trees, horizontally from the trunks?

It is also interesting to one who looks on the woodlands in Winter to consider the origin and growth of trees that shed their leaves at this season, and how much they differ from the pines, hemlocks, and other coniferous monarchs that appear so warm in their garments of green.

No doubt, at one time, in the early period of the earth's existence, these monstrous plants, that

are now throwing out their bare, gray branches, were evergreens; but as the cold increased at the poles, where they first grew with other types of vegetation in all their luxuriance, they were gradually modified and especially adapted to grow and thrive in our north temperate zone, as the hardy foxes, bears, owls and snow-buntings have been fitted to live under the rigorous conditions of the polar regions.

The few kinds of evergreens that still linger in our forests are mostly of the pine family, and probably have not changed materially from those that grew in the Arctics before the tertiary period. Their leaves are tough and needle-like, and consequently suffer but little by the harsh wind of our northern Winters. Others, of different genera and species, bearing larger leaves, retreated before the cold wave, and planted themselves in the tropics. Some, it is believed, fell out of the race southward, and were lost. A few, such as the oaks, elms, maples, ashes, etc., lingered far to the northward of the tropical goal, and have made special arrangements to meet the buffetings of a colder climate. From the first, Nature had whispered to the leaves, "Boreas and King Frost will be cruel to you. Your broad surfaces and succulent flesh will be nipped and lacerated, and you will be broken off by the million, and bled profusely at every pore. Under such difficulties

you can not perform the work of taking the carbon from the air; so, when you feel the breath of Autumn withdraw the starches, sap and other nutritive material from your tissues into the infant bud you have guarded so tenderly through the Summer under the base of each one of your stalks, then die in all your glory, and drop off without a struggle, as those that have done their duty well. The young bud, in whose body your blood is stored, is like the seed fallen in the soil, which lies dormant during the wintry reign, but at the first warm breath of Spring will burst forth to produce another generation of leaves and twigs."

But the season of rest in the deciduous trees is brief. Hardly has the sun crossed the vernal equinox when they begin to "show belief." The juices, confined all Winter in the wooden cells, expand, and the veins of the topmost twigs are charged with the colorless blood. The sweet birch trunks and limbs are overflowing with the exuberant sap, which drips on the dead leaves below them. The white and red maples are fountains sending up streams of delicious hydro-mel, and bursting asunder the garnet blossom buds, while the importunate bees, with their pollen baskets, are early to their market, and garrulous over the scarcity of bread-stuffs.

The elms have bloomed and gone to seed almost before we know it. A mist of many hues

lingers amidst the twigs and smaller branches. Upon a thousand hills, and up the valleys, regiments and brigades of stately sylvan giants, as if possessed with living spirits, are marching, swaying their arms and clapping their hands for joy, and flinging out their colors against the azure walls for the summer's campaign.

LEAVES IN WINTER QUARTERS.

VIII.

LEAVES IN WINTER QUARTERS.

WHEN the seed-eating birds, that linger with us through the year, fly from their warm coverts on Winter mornings to find their granaries on the ground locked up by the frosts or snow, they have been taught by keen senses to look up higher for their breakfasts, on the tables of the shrubs and trees. If there is in the neighborhood of their bedrooms a plenty of sumach, cornel, privet or barberry bushes spreading out dishes of crimson and purple fruit, the birds are sure to visit them; but if the scarcity of these puts them on short allowance, the hardy grouse and quail, and the self-reliant little finches, know of other condiments on which to regale themselves.

Centuries and centuries ago—how many it would be interesting to know, but long before the botanists in the cold season began their investigations—they discovered by the stress of circumstances, that the unexpanded buds which stud the

twigs of trees and shrubs were as full of starch, sugar and other nourishment as eggs are full of meat.

So let us in this Winter's walk, in lack of other fare, like the partridges, have recourse to the buds! It is a beautiful picture, this wooded slope, bespangled with young twigs of the various shrubs, painted in many shades of yellow and brown, all brightly polished and glistening in the sunlight, while the tall oaks, hickories and other trees throw up their limbs in every direction and mark the clear, blue dome with many curves and angles. As one looks on all these fantastic scrawls, he is led to inquire why they have been traced so curiously against the sky, or on the lower background. The question is partly answered in one word—selfishness; for since each branch started out from the bud it has been struggling more or less with its neighbors for its own interest; that is, trying to get all the sunshine possible! Here a lower branch is bent down and kept under a more prosperous bough above it. There a young shoot flourished for a while, then in a vain effort to raise its head directly to the light, declined in the shade and grew to be a crooked, scraggy arm, no longer able to push its thrifty fellows aside. Hundreds of sprigs went to the wall to make way for the sturdy, gracefully-curved limbs that lift their slen-

der, shining spray high over all, to bask in the sun.

Yet this is not the only cause of this curious branch variation, seen among the different trees. Within sight are two trees growing quite near each other: the hickory and ash. Observe the difference in the manner in which they draw their lines. Why is it so? Examine closely the twigs on each and notice the fashion they have adopted in setting their buds. On the end of every shoot of the shag-bark is placed a terminal bud, as it is called, like a crown or bishop's hat, while below it, on the sides, are ranged alternately, sometimes at almost regular intervals, as if measured with line and rule, the smaller buds, which will make the branchlets of another season. The ash you will see, by some strange law unto itself, has taken another method of putting out its shoots. The little nodes from which the leaves spring, and which determine the arrangement of the twigs, are all opposite; the pair below being placed on the stems at exactly right angles with the pair above. This is the reason why we see in the topmost spray of the ash, when it has had the full light of the sun and uninterrupted growth, so many forks and crosses or "vegetable weather-vanes, with north and south and east and west pointers, thrown out one above the other," so different from the cat's-cradled, entangled tracery

of the hickories, and many other trees that bear alternate buds.

