

THE MORNING GOSSAMER.

AMONG OUR FOOT-PRINTS.

TO one naturally possessed of a keen and searching vision, perpetually educated by that continual practice inspired by a love of nature-study,

there is sure to be an emphasized significance, if not an added sentiment of hearty indorsement, in Thoreau's judgment of the "walkers" of his period, or at least of his acquaintance: "I have met with but one or two persons in the course of my life who understood the art of walking, that is, of taking walks." It is, moreover, by no means a distinction without a difference that prompts the final modifying phrase, for, as a matter of fact, if the truth were known, I believe it would be found that the best "walkers" were, as a rule, the least accomplished in the art of "taking walks."

The estimate of Thoreau was certainly rather discouraging; and while I am convinced that had "the course of his life" been happily extended to the present day he would find a much more hopeful prospect, it is nevertheless true that there is still a perceptible lack of that deep and sincere appreciation of nature which is the great secret and the chief source of pleasure and profit in the "art of taking walks."

Not but that there are, at the present day, a large number of people who love nature, and are imbued with a certain enthusiasm in her presence; but how often is this enthusiasm identical with that of a child—of an infant, if you will—over some gayly colored toy?

It is, for instance, but a negative sort of rapture at best which is only to be awakened from its lethargy by the glare of a gaudy leaf or the sun-glitter of a glistening wing, as by the bauble or the trinket. The eye is not only abnormal that should ignore such glaring instances, such a retina is not merely unsympathetic and unresponsive, it is blind. Who could help seeing a brilliant, flaming copse of sumac; and who would not experience a sense of pleasure at having seen it? The fiery spike of cardinal-flower gleaming before us in the field kindles a sympathetic flame in the dullest vision. Our eyes are riveted upon it, not from any impulse of will or choice of their own, but because that loud tone has called out to them from afar; while at the same time perhaps our hands begin to tingle with the sting of some revengeful nettle, seeking recognition through another sense, too often the most keen.

These hints abound in nature. They are her forcible appeals to the apathy of every dormant sense. To many this net-

tle would be without a name were it not thus to inoculate itself in the memory; and yet, even in spite of its impetuous method, you will sometimes meet a person who has been stung a dozen times with a nettle and is even yet unable to know the rascal when he sees it.

I remember a certain short conversation, of which I was a party, last summer. My respondent was a dapper young man, who had but just returned, aglow and exultant, from a mountain climb at Conway. He had "done it in two hours," and he was consequently the "lion" of the occasion, on free exhibition to an admiring circle of hotel guests and friends. Anticipating the pleasure of the same trip myself, it was but natural to question him concerning its features of the picturesque.

"Is there a fine view on the further side of the mountain?" I asked.

"Oh yes."

"What are its especial features?"

"Well, I don't remember just what—er—er—mountains, and so forth."

"What sort of a path?" queried I further.

"Oh, nice and shady nearly all the way."

"Mostly hard-wood trees, I presume?"

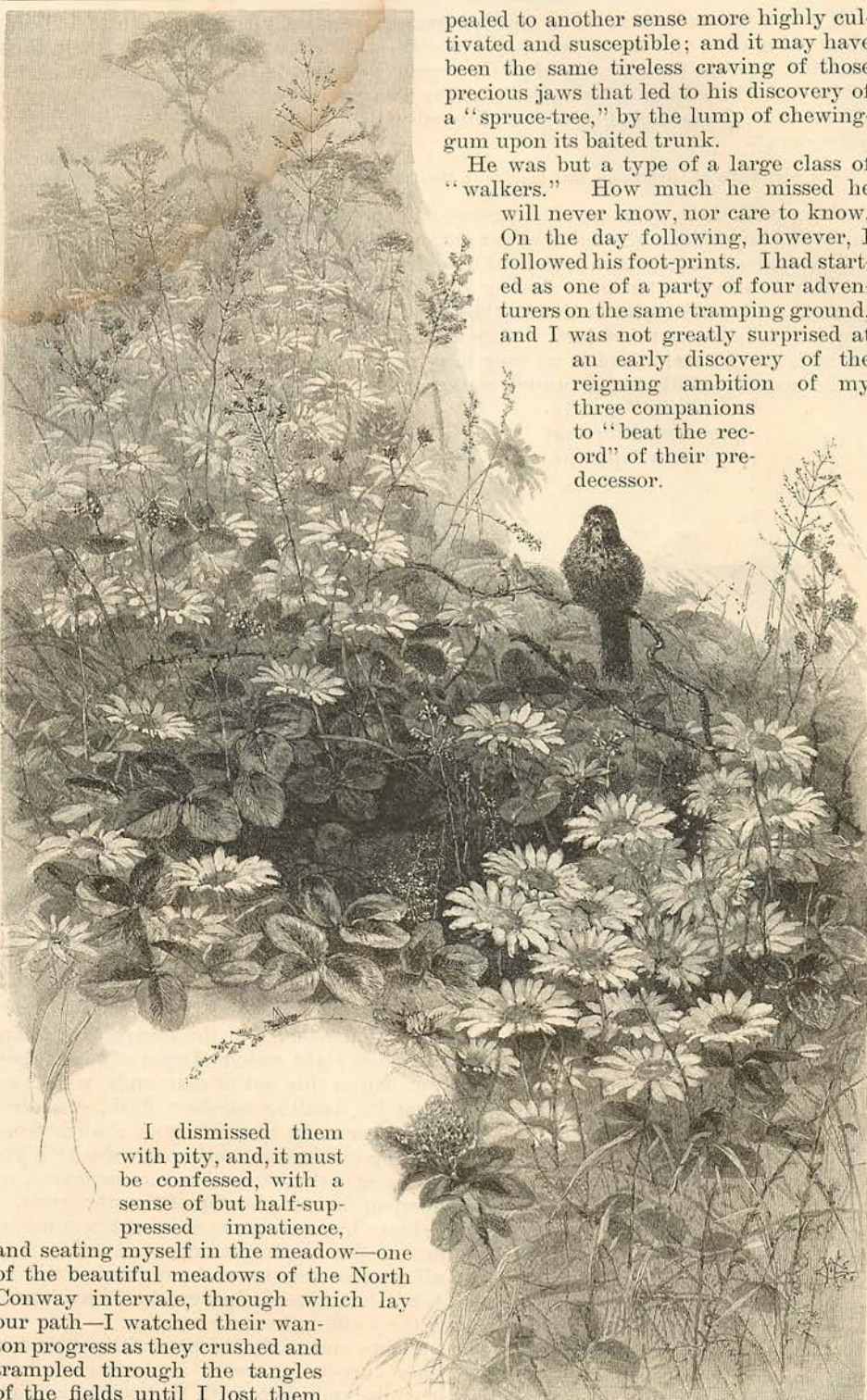
"Yes—er—er—principally white birch, and—er—some spruce."

After each reply he would come to a dead pause, and gaze fondly at his pedometer. In point of fact, as I afterward discovered, the "white birch" growth consisted of a single tree near the summit, almost the only solitary birch in sight of the path, which was embowered for a mile with beautiful maples and great smooth beeches, besides numerous aspens, poplars, mountain ash, and spruces. The "birch-tree" in question was a huge gnarled veteran, in color as glaring as a white-washed sign-board, and in further simulation scarred with sculptured names and hieroglyphs, among which the newly engraved initials of our friend were conspicuous.

In all his tramp, it seemed, he had not seen a single flower, and, with the exception of the "beastly midgits," not an insect. He could remember some huckleberries and raspberries, while the only bird he was enabled to recall was "a bright scarlet fellow"—a tanager, of course, bright and fiery enough to have burned a hole in the memory of an imbecile. The whortleberries and raspberries had ap-

pealed to another sense more highly cultivated and susceptible; and it may have been the same tireless craving of those precious jaws that led to his discovery of a "spruce-tree," by the lump of chewing-gum upon its baited trunk.

He was but a type of a large class of "walkers." How much he missed he will never know, nor care to know. On the day following, however, I followed his foot-prints. I had started as one of a party of four adventurers on the same tramping ground, and I was not greatly surprised at an early discovery of the reigning ambition of my three companions to "beat the record" of their predecessor.



I dismissed them with pity, and, it must be confessed, with a sense of but half-suppressed impatience, and seating myself in the meadow—one of the beautiful meadows of the North Conway intervale, through which lay our path—I watched their wanton progress as they crushed and trampled through the tangles of the fields until I lost them among the distant trees.

