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*** START OF THE PROJECT GUTENBERG EBOOK BIRDS AND ALL NATURE, VOL. 6, NO. 2, SEPTEMBER 1899 ***

BIRDS AND ALL NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. VI. SEPTEMBER, 1899. NO. 2.

CONTENTS

THE POINTER.

(*Canis familiaris—Sagax avicularius.*)

THERE is a wide difference of opinion among naturalists as to the stock from which our dogs of the present day came. Hallock says that some have it the wolf, others the jackal or fox, while not a few claim that the wild dog of India is the source from which sprang all the varieties. He maintains, however, that it cannot be declared with any degree of certainty what the parent stock was. Certain it is that to no one animal can the paternity of these useful races be credited, as they are so widely different in form, color, and characteristics, and man could never have developed and brought together such vast differences, opposite natures and shapes, as can be seen in domestic dogs, unless the original species were in possession of the rudiments. Neither could food, climate, nor any contrivance whatever so completely alter the nature, decrease the powers of scent, render the coat short, long, or curly, lengthen or shorten the limbs, unless separate types had furnished the material.

Ancient bas-relief and monumental delineations picture the dog as distinct in its characteristics thousands of years ago as at the present day, and fossil remains have been repeatedly discovered so little resembling either the wolf, jackal, or fox, and so different in type, as to be classified with the spaniel, terrier, hound, bulldog, pointer, and pug; and as we know these to be made dogs, or in other words hybrids, the species must have been fully as numerous as at the present time.

There are numerous species of wild dogs differing from one another almost as much as our own domestic animals of to-day. Granting that the spaniel, greyhound, and terrier sprang originally from the wolf, as some argue, why not point out first why the male dogs are so dissimilar? And again, why are the wolves of different countries unlike, and which species of wolf is the true and only one? Without wishing to conflict with the opinions of those so much more learned on the subject than ourselves, we would ask, would it not be much more reasonable to suppose, without positive proof, that the origin of the domestic dog can be referred to numerous aboriginal species, crossing with the wild varieties—as we know our dogs will frequently do, including the wolf, jackal, and the fox, if we like, climate assisting, and man aiding by judicious intermixing and breeding—until the present high standard of this useful animal has been reached?

It is noticeable that we have in America far more well-bred setters than pointers, and greater attention seems to have been paid in the last few years in procuring the former blood than the latter. This arises from the fact that the setter is the greater favorite of the two, and justly the choice of the sportsman when he desires a dog that will unflinchingly stand the rough-and-tumble nature of our shooting. Of the two, the point of the shorter-haired animal is far the more marked when on game, and the training once received by him is always retained, and on each returning season he enters the field to be depended upon, while the setter oftener has to be partially rebroken each year; and if not owned by a sportsman who shoots continually, becomes headstrong and unreliable.

"For the person whose business will not allow him to take his gun in hand but two or three times in the autumn," says an authority, "we advise by all means that his dog should be the pointer; but for the one who takes advantage of the open season for different game from its beginning to its close, we recommend the setter as best able to bear continued work in all descriptions of cover." [Pg 50]

The short hair of the pointer enables him to do work on the prairies while "chicken" shooting where water is seldom found, and which he can do without for a long time; but in New Jersey, Delaware, and Maryland, and in countries where the game invariably takes to the briery thickets on being started, the pointer is at a disadvantage, as it refuses to enter them.

The pointer originally is a cross of the Spanish dog with the greyhound, or foxhound, by which the delicacy of the nerves of the nose, to some extent, is diminished, and the body rendered more light and elegant. No dog has a higher step, sense of smell, or shows greater intelligence or docility. The principal reason that he becomes rigid, or points, by the scent of game, is from the extraordinary condition of his nervous system, acquired centuries ago and handed down by his ancestors. According to Hallock, a thoroughly broken pair of high-bred pointers are so obedient to the voice and gesture of their master and so well trained to act with each other, that a wave of the hand will separate them, one going to the right and the other to the left, so that they hunt the entire ground, crossing each other regularly in front of the sportsman as he walks forward. There is one matter that is generally overlooked in ranging with the pointer. If in early life you have taught him to retrieve, and a case occurs in the field where he has to cross a stream, as the dog returns with the bird, never tell him "down charge." His coat is so thin and his organization so delicate that he is sure to catch cold; therefore, by all means, allow him to run around a little.