Look at the various shapes and sizes of these leaf packages set in many ways! Spindles, knobs, spurs, wrapped in scales, some half-buried in the bark, all of them prepared the summer before, and living through the cold winter, as the seeds do that are in the ground; only more readily than the seeds, do they unfold their leaves and flowers at the first warm breath of spring. Indeed some, like those of the elm and red maple, spread out clusters of long, slender stamens and crimson petals before the leaf buds expand at all. The allspice bushes are decked with gold. Yellow caterpillars have climbed along the shoots of the "pussy willows," and the alders by the run hang out to the first April breezes their pretty brown tassels weeks before the young leaves have thought of rolling out of their furry blankets!

While we are speaking of the blossoms of the alders and willows, it is interesting to notice the different manner in which these two kinds of shrubs bear their separate flower-buds. On any Winter's day in your walks just look at the alders. How shining, vigorous and healthy they are. "They have a cheery, hey-day appearance and switch their long catkins in the very face of Winter." But these graceful plants have other less conspicuous aments, which will be overlooked

unless one is particularly observing. Above or below the larger catkins on the same stalk, may often be seen little purple mulberry-shaped bodies, in clusters of threes and fours, keeping company and growing with them. These contain the immature female or pistillate blossoms, which in the early spring will develop as soon as the male flowers in the long, drooping spikes are ready to discharge the abundant pollen grains, which, as they escape, look like wreaths of yellow smoke carried by the winds through the naked branches. The small fruiting catkins are now covered with little purple, wormlike stigmas, protruding from the scales, which are thickly beset with hairs or tentacles of delicate moist tissue. When the pollen-dust is blown past some of these minute fingers are sure to catch and hold on to a few of the grains, which after a while push down tiny rootlets or tubes in the soft flesh of the pistil, as seeds do in the earth, till the little bottle-shaped bodies, called the ovules, are reached, when a miracle is performed which changes them to regular alder-seeds, that in the Winter are found in those dark-brown, woody cones of the previous season.

The pussy willows, too, love to grow in wet meadows and beside streams, with the alders, and, like them, have cheery hearts. Often in sheltered places the catkin buds, like tiny, tailless mice clothed with glossy hairs that gleam in the sun-

light, peep out from beneath their black, smooth covercles to sniff the mid-winter's air, or prick up their ears all too soon to catch the hum of the early bees. As if Nature had foreseen that these flower-buds would be impatient, she covers them with only a single black scale, which is easily parted or uplifted; yet with what consummate skill she has wrapped them with the finest silken robes, to protect them from the sudden changes of the weather. Dissect one of them and see the wonderful way in which hundreds of pink-tipped scales are ranged round the long, slender receptacle. From the inner side of these furry scales grow two anthers or pollen cases, now scarcely visible, even with the aid of a magnifier, but which, in the warm spring days will push their small, yellow heads through the floss and discharge the fertilizing dust.

How different in outline are the fresh, warm evergreens from the naked, hard-wood trees! The firs, spruces and pines, when growing apart, so that the light may have full play on the lowermost branches, describe almost regular spires and cones; as if they marked out to the rambler in clear-cut, colored lines — "We are the conifers or cone-bearers." Look at the terminal shoot of this young white pine, rising two feet above the whorl of branches, like the spurred point of a lightning-rod on a steeple! Almost its entire

length is beset with long, needle-like leaves, arranged in clusters, and bound together at the base by bands formed of the delicate scales of the tiny buds, like bristles in a brush. In some of these fascicles are counted seven leaves, showing how exuberant and full of resinous blood it is. The usual number in each sheath on older trees is only five.

However hardy and thrifty these evergreens appear, they can not grow in the cold Winter, and so have made special arrangements, like the deciduous trees, in preparing other buds, wherein lie dormant the shoots and foliage of the next Spring. In a whorl at the tip of this strong, healthy spur are placed six of these leaf nests, with a larger terminal one in the center. Break off one of them and view it with your magnifier. It is in the form of a cone, like the growth of the tree and the seed vessels of many members of the pine family. With what exquisite workmanship Nature has folded the tough, rusty brown scales over each other, covering them with a thin coat of pitch, and trimming their margins with fine, woolly hairs, that not a drop of water, or a whiff of frost may find their way to the tender baby shoot within!

The order in which these buds are set explains why the pines and spruces are inclined to grow into such conoidal figures. That larger bud in

the center of the whorl, always so vigorous and persistent, which crowns the head of the tree, is the cradle and swaddling clothes of the young shoot, which is really the continuation of the main trunk. As the Winter approached, the parent pine wrapped it up, and lulled it to sleep by the soft, melancholy music of its many æolian harps. The next season it will awaken and spring straight into the air, like the present growth, while the ring of smaller buds, if undisturbed, will form a circle of lateral branches, such as are seen below. Thus the tree is disposed in whorls throughout; a kind of irregular pile of wheels, with the axles and hubs grown together, and gradually increasing in diameter, while the series of curved, radiating spokes, with needles and crosses attached, are lengthened according to the growths of years.

Besides the myriads of buds set in order, and prepared in so many interesting ways on bush and tree, their names are legion that are lurking beneath the snow or underground. All stems do not rise in the air, but are inclined to skulk in the soil, as if humbled, and cared not to flaunt themselves, or cast graceful shadows and reflections on fields and mirroring ponds. In the bogs, beneath the russet uplands or Winter coverlet, are life and health. Runners, root-stalks, tubers, corms and bulbs, are only lowly, modified stems, gorged with

starch and other plant food, stout and fleshy with excessive feeding, and, like the aerial branches, produce buds, ready to wake from their sleep at the earliest call of the vernal sun.

How quickly the cat-tails, sweet-flags, and flower-de-luces, by the streams and swamps, will respond to the south-west winds, and wave from their hidden arms millions of sword-like leaves! In the rich woodlands, the Solomon's-seals, Jack-in-the-pulpits, and wake-robins are prompt to accept the first invitation of the season, and give discourse to the attentive Rambler. "Behold the lilies and arums of the field and wood, how we grow!" The subterranean branches of such kinds of plants are often mistaken for the roots; but if one examine them closely, he will soon discover that the real roots are often disposed along their sides. The stems of certain species do not attain a great length, for after a time, the older parts die away nearly as fast as the newer, budding end grows. But in places where the cat-tails are, in asparagus beds, or in couch-grass plats, the soil is bound through and through with a network of string and rope-like shoots, yearly sending forth leaves above, and small, fibrous roots below.