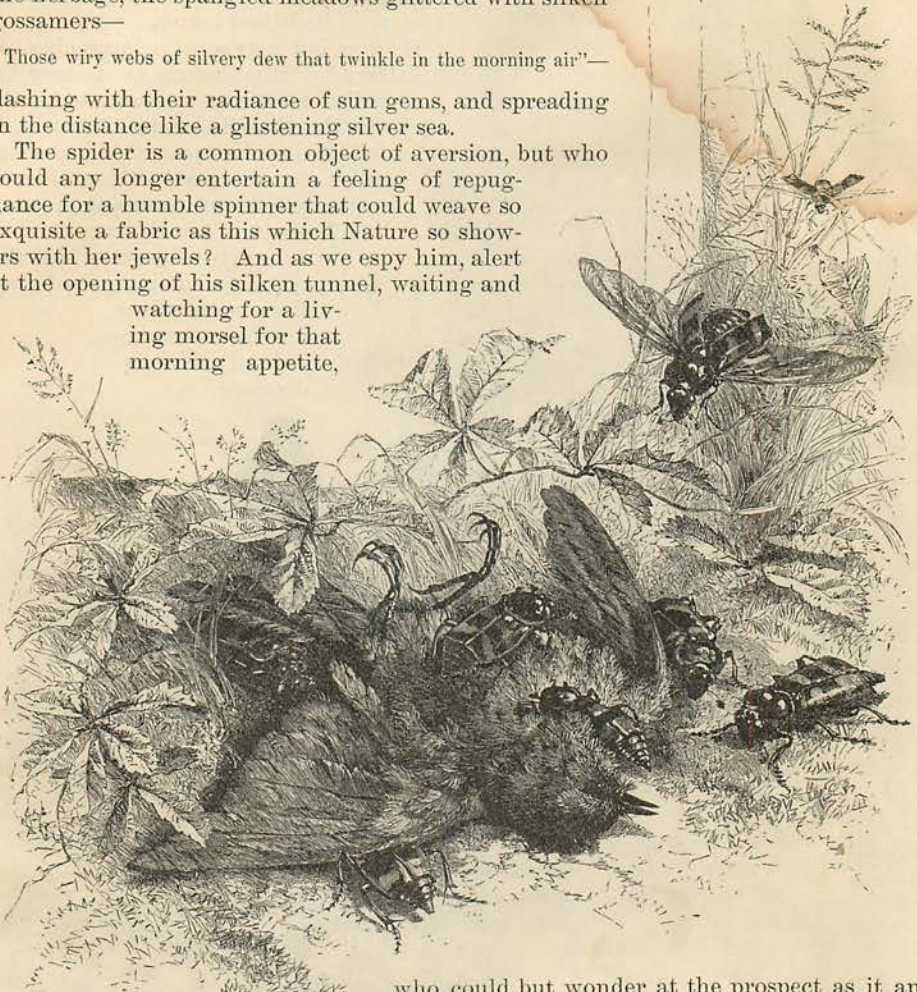
THE SONG-SPARROW'S NEST.

It was a fine morning. The meadow-grasses were yet glistening with their beads of morning dew, and the rowen clover clusters still held up carefully to view in their half-closed palms their wealth of precious gems gathered in the shadows of the night; while extending from my very feet, far, far away above the herbage, the spangled meadows glittered with silken gossamers—

“Those wiry webs of silvery dew that twinkle in the morning air”—

flashing with their radiance of sun gems, and spreading in the distance like a glistening silver sea.

The spider is a common object of aversion, but who could any longer entertain a feeling of repugnance for a humble spinner that could weave so exquisite a fabric as this which Nature so showers with her jewels? And as we espy him, alert at the opening of his silken tunnel, waiting and watching for a living morsel for that morning appetite,



A BURIAL.

who could but wonder at the prospect as it appears to those eight watchful eyes of his as they look out across this bed of diamonds, with now and then its dazzling rainbow flash, gleaming from the kisses of a bevy of drops shaken from their setting on the web, perhaps by some “high-elbowed grig,” that kicks the clover leaves, or alights upon the swaying tip of timothy-grass.

And now a bee settles above upon the clover blossom, a crystal bead is tumbled from its nestling-place, and falls flashing on the sloping canopy. Another and another are overtaken in its course, and all go glancing down the quivering web in a tiny avalanche of sunbeams, and each sends forth its parting rainbow gleam as it penetrates the meshes and vanishes among the yielding leaves beneath.

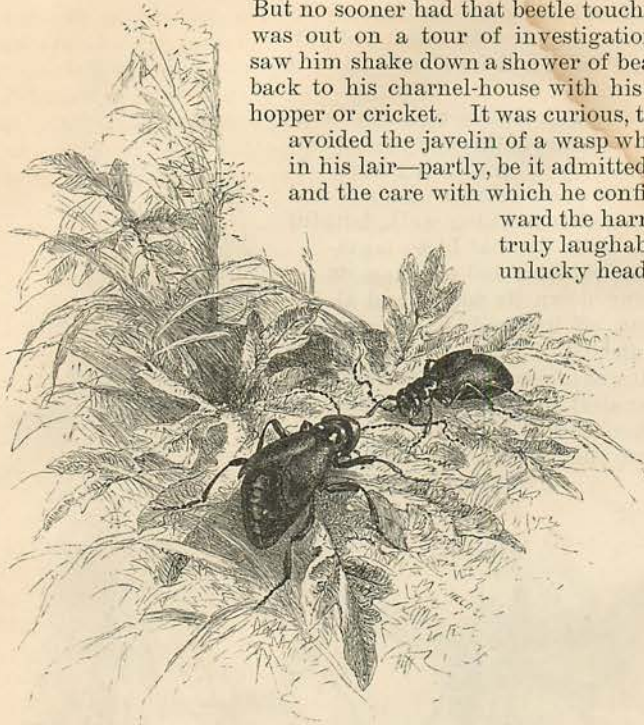
It is a privilege to get down upon one's elbows and study the play of light among this spread of jewels. Now a faint filmy aureola glows in an iridescent halo about some palpitating drop. See how it winks and plays with the twinkling sunbeam, now tinting the air with a melting gleam like the hovering spirit of an eme-

rald, quickly chased away by the flame of a radiant ruby glow, and now an instant of glitter, a spangle of light, and its place knows it no more.

I confess to a presumptuous rashness in attempting a reproduction of this dewy gossamer, but it is given merely as an alluring hint. It is the result of a page or two of notes and sketches made on that morning walk, faithful even to that little fly that lit so tantalizingly near, rubbing and twisting its toes, brushing down its wings, and almost pulling off its head in its fussy morning toilet.

It was interesting too to watch that alert figure just within that silken tunnel, with every separate foot on the *qui vive* for some tell-tale ten-

sion on those webs. And what was that subtle power of distinction by which those feet could detect the difference between the jostle of a falling drop and the touch of a beetle of equivalent weight, even though the latter were out of sight upon some wing of the "pretty parlor"—a corner, by-the-way, where the dainty carpet was figured with a relief design of white clover leaves.



OIL-BEETLES.

But no sooner had that beetle touched the web than our spider was out on a tour of investigation, and more than once I saw him shake down a shower of beads below, as he scampered back to his charnel-house with his quarry of luckless grasshopper or cricket. It was curious, too, to see how skillfully he avoided the javelin of a wasp which had become entangled in his lair—partly, be it admitted, through my connivance; and the care with which he confined his attentions well toward the harmless end of his victim was truly laughable; now throwing over his unlucky head an entangling cataract of

floss silk, or now and then taking him unawares by a quick assault and an ugly nip in the neighborhood of that slender waist. The sequence of this tragedy I did not wait to see, for a large beetle came humming along over the grass, and almost tipped my ear with his buzzing wings, and finally alighted near a clump of yarrow close by.

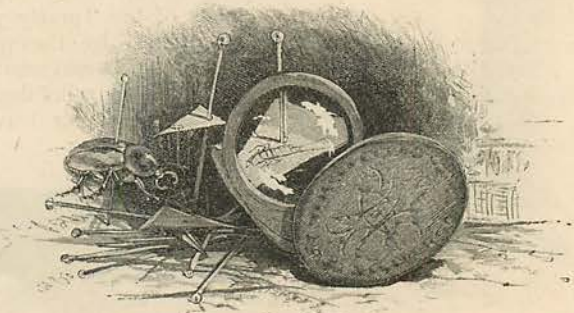
How often do we hear the query, "What becomes of all the dead birds?" The secret of their mysterious disap-

pearance was but just now half told by the buzz of those brown wings, and the other half is welcome to any one who will take the trouble to follow their lead. This beetle is one of man's incalculable benefactors. It is his mission to keep fresh and pure the air we breathe. He is the sexton that takes beneath the mould not only the fallen sparrow, but the mice, the squirrels, and even much larger creatures that die in our woods and fields.