Points for the show bench, as given by the *Fancier's Gazette*, are:

Head should be moderately long, narrowing from the skull; the skull not too prominent above the eyes, as this gives a heavy appearance; rather deep in the lip, but not any flaw, or very slight; nostrils open, with level jaw; eyes moderately bold; ears thin, set in to the head, just where the skull begins to recede at the sides of the head, hanging flat on the cheek; throwing the ears back so as to show the insides has a bad appearance, and too often indicates a cross; neck medium in proportion to head, and body rather inclined to be long, but not much so, thickening from the head to the set-in of the shoulders; no looseness of the throat skin; shoulders narrow at the meeting of the blade bones, with a great amount of muscle, long in the blades, set slanting, with

arm of the leg strong and coming away straight, and elbow neither out nor in; the legs not great, heavy boned, but with a great amount of muscle; leg pressed straight to the foot, well-rounded, and symmetrical, with foot well rounded (this is the forelegs and feet); chest moderately deep, not over wide, but sufficiently wide and deep to give plenty of breathing-room; back level, wide in loins, deeply ribbed and with ribs carried well back; hips wide and full of muscle, not straight in the hock, but moderately bent; stifles full and well developed; the stern nearly straight, going off tapering to the point, set-in level with the back, carried straight, not above the level of back; symmetry and general appearance racy, and much beauty of form appears to the eye of a real pointer breeder and fancier. The weights considered best for different purposes are from fifty pounds to about sixty-five pounds. Coat short and glossy, but a deal here depends on condition.

POINTS IN JUDGING.

Head	25
Neck	10
Shoulders	15
Legs	10
Feet	10
Loins	10
Stifles	5
Stern	15
	——
	100

Color and Coat.—The coat ought to be very short and soft, and fine, and the skin thin and flexible. Most people in England prefer the lemon-and-white to liver-and-white, or black-and-white.

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CHICAGO:
A. W. MUMFORD,
PUBLISHER.

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THE PSYCHOLOGY OF BIRD STUDY.

IT is of advantage to know why a given occupation is profitable, why it is attractive or otherwise, to what sort of minds it is best adapted, and how it should be conducted to yield the best returns.

Other things being equal, the mind acts most healthfully on what is most pleasing. Children are attracted most by things having life, character, color, and rarity. Whatever has life appeals directly to the young mind, especially where the various stages of life are apparent. Birth, infancy, the family relation, society, paternity, sickness, death, joy, sadness, homes, building of nests, eggs, incubation, flying, singing, fighting, foraging, searching covert places, digging, boring, hammering, wading, swimming, catching, devouring, sentry duty, migration, gregariousness, dress, differences in appearance of sexes and ages, moulting, mimicking, special equipment for occupations, anatomy, physiology, hygiene, usefulness to man, assistance in agriculture and arboriculture, destructiveness to noxious life, swiftness, deliberation, expertness, stupidity, instincts for remarkable performances, lack of judgment in certain lines, loquacity, vivacity, sympathy and mutual helpfulness, resemblances to humanity and differences, and apparent moral sensibility, are among the leading features of birds in general which make them attractive to the youthful mind.

Where any of these subjects may be utilized in the ordinary instruction of children the results are more permanent and direct than where the same sort of instruction has been attempted with material that appeals less strenuously to the soul of the learner. That which arouses the most intense activity makes the most lasting impression. Even where the impression is a painful one the result endures; as in old England the memory of landmarks was impressed upon young boys by showing and flogging the boys at once. The unreasoning pain and the sight of the landmark remained forever associated. Modern research has found that pleasant sensation opens the mind and that attention is easily concentrated where inclination also leads. Whatever is discovered by the pupil while thoroughly aroused is of most lasting value. The ideas which school men have for centuries been trying to beat into the minds of children by senseless and dull repetition have been found to be easy of acquisition and in many instances matters almost of intuition if they may first be brought into the consciousness in a natural manner.