It is nearly like making a rapid journey two or three degrees southward, to walk from the bleak northern side of this hill to its southern, sunny slope. Here already are peeping out of the crev-

ices of the warm ledge the pretty scalloped leaves of the columbines and rock-creesses, while the saxifrages on the shallow soil are spreading out tiny purple mats, as if invoking the sun to crown them with the clustered cymes. Further down in the rich ground, beside old stumps, the first leaves of the celandines, when bruised, exude their creamy saffron-colored blood. Beside the icy stream, at the foot of the hill, the bristly buttercups, with a fresh lease of life, are lying low to listen to the first piping of the frogs; and the ox-eyed daisies, so abundant in the fields beyond, have woven little rugs close to the frozen ground, and look as green and sound of bud and leaf as the young, tender exotics of the conservatories. What is it that keeps these plants so vigorous and healthy through the Winter? Last Fall the stalks withered and dropped down, but unlike the short-lived annuals, a small part of the stem, fed by the roots, with jelly, starch and sugar, remains full of vitality through the season of frosts. Indeed the leaves, so well set the Autumn before, and so bountifully supplied with plant-food, seem to grow very slowly in the milder days.

Let us look at this crowfoot (buttercup) that has planted itself so trustingly in this exposed situation, and observe the way in which the naked bud spends its winters. From the short stem that joins the root has grown a whorl of leaves,

with petioles or stalks of different lengths, wide and concave at the bases, which forms a kind of sheath. Into this curious vegetable crib, which answers the purposes of scales in tree buds, nestles the infant leaf. With the magnifier one can see how nicely its tender lobes are folded and the care that Nature has taken in clothing it with a suit of long, bristly hairs. It only waits for the sun to lift it upon its foot, when another will be born, and still another, to grow below it. Every leaf is planned and prepared beforehand, and down somewhere in the short, thick stem lie hidden the germs of other leaves, which finally will see the light; and last of all, when the king-cup has reached its destined stature, June will bring forth the golden crown, to adorn it with regal lustre and glory.

HUMBLE FAMILIES IN GRAY.

IX.

HUMBLE FAMILIES IN GRAY.

THE hillside yonder, studded with boles and the rugged outcrops of pudding-stone which are dappled with various lichen, now freshened and made alive with color by the melting snows, presents a most beautiful view to the rambler. As he draws near and studies the picture in detail he finds none but the commonest kinds of these curious plants with their margins variously lobed and sinuated, fringed with fine hairs or entire, according to the species. Some are thickly beset with little dish-shaped apothecia, which are the receptacles for the spores or seeds, while other specimens, it may be of the same species, are entirely free from them, but frequently covered with a dense mass of minute warts or powdery cells, the contents of which, as well as the true spores, possess the power, it is said, of making new plants, when the winds carry the fine grains to suitable places for their germination. Here is

an ash-colored rosette, so closely adherent to the rock that it is impossible to remove it without injury. It is curiously stamped with numerous dimples or little shallow hollows, and the borders are deeply divided into many long, narrow pinnately cleft lobes. Surely it is a pattern which Flora with her looms and coarse needles devised long ago. Indeed it is a kind of patchwork figuring which must be cleaved from its substrate and torn apart in order to examine the nature of the fabric and the dye-stuff which stains it. The distinct, well-defined, bright white line along the ragged edge of a scrap of it, catches the eye at once. If it is viewed with a strong magnifier, it has the appearance of the frayed borders of a thick piece of white paper, with the alternate thread-like tissues well woven together, and the broken ends projecting in every direction. This is the pith or marrow of the thallus; the layer of starchy filaments, stored for the life and support of the plant. The thin, under bark layer is black, varnished and bristling with numerous fibers. As many as thirty are counted on a bit not larger than a large pin-head, so there must be on this single patch no less than thirty thousand of those attaching threads, which so admirably serve to keep it in its place. That part of the central layer immediately beneath the upper crust or bark is stained with light bluish gray, owing to the

disposition of many little germinating cells, called gonidia, which are filled with a chlorophyll-like coloring matter, and so minute that it requires a powerful microscope to distinguish them. These bodies, which are pushed through the closely-woven threads of the upper bark layer, give it its color.

It would be interesting to further read the inscription, the curious letters and figures, on this antique rock sampler. When did the lichen artist begin to weave her threads here? She works slowly on such looms, and in seasons of drought lays by her shuttles altogether. Persons who have had the curiosity to watch the progress of certain specimens of the *Parmelia*¹ for a quarter of a century, say that they have remained in about the same condition as when they first attracted their attention. So this foliaceous web, that has attained quite large dimensions, perchance could have been seen by a wandering Natick, or had its disk rubbed by the soft nose of the wild deer!

There is a singular genus of lichens, the common *Cladonia*,² several species of which assume peculiar, eccentric forms. The stalk-like elevations, called podetia, bearing fruit of various colors, and rising from a mat of scale-like, half-erect scalloped leaves of the thallus, which grows close

¹ "A small, round shield."

² "A tender branch."

to the bark or earth, readily attracts the attention of the rambler. They are in the shape of cups and saucers, wine glasses and goblets, clubs and spurs, and mimic shrubs, branched in many curious ways. The cardinal flowers by the stream in Summer do not sooner catch the eye than the scarlet *apothecia* of this cock-spur lichen growing at the foot of old trees and around decayed stumps. The bright-red heads mingled with the mosses, or raised above the dull, ash-green mat, gleam like living coals and make many a niche and corner in the old gray woods, to blossom like the rose. This crumbling pine stump, fairly sparkling with the lichen fire, is beautiful to look upon. Such a gay color, among the prevailing drabs and browns, stimulates the sight. One feasts his eyes upon it, as he would feast on the red apples from the opened hoard in the field in Spring, albeit there is better fruit in the stalls, and as glowing colors in the milliners' windows. It is the wildness and earthiness of it that gives it its charm. It seems almost irreverent to break the brilliant rosary on which one could count his prayers, but like children we can not suppress our desire to handle the pretty beads and to see the inside of things. Some of these thalline stalks bear no fruit, but grow up like thorns, stout at the base, tapering to quite a sharp point and somewhat curved, while those having the scarlet heads are of irregular

growth, covered with a kind of greenish blue meal, and often beset with minute, scale-like leaves. All of the stalks are hollow.