Beneath that clump of yarrow I found just what I had expected—a small dead bird—and the grave-diggers were in the midst of their work. Already the rampart of fresh earth was raised around the body, and the cavity was growing deeper with every moment, as the busy diggers excavated the turf beneath.

Now and then one would emerge on a tour of inspection, even rummaging among the feathers of that silent throat, and climbing upon the plummy breast to press down the little body into the deepening grave.

These nature burials are by no means rare, and where the listless eye fails to discover them the nostril will often indicate the way, and to any one desirous of witnessing the operation, without the trouble of search, it is only necessary to place in some convenient spot of loose earth the carcass of some small animal. The most casual observer could not fail soon to be attracted

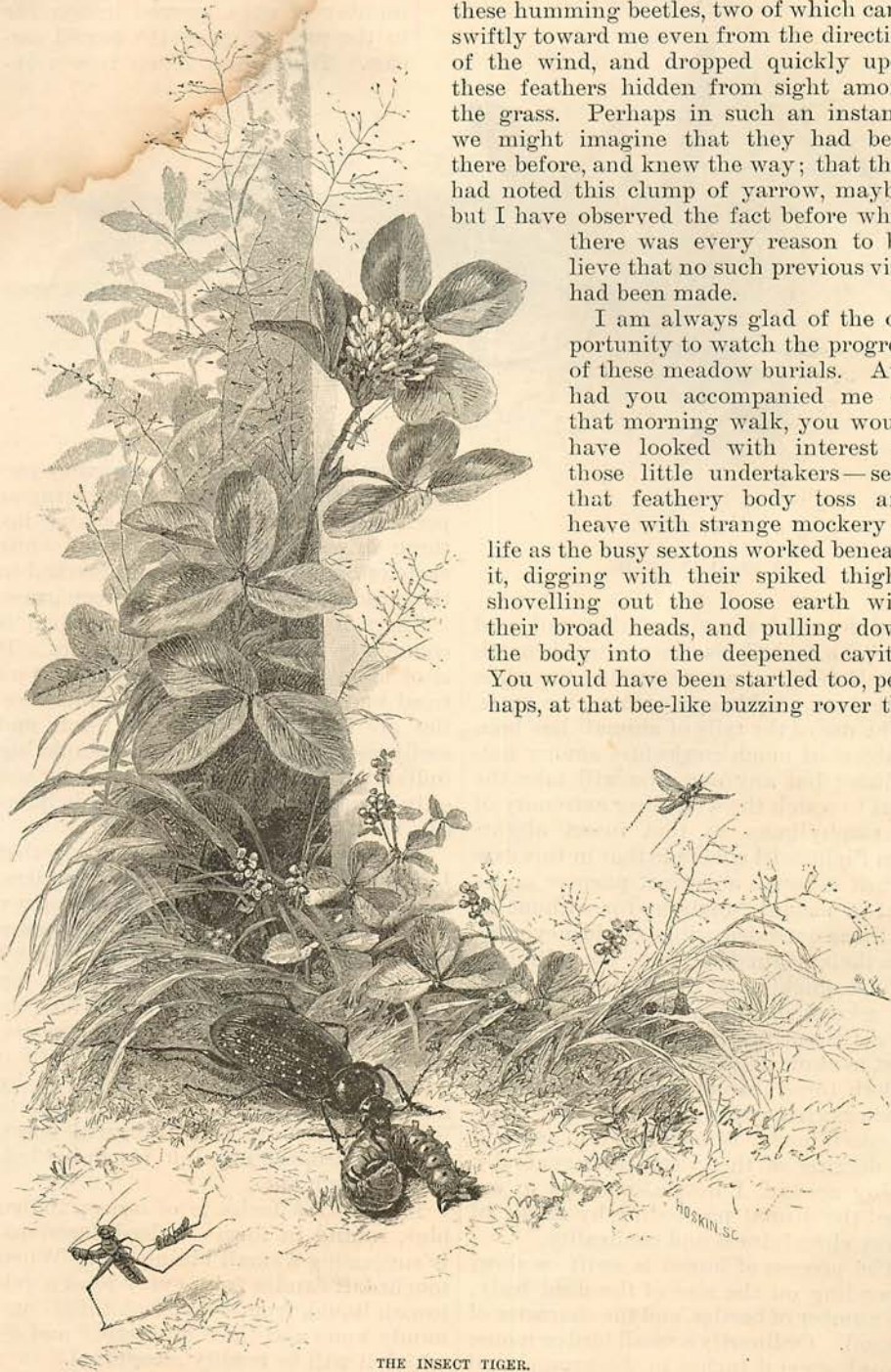


UNDER THE GLASS.

by the orange-spotted beetles. Entomologists assert that these insects are attracted by the odor of decay; but from my own humble investigations I have never been able to fully reconcile myself to this theory.

If it were the question of odor alone in this dead bird, for instance, it would be difficult to explain the bee-line flight of these humming beetles, two of which came swiftly toward me even from the direction of the wind, and dropped quickly upon these feathers hidden from sight among the grass. Perhaps in such an instance we might imagine that they had been there before, and knew the way; that they had noted this clump of yarrow, maybe; but I have observed the fact before when there was every reason to believe that no such previous visit had been made.

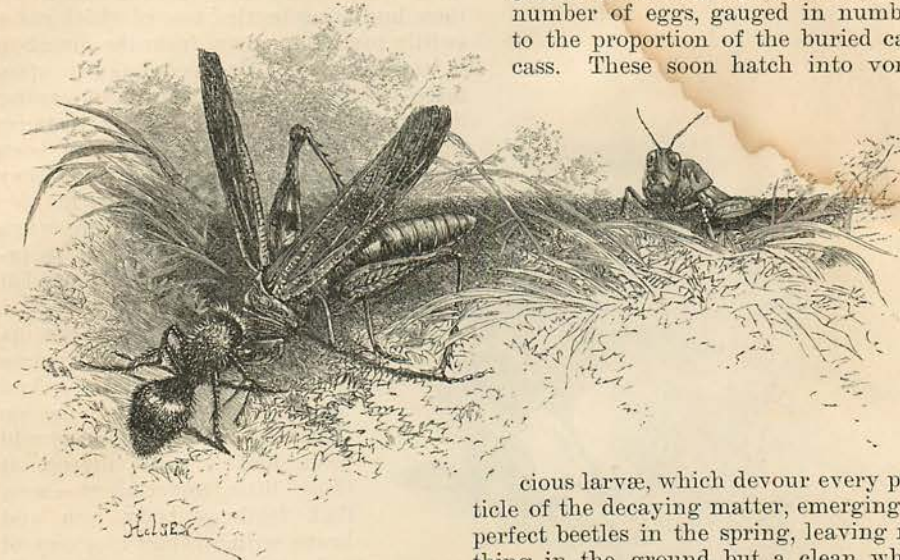
I am always glad of the opportunity to watch the progress of these meadow burials. And had you accompanied me on that morning walk, you would have looked with interest at those little undertakers—seen that feathery body toss and heave with strange mockery of life as the busy sextons worked beneath it, digging with their spiked thighs, shovelling out the loose earth with their broad heads, and pulling down the body into the deepened cavity. You would have been startled too, perhaps, at that bee-like buzzing rover the



THE INSECT TIGER.

"devil's-coach-horse" that alighted near, with its lively wriggling tail in mid-air, and you would have smiled, as I did, to see the comical alacrity with which he

covered with earth during the space of twenty-four hours. The female beetle often conceals herself within the carcass, with which she is inhumed, finally emerging after having deposited therein a number of eggs, gauged in number to the proportion of the buried carcass. These soon hatch into voracious



AN UNGAINLY VICTIM.

larvæ, which devour every particle of the decaying matter, emerging as perfect beetles in the spring, leaving nothing in the ground but a clean white skeleton, whose grave is soon marked in the meadow by a tuft of fresh green grass.