The instructor who has not the time nor the tact and invention needed to open the minds of his pupils first and then arrange matters so that self-directed activity will follow, will have a great deal of hard work before him if he hopes to compete with those who have found the secret of the mind's growth and act upon it intelligently. Such teaching cannot produce the results which are now being acquired in our best schools.

A whole system of education could be arranged with bird life as material for arousing and fixing the interest of the learner. But this is not our purpose. A whole system should take in all of the universe that is capable of interesting the learner. Our purpose is to take the most intensely absorbing field and show how it may be tilled. Birds are used because so much more and better activity is to be secured by using them as the material for school work than from any other. [Pg 54]

Why birds are so commanding to the growing mind will become clear to one who will patiently follow the thought in the remainder of this article. In avoiding technical terms the statement has been weakened, but it is believed that those who would enjoy the reading better if the terms were technical and closely accurate do not need to have the matter stated to them at all. Hence the statement is made in the terms of common speech with the object in mind of giving the reasons to those not much accustomed to the terms used by writers on psychological topics.

The mind is somewhat like the eye. It takes in whatever is before it. It is never concentrated upon one object alone, but has to occupy itself to some extent with the surroundings of the object. It is impossible to fix the mind, or the attention, exclusively upon one thing. We frequently ask our pupils to do this, but it is impossible. The mind at any one instant resembles the surface of a wave of water, part of what it carries is low, another part higher, and some other things are highest. But few things can be at or near the crest at once. Many things are around the base. As with the eye a few objects are at or near the focus, many things are where they are sensed but are not in the supreme position. And as the wave of water runs along its course so the mind moves forward. It will either run directly away from the subject or it will turn the subject over and carry it along in continually changing aspects. The mind cannot stand still. It cannot keep anything more than an instant except by turning the thing about and perceiving it in relation to other things. We still consider we have the thing in mind after we have ceased to think of it as a whole and pass on to thinking of its relations to other things.

The mind differs from the wave of water in that it is not extensive to the right and left of its course. It is like a hill with a small crest that can hold but few objects upon its surface. When we say we are thinking profoundly upon a subject we mean that that subject and its connections are continuously upon the crest of the wave, and that unrelated things are either not in the mind at all or they are at least not at the focus.

The things that are in the mind but not focal are continually striving, as if they were alive and very active to get at the focal point. Just as the eye is continually tempted to wander, making one object after another its focal one, so the mind is bound to travel unless it has been trained to turn from the thing to its relations and related things and from them back to the main thing again. That is the only way to pay attention. You cannot pay attention to one physical thing for more

than an instant. But you can hold a chain of connected things running through the mind, but the things are continually modified by their relations and the absolutely same thing is never again in the mind. When it appears again it is clothed upon or enlarged or modified by what the mind has discovered about it and its relations or has invented and attached to it.

It is easy to repeat the multiplication table without having it focal in the mind. You may read half a page of print with your focal point upon some other matter. You may pray and find in your mind at the same moment a wicked thought. Worse than this, you may continue your prayer and the [Pg 55] wicked thought may become focal. Not by your desire that it shall be so, but by the power of marginal things in the mind which makes them focal without your apparent anticipation or desire to have them at the focus. You cannot say that the multiplication table is not in the mind when you are repeating it and wondering who will be at the party this evening. It is there but not focal. When you are reading the words of the page the words may be in your mind, but the focal point may be occupied at the time by wondering how the baby learned to climb so young and guessing whether you ought to catch her or run the risk of her falling, and if she should fall how much she would be injured, what the people would think of you for sitting there and letting her fall, why babies have to fall so much, whether they really learn much about slipping or center of gravity by falls so early in life, and a thousand other items in child study. But the reading is in your mind much as it used to be when your teacher said to you, "Now I want to see you keep your eyes on your book for fifteen minutes without looking off."