In what looms or wheels were the cup-bearing *Cladonias* turned? How did the artificers of the humid air contrive to weave so skillfully the cell threads into cavities of such a variety of patterns? Here are cups and chalices from which the bees and early butterflies might feed. Dishes with their edges entire or ornamented with small teeth, or embossed with the minute nodes of the brown *apothecia*, and goblets with irregularly cut rims from which have grown a profusion of shoots, crested with fruit caps! What is the purpose of the little hollows and cavities? They are not the receptacles of special bodies, as are the sessile disk-shaped *apothecia* of some of the foliaceous lichens, or like the capsules of the mosses. By the way in which they are sometimes cut, and their inclination to break up into clusters of fertile branchlets, we may perhaps conclude they are simply the precursory forms of the higher, much branched, species, of which *Cladonia rangiferina*, or the reindeer moss, growing abundantly on rocks and sterile pastures, is a representative.

This last-named lichen and other closely allied species, which we crush beneath our feet and consider mere litter and rubbish, are really interesting and beautiful, if we would pause to study

them. They are the corals of the air ocean, as it were, built up slowly by the atoms of moisture and light, and heat, and are faithful in their duty in making soil and preparing it for the growth of higher plants. Pluck a specimen of this *Cladonia pungens*, growing so commonly in shallows on the ledges in pale, dense clumps. It is as slender and fragile as spun glass when dry. How easily it is separated from the earth, because it has hardly the suggestion of a root. The horizontal thallus, or mat of scale-like leaves, seen in many other species, is here entirely absent. Into what a curious entanglement of branches has this tuft of hollow stalks been developed! It is a compact thyrsum of branch tubes, grown together, a miniature lichen banyan tree, without roots. The axils or armpits of the branches are perforated as if with pins, and the tips of the numerous little forks and teeth at the extremities of the branchlets are colored brown. These are the sterile summits. The fruitful ones, not so abundant and usually found on separate tufts, are arranged at the tips of certain stalks, in little clusters or cymes. A pale, ash-colored, more loosely-branched kind, with curved or drooping summits, and also a species called *Cladonia racemosa*, with greener ramified stalks, thickly beset with scales, is frequently mingled with this lichen. All of them are found, I believe, in high northern latitudes,

both in Europe and America, where they grow more luxuriantly than here, and on them the reindeer and caribou feed in seasons of short commons.

Particular species of lichens are found growing in all parts of the world, and it is their cosmopolitan habit that gives them a certain historical interest. *Evernia furfuracea*,¹ growing in erect or pendulous tufts on trees in the Northern and Southern United States, "has been found and identified in the Egyptian coffins, having been adopted, from its softness, to fill in the vacant places." My correspondent, Corinne Hoyt Coleman, who has a keen scent for the curious in Nature, and sees things with inspired eyes, sends me from the New Hampshire woods the *Usnea barbata*,² a species said to have been described by Theophrastus the Greek philosopher, more than two hundred years before the Christian era. One loves to call to his mental vision the old Athenian and his companions, in white robes and sandals, taking their walks along the Ilissus and over the neighboring hills, as did the Concord sage and his friends by the shores of Musketaquid and Walden, the "Cliffs" and "Cæsar's Woods," to seek the company of the dryads, and to be refreshed and inspired by the Great Spirit of

¹ Lichens covered with a meal-like powder.

² Bearded moss.

Nature. In these walks through the Attic woodlands, this self-same *Usnea*, so curiously bearding the trees, must have often invited his attention. One can imagine him intently viewing it with his "burning sphere," — "the shrub-like," glaucescent, papillate thallus enclosing the medullary indurated cord, and still more perplexing "apotheke" with large, pale, shield-shaped disk, margined with fibres. Were not these his conclusions as he proceeded with the analysis? Had he not one day spoken of it to Plato, his teacher, on their way to the lyceum, or discoursed on its structure and mode of growth to his pupils, while walking up and down the porches or in the streets of Athens? To examine this lichen, is almost like greeting the philosopher who found time, amidst his other works, to write on the science of plants more than two thousand years ago. I look on it as one of the old things of the world—an antique lichen, done in bronze.

Had not the Athenian in his walks often admired, as Thoreau did, that curious fungus-like lichen named *Beomyces rosaceus*, found not rarely growing in little plots on the naked soils, in shady woods? At the foot of a hill, under the black birches, where the earth within a year or two has been dug out and thrown in a heap, is a bed of the fruit of this species. It has taken complete possession of the mound, which is coated with the

fine, granulated ash-green thallus that resembles mould, and from it grow myriads of tiny balloon-shaped stipes crowned with light-pink or flesh-colored fruit heads, giving the whole a pretty effect in delicate hues. It is a good illustration of Nature's watchfulness and the prompt way she has of veiling the naked earth. She likes to conceal the blemishes on her face. Even this spot of gravel dirt she considered an ugly freckle, and so readily enough invented a lichen mantle, with its broiery and beads, as a temporary covering.