There is still another beetle which is commonly met with in our rambles. It is of all others "the poor beetle that we tread upon," for while many ground beetles are nimble of wing and limb, and easily escape before us, this floundering individual, known as the meloe, is not only wingless, but is as fat and helpless as a baby. In their proper season it is rarely that I do not discern several of these wingless, helpless beetles during the course of my walks. And here among the buttercups and beaten grasses of these foot-prints I found a pair of them, one of which lay crushed by a careless step, while the other, with a sort of pathetic helplessness, moved about its dead mate, caressing it with its antennæ, and endeavoring by many tender efforts to coax it back to life. I picked up the uninjured specimen and dropped him into my insect bottle to carry home.

Both these insects feed on and deposit their eggs in carrion; and while the "devil's-coach-horse" is not known to assist in the digging of the grave, he is generally nosing around, I notice—perhaps to enliven the dismal proceeding by an air of frisky cheerfulness and comicality.

The process of burial is swift or slow, depending on the size of the dead body, the number of beetles, and the character of the soil. Ordinarily a small bird or mouse is sunk several inches in the ground and

covered with earth during the space of twenty-four hours. The female beetle often conceals herself within the carcass, with which she is inhumed, finally emerging after having deposited therein a number of eggs, gauged in number to the proportion of the buried carcass. These soon hatch into voracious

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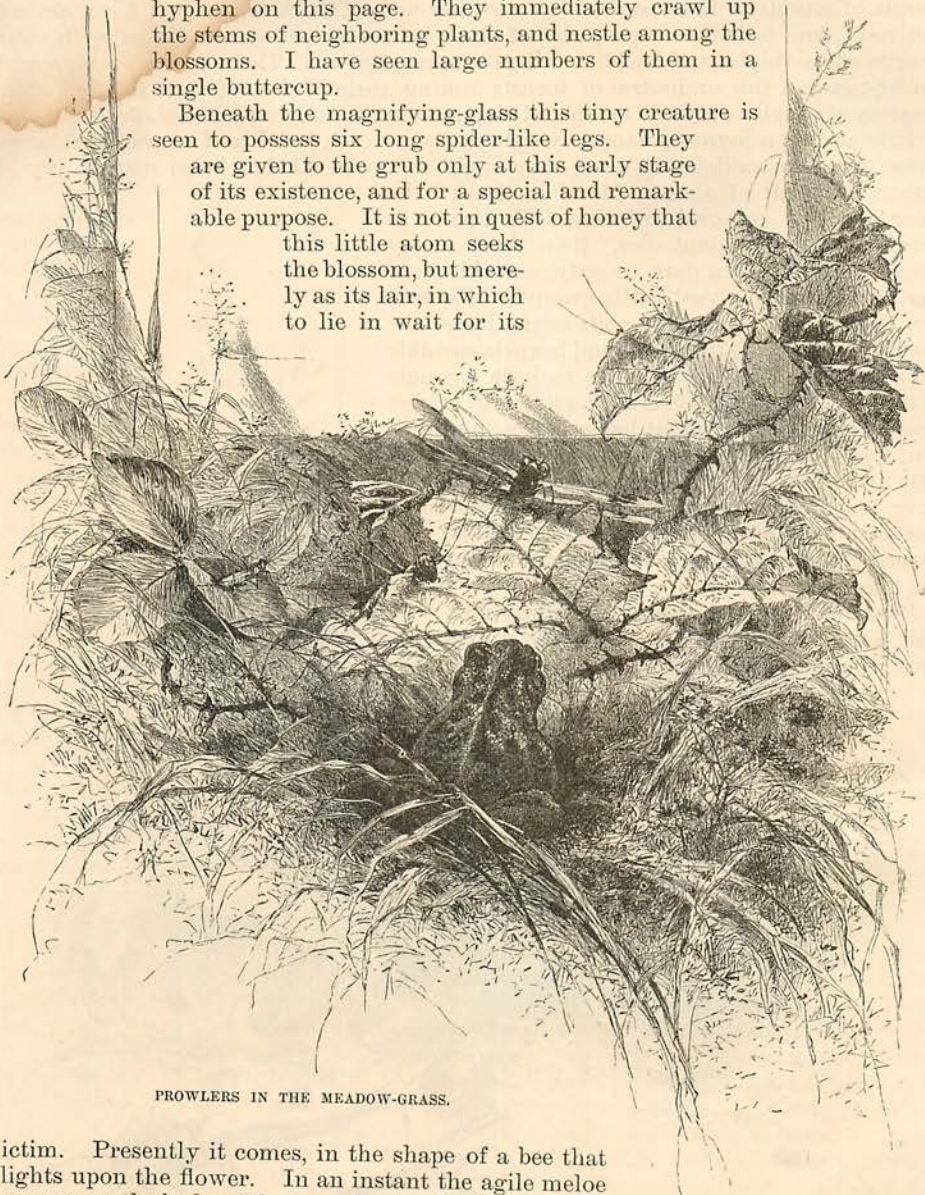
In color the meloe is of a deep indigo blue, rotund in form—indeed, facetiously suggesting a small bluing-bag. When touched, it exudes from every joint a yellowish liquid, from which habit it is commonly known as the "oil-beetle," and by which it will be readily recognized.

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Clumsy and unattractive as this beetle is, it is nevertheless much more interesting than one would imagine, and when on my return home I took the insect out of the bottle, and was enabled to relate its curious life history, it was gratifying at least to hear one appreciative listener admit that "that bug's young uns were putty smart."

And he was not mistaken. Briefly told, the history of this common blue beetle is as follows: It feeds upon the leaves of buttercups, on the ground beneath which the female deposits her eggs, several hundred in number. These hatch into minute but surprisingly active larvæ, scarcely larger than a hyphen on this page. They immediately crawl up the stems of neighboring plants, and nestle among the blossoms. I have seen large numbers of them in a single buttercup.

Beneath the magnifying-glass this tiny creature is seen to possess six long spider-like legs. They are given to the grub only at this early stage of its existence, and for a special and remarkable purpose. It is not in quest of honey that this little atom seeks the blossom, but merely as its lair, in which to lie in wait for its



PROWLERS IN THE MEADOW-GRASS.

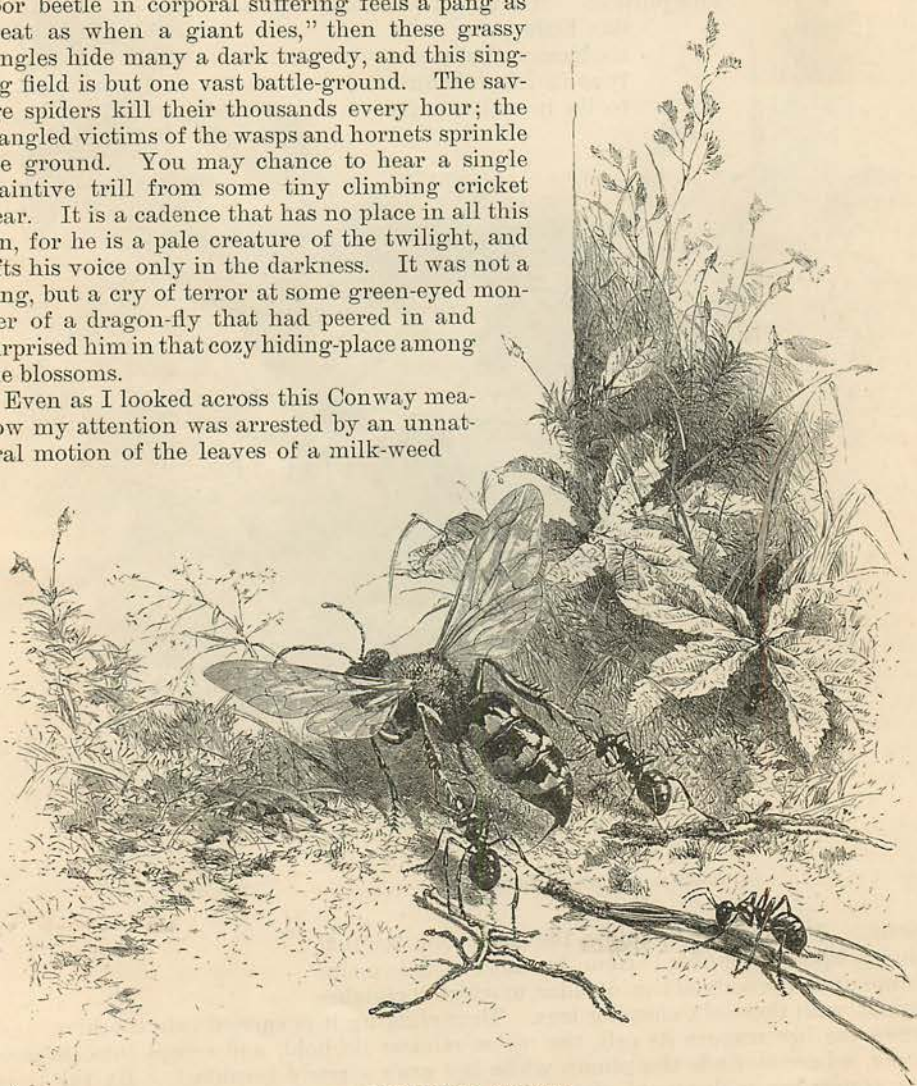
victim. Presently it comes, in the shape of a bee that alights upon the flower. In an instant the agile meloe jumps upon the body of the intruder, to which it clutches tightly with those six clasping legs. Thus clinging it is carried into the hive, and when the bee reaches its cell, the meloe releases its hold, and creeps into its new home, where it finds the plump white bee grub a ready breakfast. By the time the young bee is devoured, the meloe casts its skin, and assumes the form com-

mon to the larvæ of many beetles, in which those long legs are no longer seen. Thenceforth the insect feeds upon the bee-bread stored by its duped foster-mother, until, when fully grown, it passes into the pupa stage, and soon appears again as that guileless innocent tumbling in our foot-path.

There has always been to me a strange fascination in that great wing chorus that goes up from those myriads of sounding timbrels among our grassy fields and sedgy marshes—that endless palpitating chord of teeming life which seems to set the very air in tremulous waves as it rises quivering above the grass-tips. What a dizzy tangle of sounds! There is the high shrilling note of the black cricket down among the roots, and now the “zip-zip-zee” of those brown striped grasshoppers, with their fragile glass thighs and leaf-like wings of gauzy green. There is the ever-present under-tone of the orchestra of locusts tuning their legion of tiny fiddles, while swarms of slender katydids creep and sing among the dancing grass blades.

It is always a joyous pastoral symphony to my ears, but I half suspect that, were those members sufficiently keen, they might descry in all that babel many a cry of terror and wail of agony; for in death “the poor beetle in corporal suffering feels a pang as great as when a giant dies,” then these grassy jungles hide many a dark tragedy, and this singing field is but one vast battle-ground. The savage spiders kill their thousands every hour; the mangled victims of the wasps and hornets sprinkle the ground. You may chance to hear a single plaintive trill from some tiny climbing cricket near. It is a cadence that has no place in all this din, for he is a pale creature of the twilight, and lifts his voice only in the darkness. It was not a song, but a cry of terror at some green-eyed monster of a dragon-fly that had peered in and surprised him in that cozy hiding-place among the blossoms.

Even as I looked across this Conway meadow my attention was arrested by an unnatural motion of the leaves of a milk-weed



STRATEGY VERSUS STRENGTH.

near, and on closer scrutiny I saw a large black beetle creeping slyly up the stem, and out upon a leaf, where an *Archippus* caterpillar was feeding. In another instant the caterpillar was writhing on the ground with a mortal wound, while its murderer dropped pell-mell from leaf to leaf in eagerness to finish its deadly work. This was the fierce carnivorous beetle, the tiger of the insect world, a glossy black creature, with gilt spots like golden nails in his coat of armor.

I witnessed another long but unequal battle on that morning between a large *Mutilla* ant and an ungainly grasshopper. The conflict lasted fully five minutes, until the grasshopper felt the fangs of the *Mutilla* at the nape of his neck, when he readily succumbed.

With such savage murderers forever prowling among the shadows, with the nets of the spider spread on every hand, and hungry toads and snakes with their prying eyes seeking out every nook and cranny, it would seem that life among our singing meadows was anything but a round of pleasure. But the same warfare is broadcast in the breeze above as well. Not even the fluttering butterfly is safe, but is pounced upon in mid-air by the great sand-hornet, its wings torn off in mockery, and thus shorn of its glory, is lugged off to some dark hole in the ground; and the bee returning to its hive is waylaid on the wing, its body torn open, for the sake of that morsel of a honey-bag within.

This sand-hornet already alluded to is the greatest villain that flies on insect wings, and he is built for a professional murderer. He carries two keen cimeters besides a deadly poisoned poniard, and is armed throughout with an invulnerable coat of mail. He has things all his own way; he lives a life of tyranny and feeds on blood. There are few birds—none that I know of—that care to swallow such a red-hot morsel. It is said that not even the butcher-bird hankers after him. The toad will not touch him, seeming to know by instinct what sort of chain-lightning he contains. Among insects this hornet is the harpy eagle, and nearly all of them are at his mercy. Even the cicada, or drumming harvest-fly, an insect often larger and heavier than himself, is his very common victim. Considering these characteristics, it was of especial interest to witness such an incident as I have here

pictured, where one of these huge tyrants was actually captured and overpowered by the strategy of three black ants.

I had left the meadow, and was ascending a spur of the mountain by the edge of a pine wood, when suddenly I espied the hornet in question almost at my feet. He immediately took to wing, and as he flew on ahead of me I observed a long pendent object dangling from his body. The incumbrance proved too great an obstacle for continuous flight, and he soon dropped again upon the path, a rod or so in advance of me. I overtook him, and on a close inspection discovered a plucky black ant clutching tightly with its teeth upon the hind-foot of its captive, while with its two hind-legs it clung desperately to a long cluster of pine needles which it carried as a dead-weight. No sooner did the hornet touch the ground than the ant began to tug and yell for help. There were certainly evidences to warrant such a belief, for a second ant immediately appeared upon the scene, emerging hurriedly from a neighboring thicket of pine-tree moss. He was too late, however, for the hornet again sought escape in flight. But this attempt was even more futile than the former, for that plucky little assailant had now laid hold of another impediment, and this time not only the long pine needles, but a small branched stick also, went swinging through the air. Only a yard or so was covered in this flight, and as the ant still yelled for re-enforcements, its companion again appeared, and rushed upon the common foe with such furious zeal that I felt like patting him on the back. The whole significance of the scene he had taken in at a glance, and in an instant he had taken a vise-like grip upon the other hind-leg. Now came the final tug of war. The hornet tried to rise, but this second passenger was too much for him, he could only buzz along the ground, dragging his load after him, while his new assailant clutched desperately at everything within its reach, now a dried leaf, now a tiny stone, and even overturning an acorn cup in its grasp. Finally, a small rough stick the size of a match was secured, and this proved the "last straw." In vain were the struggles of escape. The hornet could do no more than lift his body from the ground. He rolled and kicked and tumbled, but to no purpose, except to make it very lively for his captors; and the thrusts of that lively dagger were



BIRD-NEST FUNGUS.

wasted on the desert air, for whether or not those ants knew its searching propensities, they certainly managed to keep clear of this busy extremity.

How long this pell-mell battle would have lasted I know not, for a third ant now appeared, and it was astonishing to see him; with every movement of the hornet, he in turn would lay hold of a third stick, and at the same time clutch upon those pine needles to add their impediment to the burden of his own body.

Practically the ants had won the victory, but what they intended to do with the floundering elephant in their hands seemed a problem. But it was to them only a question of patience. They had now pinned their victim securely, and held him to await assistance. It came. The entire neighborhood had been apprised of the battle, and in less than five minutes the ground swarmed with an army of re-enforcements. They came from all directions; they pitched upon that hornet with terrible ferocity, and his complete destruction was now only a question of moments. I experienced a sort of fiendish delight at such a fitting expiation for a life of rapine and murder. But while quite willing to leave him to his fate, there was a problem of engineering skill connected with his capture which I wished to solve, and I concluded to come to his rescue, and even spare his life if need be,

in an interesting experiment. I therefore dislodged all the ants excepting the two original assailants. The overwhelming attack upon the hornet had made him furious, but these pugnacious little fellows were even yet more than his match, and still held him as before. No sooner, however, did I remove these extra weights of ants, sticks, and pine needles than the insect took wing, and was soon out of sight. But he still carried his doom in his flight, and my conviction is firm that those two ants were even yet his executioners.

If there is any one class of natural objects which is more than any other especially ignored by nearly all "walkers" and nature students generally, it is the wonderful tribe of cryptogamous plants known as fungi—the great family of toadstools, mushrooms, moulds, and mildews—forms of vegetation which present some of the most inexplicable and mysterious phenomena to be found in the whole vegetable kingdom.