As the rambler becomes interested in the various species in this low order of plants, he is impressed with the plan and appearance of their fruit-cases — *apothecia*. The apothecium is the culminating, crowning point of the lichen, as the rose is the superlative glory of the bush. It is the anticipation or forerunner of the corolla of the higher plants. As the inventor at first may devise some comparatively clumsy implement, and afterward improve his work, so Flora, it would seem, from the mere fruit receptacle of the lichen, at last evolved for us and the honey gatherers the flowers, with stores of nectar and thousands of beautiful designs. See the bits of color she has from the first put into these fruit-cases, as if for some reason it were a point especially to be looked after! In the most instances they are different from, and brighter than the thallus, over

which they are sprinkled, and to which they are attached. Many of them are of various shades of brown. Some are as black as jet, or bright white, while others are red, scarlet or pink. Their beauty is only skin deep, but if our eyes were microscopic, we could see that the colored skin or rind is composed of numerous tiny filaments, slender at their bases and somewhat swollen and club-shaped at their summits, and within the mass of these erect threads are embedded certain small membranous cells or bags which contain the spores, not yet mature. What is the purpose of this special coloring of the *apothecia*? Is it to advertise themselves, as the flowers do to the bees? Perhaps these insects gather the meal-like substance for their bread, which many of the lichens yield abundantly, though one can not conceive how the plants in return are benefited thereby. The winged busy-bodies are sharply questioned, as they buzz here and there about the stumps and ledges in the early sunny Spring days, but they give no satisfactory answer; however, one is inclined to believe they, like the caribou and reindeer of the north, or the Nature-loving rambler, sometimes go to a lichening when other food is scarce.

These simple mats or expansions of starch cells, seen almost everywhere on the ledges, or the pale sulphur or ash-colored species on the earth, hav-

ing rough and crumbling surfaces, and so difficult to identify, appear interesting only from association. They are the representatives of the earliest forms of vegetation, the copies and reprints of Flora's ancient drawing. After the rocks had been lifted from the ancient seas, or a pinch of gravel-dirt was formed, then the goddess began her work. With cunning fingers she hastened to mount the plants, without true stems, leaves, flowers or roots, wherever there was a suitable matrix. The lichens depend wholly on the moisture for their increase, they are of necessity of slow and interrupted growth, but capable of continuing many years. Their starchy nature favors hibernation. As the buried tubers and corms wait for the sun to warm the earth that they may germinate, so these humble plants, in seasons of drought, wait patiently and without apparent suffering, for the rain or the humid air to set their laggard shuttles in motion again.

WINTER SKETCHES.

X.

WINTER SKETCHES.

THIS flight of snow gives a zest, a relishing flavor to the Winter, which has until now been without its white covering; and I go forth to see the earth in a different phase.

How effectually the snow has shifted the scenes and masked her face! Every foot-fall is muffled; every angle is now a curve. That sharp, ragged ledge has been completely upholstered with the white ermine showing a hundred plump shoulders, pillows and bosses. The branch lines of the oaks and maples, drawn in brown and white crayon, are in beautiful relief against the sky, while the tall, straight hickories on the hill in the distance suggest to the mind a forest of ships' masts, with the white sails snugly clewed to the square yards and stays. The slim, white birches appear actually gray, when viewed against a snowy back-ground.

But the richness of the snow tracery and flourish, on pilaster and capital, soon falls to dust and skivers, for the Winter breezes are true icono-

clasts and can not rest. No sooner have these pictures been finished, when out from the North come sweeping through the arches irreverent gusts that break the idols into millions of fragments. Little imps of whirlwinds waltz through the columns overhead and brush off handful after handful of fleur-de-lis and bits of perfect moulding, feather and spangle. In a day the uneasy wind has made sad havoc with the decoration on the hard-wood trees, and the forest floor is strewn with the débris—odds and ends of ornaments that have made little pits and dimples, like mice and bird tracks, in the white carpet underfoot.

But the snow remains longer on the thick foliage of the evergreens, in the forms of cushions and huge bears' paws that furnish good, warm roofs for the birds. Many a partridge and quail, the hardy finches and merry chickadees, must have taken shelter under them last night. The protection that this kind of cold wool gives to the Winter animal and plant life is an important function in the economy of Nature. The stick and leaf house of the squirrel and deer-mouse in yonder tree was relieved of various uncomfortable draughts and made much warmer by the snow chinsing; while the green blood of the radical leaves of hosts of venturous perennial plants is quickened by the soft, white mantle, so tenderly laid over them.

In my walk I have suddenly come upon a tablet, on which is a record in hieroglyphics of two important events in the history of a pair of winged creatures that fluttered about these woods last season. The characters are indeed interesting to translate.

There in a young sapling is a vireo's nest, stuffed and padded with the softest, whitest lining, which the mother builder and young, now flown with the Summer, would have thought the coldest comfort. How many hopes and fears for this nest, how much love, were once centered on this cheerless mass of fibrous roots and grasses! Now the builder is far away, searching, perchance, among the leaves of the palmetto and orange trees of tropical or sub-tropical regions; yet something whispers to her in that distant land, to come again to this identical wood! She simply waits in her Winter retreat for the sun to bring forth the foliage and proper food, when on those marvelous wings she will speed her way along the invisible path to her real home, for it is only here, in the coolest region of her migration, that her maternal heart beats for the love of nestlings.

Above the anaglyph of this pretty chronicler is chiseled, as it were, in bas-relief, another record. A gay female butterfly, as she wavered by in her crooked way, on liveried velvet wings, stopped here to immortalize her name. On a slender twig

she has glued a cluster of tiny eggs, thimble-shaped and finely ornamented with ribs and furrows and arranged in almost regular order. Whence had come to her little head that intelligence, that conscious knowledge of the means employed that certain ends may be attained—the wonderful tact and foresight, manifested in this scrap of light and shadow that flitted among the underbrush last season? To this shoot she came and reasoned, it would seem! “At the base of this leaf stalk is a bud. I do not see it now, but I know it is there. In the cold weather, when I am dead, or have crawled into a snug crevice for Winter quarters, this leaf will fade and drop away; then it will be seen plainly enough. From the uncovered bud a knot of tender leaves will grow next summer, and upon these my caterpillars love to feed; so, just under this bud I will glue my eggs, that when they are hatched, my weaklings may have the proper food close at hand!”

From somewhere overhead comes down a finely-spun Winter lyric, which faithfully expresses the emotions of that valiant little singer, the chickadee. At times his tune is not half played out, or perhaps I do not catch the piping of the lower notes. Perhaps, just here, there is a scarcity of grub in the tall warehouses, or he sees a cluster of spiders' eggs in the crevices of the bark that can not be had for a mere song. Yet he never



"THIS ATOM IN FULL BREATH."

really complains. What character is wrapped up in that tiny bit of feathers! What hardihood and self-reliance! The vireo, that wove her hanging cup in the sapling last Summer would soon perish. But —

“Here is this atom in full breath
Hurling defiance at vast death.”