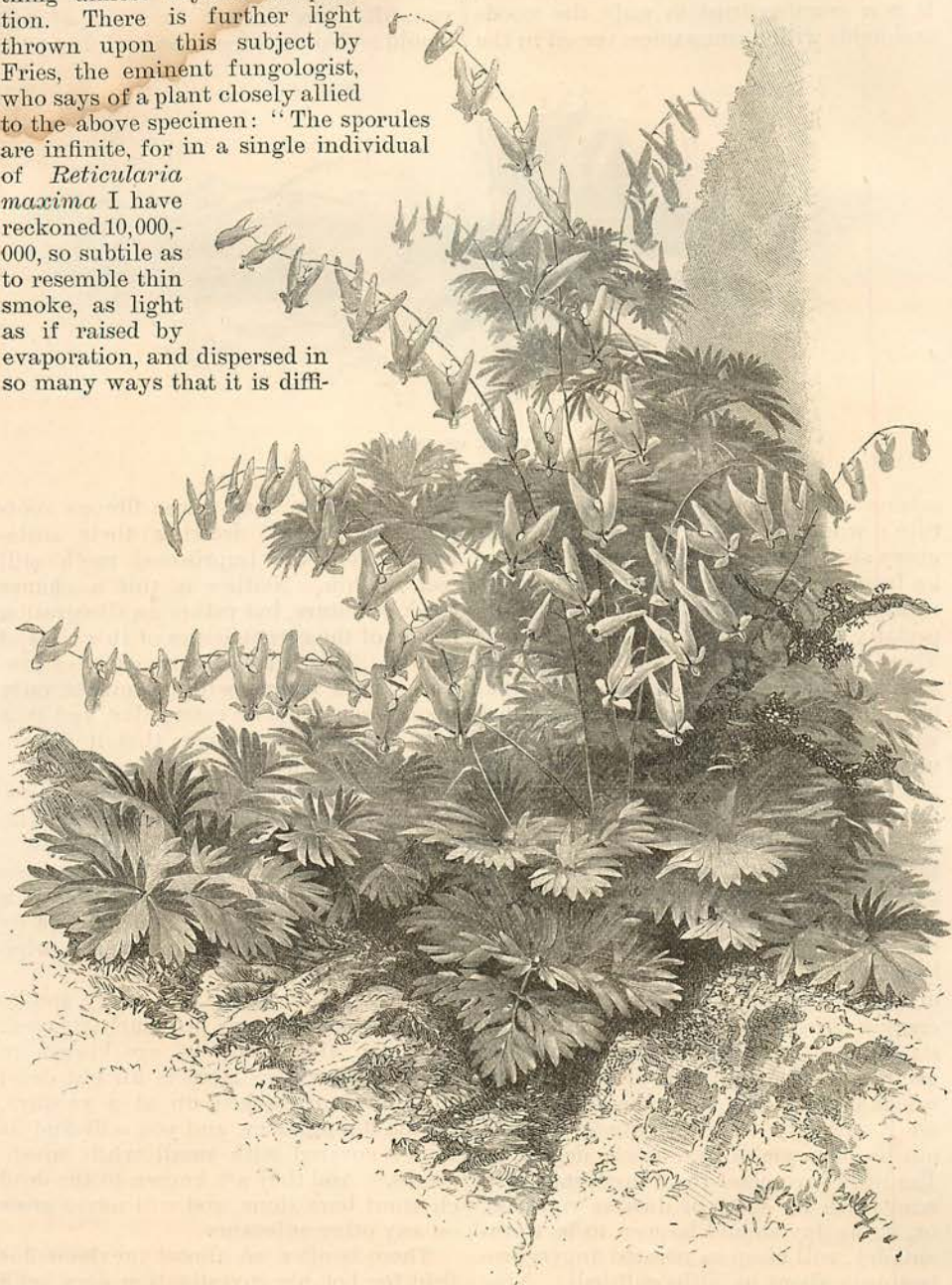
A gentleman well known to scientists as an authority on the subject of American fungi, and whom I count it an honor to call my friend, recently almost took my breath away as he told me, in addition to several other friends eagerly assembled



FAIRY PARASOLS.

about his microscope, that the myriads of beautiful spores which we observed in that bright field of his objective did not actually cover a space much larger than the

diameter of a needle. "And yet," continued he, "each individual of them is capable, under favorable conditions, of reproducing a cluster of these puff-balls which I hold in my hand. It is a lucky thing for us that it is so fastidious that it will only vegetate upon dead wood, for otherwise there are enough of those spores contained in this one plant, were each to germinate and mature, to crowd the whole surface of the United States, and this cluster could easily cover the entire globe." Whether considered as figurative or not, the reproductive possibilities of these plants are something almost beyond computation. There is further light thrown upon this subject by Fries, the eminent fungologist, who says of a plant closely allied to the above specimen: "The sporules are infinite, for in a single individual of *Reticularia maxima* I have reckoned 10,000,000, so subtile as to resemble thin smoke, as light as if raised by evaporation, and dispersed in so many ways that it is diffi-

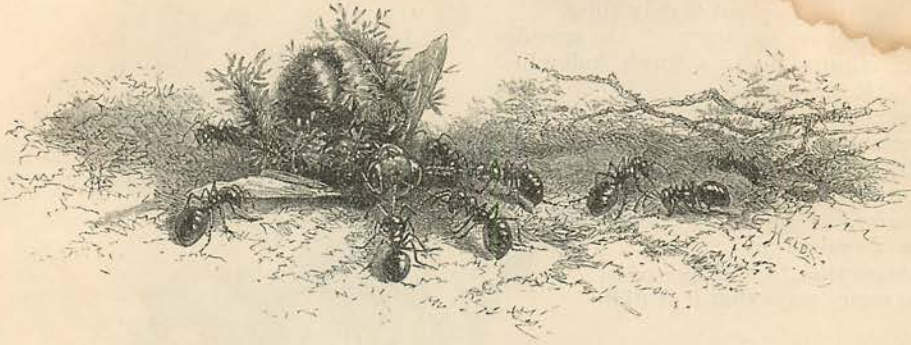


cult to conceive the spots from which they could be excluded."

When it is known that a single one of these plants will cover an area of seven square inches, and, moreover, that a single spore will often reproduce a whole cluster of the same, it becomes a simple matter to compute the enormous resultant area. It is a genuine treat to walk the woods and fields with a companion versed in the

the matted carpet of pine needles, while from beneath its edge a great red-faced mushroom protrudes its head to tell of its struggle through the mould.

As you sit upon the mossy log a bright orange bit of color at your side arrests your attention. It proves to be a small toadstool, and as you pull it from its bed you lift upon its root—a lump of leaf mould? No; a large brown chrysalis,



A VICTIM OF GREED.

science of fungology. A new page of nature's wondrous history is turned with every step, and an infinity seems to open up from every heap of rubbish and every unsightly clod. The damp woods are especially rich in forms of fungous growth. They offer a limitless museum of their strange and beautiful curiosities of vegetable life. Here are tiny bird-nests filled with eggs clustering upon a lump of leaf mould, or crowding upon this dried stick that snaps beneath your heel. Fragile fairy parasols lift their slender forms above the dried leaf. You have crushed hundreds of them in your path. Sometimes as many as twenty will be seen growing upon a single leaf, long since too far gone to need their shelter. Perhaps you will chance upon a beautiful drooping hydnum, with its crowded creamy fringe hanging from the prostrate beech trunk; but you would not leave this tender growth to decay in the woods if you knew it for the dainty morsel it actually is. The whole tribe of mushrooms yields few such delicacies. The little barometer the "earth-star" will send forth its cloud of dust as you pass, or, if the day should happen to be warm and dry, will clasp its pointed fingers protectingly about its little puff-ball. Near by a heavy stone is lifting up among

through whose shell those fibrous roots have penetrated, drawing their sustenance from the imprisoned moth still seen within. Neither is this a chance freak of nature, but rather an illustration of one of the eccentricities of this class of plants. This is a distinct variety of fungus, whose spores will germinate only upon a chrysalis or caterpillar, and it is even believed, moreover, that it is confined to a single species of insect.

These are not rare or isolated instances, but such as any one may discover who would reap "the harvest of a quiet eye."

I have selected these at random from my own experience, and they are only a few of many which I have memorized by careful colored drawings from the original specimens.

I might almost say that every species of plant has a fungus peculiarly its own. The lilac, alder, ash, etc., are known to be thus affected. Here is an old dried chestnut burr picked up at a venture. Search it a moment, and you will find its spines covered with small white mushrooms. And they are known to the dead chestnut burr alone, and will never grow on any other substance.

There is often an almost inexhaustible field for botanic investigation even on a single fallen tree. My scientific friend

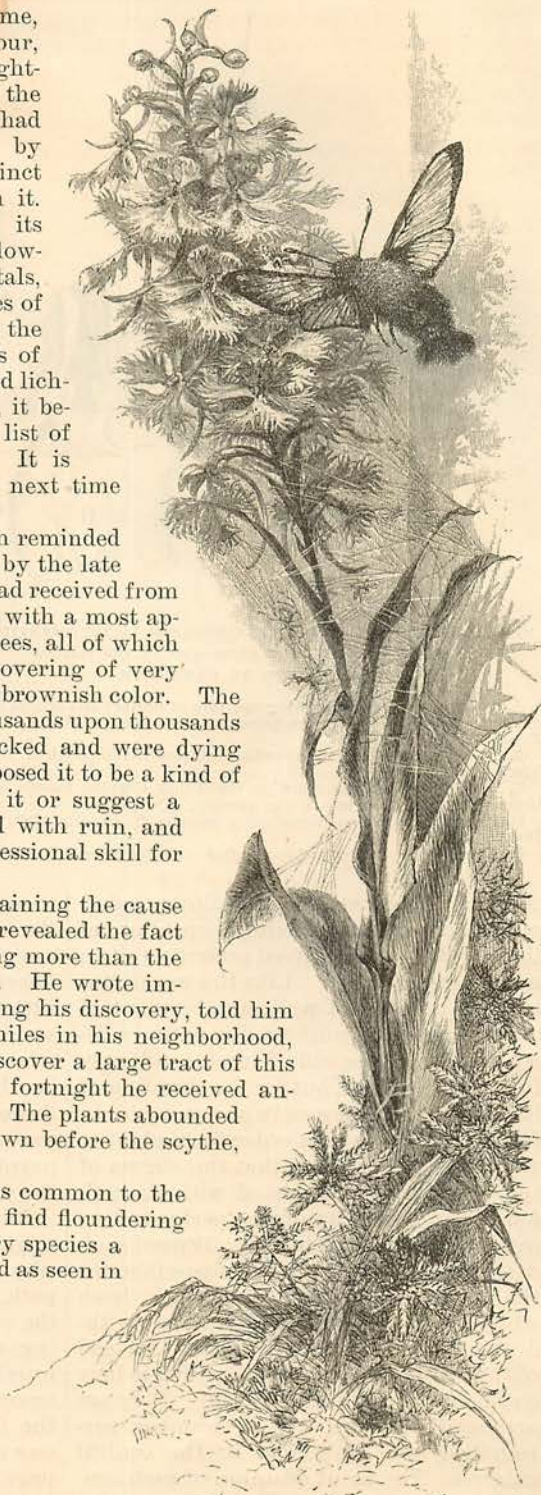
already alluded to recently informed me, on his return from an exploring tour, that he had spent two days most delightfully and profitably in the study of the yield of a single dead tree, and he had surprised himself by a discovery by actual count of over a hundred distinct species of plants congregated upon it. Plumy dicentra clustered along its length, graceful sprays of the frost-flower, with its little spire of snow crystals, rose up here and there, scarlet berries of the Indian turnip glowed among the leaves, and with the crowding beds of lycopodiums and mosses, its ferns and lichens and host of fungous growths, it became an easy matter to extend the list of species into the second hundred. It is something worth remembering the next time we go into the woods.

While on the subject of fungi I am reminded of a singular incident related to me by the late Professor Wood, the botanist. He had received from a bee-keeper in California, together with a most appealing letter, a small box of dead bees, all of which were heavily laden with a thick covering of very small paddle-shaped substances of a brownish color. The accompanying letter stated that thousands upon thousands of the writer's bees had been attacked and were dying from this strange disease. He supposed it to be a kind of fungus, but nobody could explain it or suggest a cure. His business was threatened with ruin, and in his extremity he appealed to professional skill for a remedy.

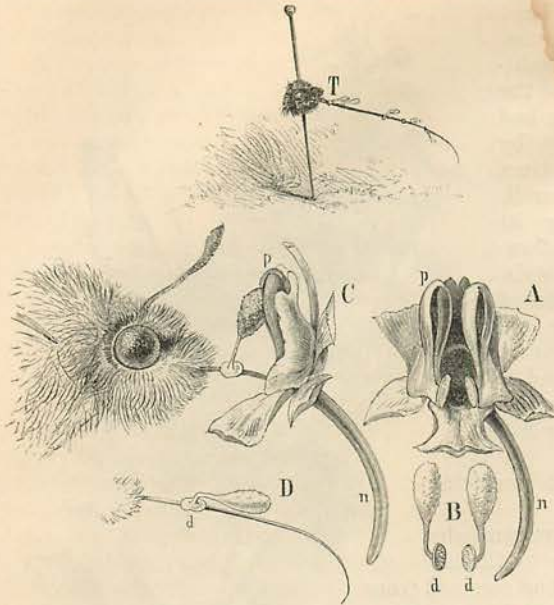
Mr. Wood was not long in ascertaining the cause of the trouble. A small magnifier revealed the fact that the so-called fungus was nothing more than the sticky pollen of a certain milkweed. He wrote immediately to his correspondent stating his discovery, told him to search the country for several miles in his neighborhood, and he would somewhere surely discover a large tract of this mischievous *asclepias*. In about a fortnight he received another letter, confirming his theory. The plants abounded in the locality, and had been cut down before the scythe, after which the trouble had ceased.

This peculiarity of the milkweed is common to the genus, and it is not a rare thing to find floundering among the blossoms of our ordinary species a honey-bee or bumble-bee encumbered as seen in the illustration on the preceding page, "A Victim of Greed," which in its embarrassed condition has become an easy prey to a swarm of ants. This figure was drawn from a specimen now in my possession. The insect was one of several recently found upon a plant of our common *asclepias*.

The pollen of most plants is in



THE ORCHID AND ITS FRIEND.



MAGNIFIED VIEWS OF THE PARTS CONCERNED IN THE OPERATION OF EXTRACTING NECTARY FROM AND IN FERTILIZING ORCHID FLOWER BY HAWK-MOTH.

- A. Opening of flower, showing aperture of nectary and stigma immediately above, with a pollen pouch on each side. n. Nectary. p. Pouch.
 B. Pollen masses removed, showing their position in pouches. d, d. Viscid disks.
 C. Head of hawk-moth, showing viscid disk clasping tongue, and being withdrawn from pouch. n. Nectary. p. Pouch.
 D. Horizontal position immediately assumed by the tiny club. d. Disk.
 T. Appearance of tongue of moth after exploring several flowers.

the form of the well-known yellow powder, and is dusted freely from the opening anthers. But the milkweed presents quite a novel arrangement. Like the wonderful tribe of orchids, as well as a long list of other plants, the milkweed is entirely dependent upon the aid of insects not only for its fertilization, but for the shedding of its pollen. It is scarcely necessary to refer to the fact that in order for a plant to set seed it is necessary that the stigma of the flower shall be dusted with the pollen. We see it naturally performed in many blossoms, but in the milkweed such a spontaneous process is impossible, for the pollen is concealed in a pouch, from which it never would escape unless withdrawn by some external force. Instead of the ordinary powder, the pollen is here gathered into oblong clusters. They are arranged in pairs, five in number, surrounding and imbedded in the central column. The point of union of each couple is at the top, where they are provided with two glutinous disks, which there lie

in wait for their deliverer. No sooner does the foot, or leg, or body, or even a hair, of this bee we are watching come in contact with these little disks than they clasp upon it, and are pulled from their hiding-places. They thus accumulate, and are dragged about by the insect, and carried from flower to flower, each of which becomes cross-fertilized by thus having their stigmas at the upper part of the blossoms brought into contact with the pollen. We may thank the bees and hornets for those silky pods that glisten on our September road-sides.

The great tribe of orchids, among the most beautiful plants on the face of the earth, were only quite recently revealed to us in all their true significance. Their endless forms and colors have afforded sufficient stimulus to most botanists, but any one who will go through an orchid conservatory in company with Darwin will acquire a vastly increased interest in these flowers, of which their strange shapes are but an alluring hint.