And the voice of the crow yonder in the hemlock! However coarse and croaking his speech may seem to the listener in the warmer season, it is sent forth now through the Winter air clearly, melodiously even, and gives a temper and healthful quality to these chilling, snowy woods. “*Caw, caw, caw!*” he vociferates with as much earnestness and enthusiasm as a person who cheers on hearing of some extraordinary bit of good news. He has a correct inflection, too, and clearly understands the rules of pronunciation. His exclamations and commas are as readily traced, as though his discourse had been set up in plain “long primer.” His note usually is only thrice repeated, but at times, when he is particularly communicative or excited, he gives tongue and sets the tidings afloat in a half-score of caws, as if he wished to impress on the mind of the listener the importance of his assertions. “Hurrah, Huzza! Hear all!” says the woods-crier from the tree tops,

or when he blots the white page of the fields. "Away with the doldrums! My coat is sombre, but my spirits light." In these Winter days he is more than ever a vegetarian. He scours the orchards for the stray "frozen thaws," and has an eye for brilliant berries on the shrubs. Sometimes he finds in chinks and crevices of the ledges a caterpillar, or a fat, ham-like cocoon pendent, on walls and plants; or if he can spice his diet with an occasional mouse or small bird, he counts it as no sin, but the best of fortune, for in this season of starvation, such viands act as a kind of cardiac nutriment, which invigorates the heart and gives strength and cheerfulness.

The rains have again carried off much of the snow to the streams and ponds, and the fields and pasture-lands are figured with irregular patches of brown and white, as if "gigantic spotted hides were stretched over them." By the stream a single male robin chirps in a subdued and pathetic tone—in contrast to his manner, for he has all the warm weather pomp and pretension. He has come to the water to wash down his breakfast of berries. He does not indulge in a bath, as he would surely have done had the season been further advanced. In this uncertain and "catching weather" he must take care to keep his plumage as dry and polished as circumstances will permit.

Many of the perennial plants are starting up by the stream. Here are rosettes of water-cress leaves, and one bud of the skunk cabbage, I see, has pushed itself out of the ground three or four inches. It grows where the running water is continually washing it, and has bleached the outer leaf wrapper as white as ivory; the whole resembling a large walrus tusk. How accurately Nature has rolled together the tender lemon-colored leaves within!

The earth that was nearly bare yesterday appears this morning in a thin, wafer-like veneering of white, as if an immense army of colossal confectioners with seven-leagued boots had been busy through the night, striding over the hills and hollows and spreading with sparing hand the huge brown loaf with flaky frosting. After the army had passed on, the "snow walkers" came from their coverts and wrote their names in bold, running foot, and imprinted the plastic covering with pretty trails and records of their journeyings. By the stream, that appears almost as black as ink in contrast to the surrounding whiteness, are the impressions of various filigrees, meshes and chains, twisted and entangled in every conceivable manner. What odd, roundabout, random errands they were sent on in the darkness! Here in the Autumn, the snow betrayed the course of that nocturnal prowler, the skunk. He had visited the

foot of every tree in his route in expectation of finding, no doubt, a worm or myriapod morsel for his empty stomach. What a pretty, innocent trail he makes! His tread is plantigrade, and the imprint of his feet is perfect. He takes short steps as if his legs had been tied. Here he has minced himself along by the wall and stopped suddenly, then turned his course toward the low ground, as if he thought that, after all, the best feeding-place, or had seen or heard an approaching danger.

What manner of creature is this whose trail in the snow begins and ends so abruptly? That takes such long leaps, and whose course is so broken, and disjointed? Ah! The wings solve the mystery. The animals possessing them have, as it were, only stepped into another medium, leaving zigzag veering marks on the aerial page, if only our sight were keen enough to trace them.

I look with interest on the path of a bird, his initiative and final step; his designs and line of conduct, so clearly and neatly mapped out. Here he set his feet firmly down like props as he alighted, and made a few rear and side flourishes in the snow with his wings and tail. The foot-prints are about three inches apart, and regularly alternate. Further on he evidently was startled, for the clearly-cut tracks appear opposite with some brush-marks behind. Along the edge of the

stream his foot slipped, as he reached out in the water to spear some small mollusk or aquatic larva. Suddenly the trail is discontinued, as if the bird had fallen dead, and had drifted away with the current.

The ponds are again sealed with thin ice, which gives a dull reflection to the trees and shrubs on the banks, while the polished surface here and there, by the cunning fingers of refrigeration, are ornamented with spangles, rays and flowers. The fine green algæ that floated on the water in places yesterday, were caught in the crystalline veneering, and broken slices held to the light have the appearance of stained glass. Frost fairies thronged the wood-road in the witching hours and covered every little pit and hollow there with thin plates of pearly ice, which if tapped slightly with the cane, send forth certain musical tones like those from kettle-drums — chiming, clinking sounds, or deep, hollow reverberations, according to their area and depth. Perhaps a musician with delicate ears could select special cavities on which to express correctly the several notes in the scale.

How still the woods are! The crisp leaves, as they are lifted on their edges by the passing zephyrs, seem to admonish one in low sounds to listen: “Hush! Hist!” they whisper, “you may hear the fun and frolic of the dryads.”

The winged seed of an aster or golden rod flies

slowly by as if it were possessed of thought and were searching among the crevices and openings for some suitable spot in which to lodge and germinate. What a delicate, tenuous mote it is! Yet wrapped within the tiny kernel is the possibility of a beautiful golden plume or a cyme of amethyst that, next Autumn, shall feast the eyes of some æsthetic Rambler.