It is not necessary, however, to seek the aid of the florist in order to study the mystery of the orchid. We can go into our woods and fields and find abundant harvest for investigation. There is the little spiranthes, or ladies'-tresses, to be seen in almost any summer ramble. All who love the hemlock woods will remember the common cypripedium, or moccasin flower, also called lady's-slipper; and the sweet-scented arethusa, with its lovely purple blossom, will be associated with the memory of many a marshy meadow.

Were you to retrace your steps, you might still reclaim a delicate wilting spray which lies broken in your foot-path, where it bloomed unheeded among the sedges. If you had known its charming secret, or had seen its murmuring nursling kissing its every flower, you never could have trodden upon it. It is the little fringed orchid, *O. psycodes*, of our moist meadows. The illustration on page 79 will recall it, if the imagination lend its aid in imparting to its fringed petals a tint of delicate lavender purple.

The life history of this flower, as it has been revealed to me through recent observations of my own, is of such absorbing interest that I am tempted into a narrative of my investigations. They were the outcome of an intent perusal of Darwin's wonderful discoveries chronicled in his *Fertilization of Orchids*. This book led me with feverish impulse into the conservatory and field, and has resulted in a large number of drawings, among which are those relating to the little orchid in question. Like many flowers, this one is constructed on a principle of reciprocity. The insects serve the plant, and it yields them food in return. Let us examine the structure of this little orchid. It will be readily understood by reference to the diagrams on page 80. In this instance the bait consists of the usual sweet secretion, here deposited at the end of a curved tubular nectary nearly an inch in length. The opening to this nectary is seen directly in the heart of the flower. But observe how that entrance is guarded, defended with two clubs, if I may so speak, the pollen masses bearing some such resemblance. These are hidden in two pockets, one on each side of the opening. The lower extremity of each is provided with a flat sticky disk turned inward. This is all very simple. The trap is set. Now let us see how it works. A small brown hawk-moth hovers near, he poises like a humming-bird in front of the blossom, uncoils his slender tongue, and thrusts it into the opening of the nectary. So transparent is this tiny tube that you can readily see not only the tongue within, but the gradual absorption of the nectar. As the moth thus sips he brings his tongue in contact with one or both of the sticky disks. They clasp it firmly, and as the member is withdrawn they are pulled out of their pockets, and stand erect upon the insect's tongue. This alone is surprising, but what follows is stranger still. In a very few seconds the little club begins to sink forward, gradually lowering, until it has brought itself nearly level with the tongue. Wilted, you will imagine. Not so; it is still firm in its new position. And what will be your surprise if you watch closely as the humming rover sips from the next flower, on seeing the tips of that club so tilted strike directly against the stigma, or fertilizing surface, just above the opening of the nectary? The flower is thus fertilized, and will mature its seeds.

The flowers are frequented by several kinds of insects, but this little day-flying sphinx is one of their most common visitors, and the very conformation of the orchid would indicate, from its slender tube and the distance of the nectar from the orifice, an adaptation to the long slender tongues of moths and butterflies. I have never happened to see a bee upon this orchid, and I doubt whether the insect could reach the nectar, unless perhaps through the external puncture of some bumble-bee, which insect has a well-known trick of cutting matters short, and saving itself trouble, by biting through the honey tube from the outside. Only a few days since I watched a bumble-bee in a bed of toad-flax thus cheating nature and rifling the blossoms, and in a whole bouquet afterward gathered it was difficult to find a single flower, or even mature bud, whose nectary was not punctured near its tip.

These experiments with the orchid may be tried by any one. The drawings herewith given were made from an actual specimen of the insect, which suffered martyrdom in the cause. You may observe the appearance of its tongue after searching a few nectaries. While making the drawing, a common house-fly lit among the blossoms, and although it appeared to know the neighborhood of the bait, it seemed powerless to reach it. With a little forcible encouragement on my part, however, the insect succeeded in getting one of its eyes decorated with a pollen club.

It was interesting, also, to notice the sagacity of a diminutive spider that knew the attraction of those honey tubes, and had spread its web among the blossoms. Its meshes were sprinkled with minute insects, among which I discovered one rash atom with a club-shaped appendage as large as its body, firmly attached to the top of its head.

There are several other of our native orchids commonly met with equally if not more interesting, and in each variety there will be found some new and wonderful adaptation, some surprising mechanism, for the removal and utility of its pollen. In *arethusa* it is a little lid that lifts as the bee leaves the flower, and lets fall the pollen on the intruder's back. The *cyripedium* of our woods is a veritable trap, with but one exit, in escape from which the insect gets a dab of pollen on its head; and I might continue the list indefinitely.

These are our own native species, but in the pages of Darwin there are described many exotic varieties of most intricate and amazing mechanism, by which nature, while thus preventing the self-fertilization of the flower, equally insures its cross-fertilization, and affords unanswerable arguments in favor of the pet theories of this great philosopher.

There are similar mysteries concealed within the hearts of many of our most common wild flowers, and it is one of the most inspiring fascinations of Nature-study that while she always rewards her devotees with a full measure of her confidence, she still allures them on with an infinite and inexhaustible reserve. You may discover some unknown flower, dissect and analyze its parts, and find its place among the genera and species of vegetation, but there are strange testimonies beneath its conformation that are still unheeded, even as in these curious orchids, known and classified long ere Darwin sought the secret of their wondrous forms.

We can not all be scientists or explorers, but we can at least learn to lend an answering welcome to those little faces that smile at us from among the grass and withered leaves, that crowd humbly about our feet, and are too often idly crushed beneath our heel. The darkest pathless forest is relieved of its gloom to him who can nod a greeting with every footstep; who knows the pale dicentra that nods to him in return; who can call by name the peeping lizard among the moss, the pale white pipe among the matted leaves, or even the covering mould among the damp débris.

And to him who knows the arcana beneath a stone; who has learned with reverence how the clover goes to sleep, how the fire-weed sheds its silken floss, or how the spider casts its web from tree to tree; who has seen the brilliant cassida, the palpitating gem upon the leaf, change from burnished gold to iridescent pearl, or has watched the wondrous resurrection of the imago bursting from its living tomb—to such a one there is in all the length and breadth of nature no such thing as exile, no such thought as loneliness, and it were the voice of an unknown sentiment which should declare that

“A primrose by a river's brim
A yellow primrose was to him,
And it was nothing more.”

For there was a something deeper, some-

thing sweeter, that unfolded with those dewy petals, something from that heart laid bare that breathed its perfumed whisper in the gloaming, and found its answer in that throb of sympathy, a love which might still further feel, and feeling, whisper in return:

“The bubbling brook doth leap when I come by,
Because my feet find measure with its call;
The birds know when the friend they love is nigh,
For I am known to them, both great and small;
The flower that on the lonely hill-side grows
Expects me there when spring its bloom has given;
And many a tree and bush my wandering knows,
And e'en the clouds and silent stars of heaven.”

THE LINNET'S ECHO SONG.

THE Platz without is white with snow,
And, glistening white, this porcelain stove
Sheds on yon oriel's fairy grove
Of flowers and ferns a summer glow;

And here, though Saxon winter whirl
Round hoary lindens flakes of storm,
The legendary sylphids swarm,
And charm us back to boy and girl.

So, child-like, hand in hand we list
To a caged linnet carolling.
In pauses, hark! what echoes ring?
Or is he a ventriloquist?

For oft, in hush of throbbing throat,
We hear, or fancy that we hear,
From mellow distance, low yet clear,
A sympathetic softer note.

And hath the lonely bird beguiled
His own heart, thus to imitate
The voice of an imagined mate,
Consenting from the greenwood wild?

Ah, hand in hand and heart to heart,
Mine own! there have been weary times,
When I, in visionary rhymes,
Have played the linnet's mimic part;

Caged not in bower, but barren ship,
Have feigned fond courtship and replies
In some all-perfumed paradise—
Yea, even the kiss from answering lip;

And to dream-rhythm the lofty sails
High-bosomed sister-goddesses
Became, and paced the purple seas
To stars more lustrous, blander gales.

Illusions, love, the mightier truth
Hath dwarfed. Yet in our Dresden home—
The snow-flake flying like the foam,
But in our souls ambrosial youth—

In sweet for sweet of thought and tongue,
In bliss the bird but feigns to win,
One touch of far-off tears makes kin
The pathos of the linnet's song.