This wood-road presents a most delightful perspective with its vista of warm evergreens in the distance, the gray tangled branches of the oaks, and the nearer rows of cornels and willows, with their polished shoots of red, purple and yellow, gleaming in the wintry sun. On such a day the eye gratefully lingers on these colors. Beneath, the brown border carpet, too, is beautiful with its exquisitely-wrought figures of prince's pine and soft coats of dark-green moss. It feels like the richest Axminster to the tread. One may walk on it in soiled shoes, for, although it cost Nature much time and trouble to weave it in her loom and spread it here, she will not scold you for your thoughtlessness. How fresh and full of verdant blood this tuft of moss appears! Yet the shallow mold in which it grows is frozen and the matted stems are glistening with needles of frostwork. Sink the nostrils deeply within the mass of delicate leaves and inhale the earthy, woodsy, aromatic odors. It is as agreeable to the scent as

a sniff from your vase of potpourri, or from a Lubin's jar.

In what odd, unaccountable places do the various species of these humble plants flourish! They are the true followers of the lichens. They grow on the gray boulders and ledges, in mats and cushions, for the squirrels. Decayed tree trunks are lined with their bright-green velvet. They love to warm and brighten up the brown and barren spots on the forest floor. How sociable they are, and inclined to assemble in companies, and grow leaf in leaf, in good fellowship with each other. Here is a large colony of the hair cap moss (*Polytrichum commune*), living together without envy or rivalry. Each individual stem has reached a certain stature, prescribed by law. Unlike a community of pines, they do not resort to arms or try to raise their heads over their fellows to get the sunlight. Indeed, they seem to like the shadow and moisture somewhat better than the broad glare of the sun. Pull up a stalk and examine it. It is almost as hard to break as hemp twine, its tissues and cell-walls are so strong and firmly knit. The triangular, reddish-brown stem is loosely wrapped about with the curious aerial root hairs, so thickly woven together that the mass has the appearance of felt. The leaves along the basal half of the stalk are closely appressed and resemble small, brown scales,

while those on the upper half are abruptly larger, scattered and spreading. The end of the sprig, protected by a whorl of sheathing leaves from which, next Summer, would have grown the pedicel with its curious fruiting cup, is succulent and packed with chlorophyll.

So these modest, unpretentious mosses are humbly fulfilling their mission on the earth. They are continually making new leaves, while the old leaves are converted into rich mold, from which in time will spring up an army of higher plants, with their flourish of trumpets and their flying colors. Here at the foot of a tree is a large clump of moss with finer leaves and the thickly matted stems more delicately spun. If a yard or two of yellowish green plush with long hirsute pile had been carelessly spread out and conformed to the general unevenness of the ground, it could hardly have been distinguished, at a distance, from this beautiful piece of Nature's weaving. The numerous awl-shaped, strongly-curved leaves are arranged only on one side of the stem, as if the heavy winds blowing constantly on them from one direction had bent them, like grass-blades in the meadows. From out this soft, mossy bed has grown a mimic forest of brownish-yellow stems or pedicels on which are attached tiny fruit-cups—*cornucopiæ*, arched or bent over like bows. A month or two ago each one of these fruit-cases

was completely sealed by a ring of cells growing between the rim of the orifice and cover, that the vessels might be impervious to the weather during the growth of the spores. As the cases ripened, the cells were ruptured and the covers then dropped off, and the spores or moss seeds were poured out and sown by the Winter's wind.

Many mosses blossom in Summer and ripen in Winter. The broidery with which the margins of these spore capsules are ornamented is wonderfully beautiful and delicate. The common magnifier fails to bring out clearly the exquisite workmanship and the exceedingly fine lines and markings. The inner edge of these horns of plenty is regularly fringed with a row of sixteen amber-colored or dark purple translucent teeth, closely articulated and split down about midway; thus making thirty-two long filaments above, which are evenly bent inward over the top of the case. What is the purpose of these teeth? They are the thickened parts of the layers of cells, which, as soon as the spore case becomes ripe enough to shed their contents and the covers are detached, appear in all their delicate beauty, bending inward or outward, and thus retaining or releasing the tiny fruit, according as the amount of moisture in the air varies.

Around the outer edge, at the base of the teeth, is a rectangular recess, cut as evenly as a turner

could cut a groove with his chisel and lathe. It is a "rabbet" that the mosses designed long before the carpenters were born. What skillful fingers fashioned these tiny case-covers? Look at them lying here and there among the leaf tufts in all kinds of positions, as if the elf-urchins had hurriedly thrown their caps away and scampered off to have a dance on some other soft, green carpet in the woods.

Many of the mosses are very sensitive to the moisture, or dryness of the air. They love the warm, wet weather. In favorable situations I discover, in my rambles, several other species that have lifted up young fruit pedicels in these Winter days, so wistful are they and quick to respond to the sun. Here on the southern wooded slope by the stone wall, are spread numerous mats of the *Polytrichum piliferum*, a small brother to the common "hair-cap." To the unassisted eye there appears a fine floss on these mats, as if a thin mist were lingering over them. The magnifier at once shows that the midrib in each of the lance-shaped crowded leaves is prolonged into a toothed awn or beard, which is bright white and in striking contrast to the dark-green foliage below. From the midst of these nappy whorls have sprung many half-grown stems, each wearing its hairy cap, of the general Robinson Crusoe pattern, well pulled down and fastened over the young, tender

heads. Even these tiny stalks can not come forth without their mother's notice. The bright-green velvet cushions of *Ceratodon*,¹ as soft and almost as regular in form as those in the boudoir, have a pretty effect on the shelves of the gray rocks. Some of them already are fairly bristling with young pedicels and look as if they were closely set with bright-red pins, with green, oblong heads. Some of these tufts show no signs of fruiting. Probably they are the sterile clumps; for all of the mosses have two kinds of flowers, or organs, analogous to those of the higher orders of plants. Some kinds have their pollen-bearing flowers, or antheridia, and the pollen-receiving flowers, or pistillidia, on separate stems or tufts; while other species have them on the same stem, but not on the same receptacle. If one with the sharp and searching eyes of the microscope should look well in among the leaves of these apparently barren cushions, he would no doubt see little club-shaped ruptured sacs, from which have escaped certain minute bodies, which are nearly related to the pollen grains in common anthers, and which fertilized these succulent spore cases while they were yet young, tender cell masses hidden among the leaves, before they had lifted themselves on their high pedicels. These are the only kinds of flow-

¹ A horn and tooth, in allusion to the teeth of the fruit-cups which have little knots or lumps, like a goat's horn.

ers that such plants have. The season of blossoming varies greatly in the different species. Some blossom in Winter, in favorable situations, as these cushion mosses have. Some tufts are always in blossom and have the fruit cases in different stages of development, but the majority of them flower either in the Summer or Autumn. Many of the mats, now bristling with dry stalks, and pouring out their fruit on the ground, were in flower six or seven months ago. That it should require so long a time for this extremely minute moss fruit to ripen, seems to be remarkable.

If the attentive, discriminating rambler accepts the invitation which these humble but cheerful plants offer, he will be surprised to know how many species will salute him, and impart to him the various entertaining lessons in moss lore during an ordinary woodland walk. Each kind takes him by the button, as it were, and talks to him privately of its special characters and peculiarities.

On a willow trunk bending low over the stream are some creeping mosses, which, superficially considered, appear to be all alike, but really here are two mats growing beside each other, that belong to distantly related tribes. Close attention and a good magnifier are necessary, while they converse with you in silent but potent language about themselves. Says one: "Do you notice, I wear my leaves in a different way from

my neighbor, who has also taken the liberty to spread his mat here? See how clearly and regularly they lie over my stems and branches. Altogether I appear, I must confess, somewhat depressed. The leaves of the feather moss are more loosely worn, and are cut into longer tapering points, while many of its branchlets are erect. I dare not lift my arms so high. But it is by our fruit-cups you shall know us best. Observe that my neighbor's are incurved and nodding and crowned with a double row of teeth, while *my* cups are upright and adorned only with a simple coronet of spines, well set in below the edges of the mouth. Besides, they are round, like cylinders."

But it would indeed require acute senses, even of the bryologists, no doubt, to discover the law which directs the mosses to grow in so many different ways. What has caused the dry, slender fruit-stems in this species to be twisted so regularly from left to right, or from right to left, like candy sticks? Why do the stems of other kinds assume a flexuous, snakelike form with heads re-curved, while those on a different mat grow as straight and rigid as bristles? One also longs to know the artists who fashioned these moss-fruit urns into so many curious and elegant designs, and ornamented them with various markings and sculpturing! Here is a vase, half emptied of its

fruit, which you must carry home and examine under a powerful lens, if you would see the beautiful etching on its sides. How delicately translucent are its cell walls! The central axis or continuation of the pedicel, and the dark spore grains within, are seen as plainly as grains of sand through a thin porcelain urn. The leaves, too, are peculiarly figured. Those colorless, limpid spaces, in such a variety of shapes, bounded by the bright-green net-work of veins, are indeed curious, when viewed through the microscope. How perfectly some of the lines are drawn, as if a pen with the finest point, and dipped in chlorophyll ink, had traced the tiny, shell-like leaves, and nicely marked them into diamonds, hexagons, or narrow wavy lines, according to the several species. Besides this dainty marking, the leaves are often bordered with fine teeth, or grooved lengthwise into furrows or channels, or beset with knobs and bosses.

Truly Nature's soul is in her work. Diligent, unwearied, but reserved and reticent, she is as painstaking in forming a fruiting moss-stem, as in building the tower-like trunk of the Sequoia. In preparing the rich mold to nurture the higher plants, she must needs indulge her fancy and æsthetic taste. So with her eyes, as it were, to the microscope, that not a fillet or thread shall be misplaced, she weaves the beautiful green tapes-

try, and spreads it over the barren, unsightly places. But —

“There is no great and no small
To the soul that maketh all.”

And she profusely scatters her marvels under our feet and on every hand, whether we will see them or not.

To-day, there is a Spring-like quality in the air, and I catch an occasional whiff of earthy, woody odors, and certain indescribable sweet scents, as they are wafted by, suggestions and reminders of the balmy seasons before us — migratory breaths of incense exhaled, perchance by the sun further south. Yet the air currents have a chilliness about them and shut off in some degree the heat rays from the world. In the road at high noon the outlines of the boards, tree-trunks, and even the slender fence pickets that intercepted the rays in the morning, are sharply drawn in white against the dark, thawing earth, showing a kind of reverse shadow.

The most unusual event which I have to record in this out-of-door chronicle appeared on the very last day of Winter!

By the edge of the cat-tail swamp from one of those soft, spongy spots where the water grasses and other aquatic perennials are kept always fresh and green, I started up a small bird, that perched

on a spike near by, and began to flirt its tail in a nervous, uneasy way, as if confused or ashamed of being seen in such lowly situations.

It soon flew down again, however, on the green turfy hummocks, and began to search for food as before. From my standpoint I could see, though not plainly enough to identify the species with unaided eyes, the little bunch of grayish feathers half hopping, half flying along as if it disliked to wet its feet. Moving back a short distance to prepare my glass, I frightened the adventurous little stranger away. It flew far over the tall reeds and was lost to sight. It was too bad thus to lose my treasure, but I was not long despondent, for in a half hour afterward, while looking at some catkins further on, my good fortune unexpectedly turned or flew up again and alighted on the tip of a broken alder, not three rods away. At first I thought it to be one of the early finches, a bay-wing or a song-sparrow, but as I placed its image on the object glass and viewed it closely I found it was a true fly-catcher, the bridge pewee or Phebe bird. The saucy, pugnacious head, the black, slender, straight-edged bill, the dark-brown wings and tail, and the general resemblance to the tyrants, were unmistakable. What, then, were the circumstances connected with his life, that had brought this travel-stained wayfarer here, three or four weeks earlier than his chroniclers

say he is due? Had he been hovering about, these three months, over the edge of Winter, eating berries as these birds sometimes do, when flying insects are scarce? I ask him the question, but he does not condescend to reply. He only sits there, a complete little stoic, "and submits without complaint to the unavoidable necessity by which all things are governed", sometimes in the funniest way turning his searching eye down to the brook, that in answer looks up and laughs, as it runs by.

THE END.