The mind grows at first by use of the senses. The sight is the main instrument of youthful mental growth. Things which can be seen or visually remembered are most appropriate subjects for juvenile thinking. You cannot well converse with children upon the pleasures of hope, the uses of adversity, nor any of the forms of mind stuff that are called abstractions. True, they like to play upon words and commit them to memory so as to reproduce them. But this is not because of the real meaning of the words committed but because the ear is pleased. Children enjoy talking like adults as well as looking and acting like them in their unstudied masquerades.

The proper material for juvenile mind action is what may be acquired by the senses. All those subjects in the second paragraph of this article are mainly appeals to the senses. These readily become focal in any mind, but chiefly in the mind that has never been trained away from the senses by abstract thinking. No child can pay attention to anything else when a bird flies in at the window. The bird and its act, its motive, its fellows, its appearance, its nest, its young, and a thousand other notions rush to the focus of his mind, no matter how diligently he may strive to keep them down. Instead of repressing in the mind what is naturally inclined to become focal, education is now finding out the value of permitting these things to come naturally into the mind and so operating upon them that mental growth ensues with little or no friction, and without asking the learner to flagellate himself continually that he may have knowledge to use in that distant and half-believed-in time when he shall be a man.

Everyone knows that children are delighted with colored pictures. But there is an intensity of delight aroused by a certain class of colored pictures which has been a matter of surprise to most educators and parents since color photography has become practical for illustration. Infants in arms, who have never seen any birds except a few of the size of a canary, are so fascinated with the bird charts that psychologists have found a new problem presented.

If we look upon the child as he views an accurate colored picture we note that he is affected just the same as if the bird itself were before him. His imagination carries him beyond the picture to the thing itself, even in the instances where he has never seen the bird nor any like it. As to his [Pg 56] mental state, we can say that the bird rises directly to the focal point in his mind, and it is not the bird picture that holds him but the bird itself. For teaching purposes this is peculiarly fortunate, for the child is ready to grasp any suggestion from the teacher in order to enjoy the bird more at length. All the subjects of school work will ordinarily appeal to the child, rising readily into the focus of attention where the bird, its relations, its acts, and things pertaining to it, become the material for school activity.

This liveliness and readiness are not so manifest where mounted specimens are used, because the element of death becomes focal at the first instant, is displaced with difficulty, and continually recurs with sickening frequency during the exercise. The acts associated with the capture and death of the bird are too dangerously strong to be avoided. They should by no means be suggested.

Mr. Aima B. Morton puts it in this way: Why do children like colored pictures to abstraction? Because the child is father to the man. And what do we love more than tone and color, music and pictures? It is an inherent quality, the soul of life leading us back to nature, the All-mother. We have hung up pictures and maps of a poor quality before the class for years, and then lectured away at them *ad infinitum* and *ad nauseam*, thinking, because we understood, that the child also understood. But this is not so. We nearly always suppose too much, especially in lower grades.

Diesterweg said: "If you speak about a calf in the school room, bring it in and show it." This principle is still true to-day. All things in nature, as far as possible, should be present *in propria persona*. Where not possible, we must try to approach that ideal by bringing the very best, and natural pictures of the objects, that is colored ones, and the vivid imagination of the child does the rest. It does not see the picture, the object itself is there, nature has entered the school room.

So we learn that bird study, aided by color photographs, is psychologically the most valuable means to the attainment of school ends. It is attractive to the young mind because it furnishes

material which rises most readily to the focal point in the mind. It relieves teacher and pupil of the strain attendant upon work where it is difficult to get the class to "pay attention." It is chiefly adapted to growing minds. No matter how strongly the matured mind with its powers of abstract thinking may be drawn toward it, it is yet more attractive to the mind that has not been trained to any sort of restraint. To get the best results, bird study should not be conducted with a view to storing the child's mind with scientific knowledge, nor for the sole purpose of employing it effectively to teach language and other branches of school effort. But it should be pursued as a mode of activity which develops mind, acknowledging the fortunate circumstance that school learning and bird knowledge will both be acquired at the same time, although they are not the direct objects of the pursuit.

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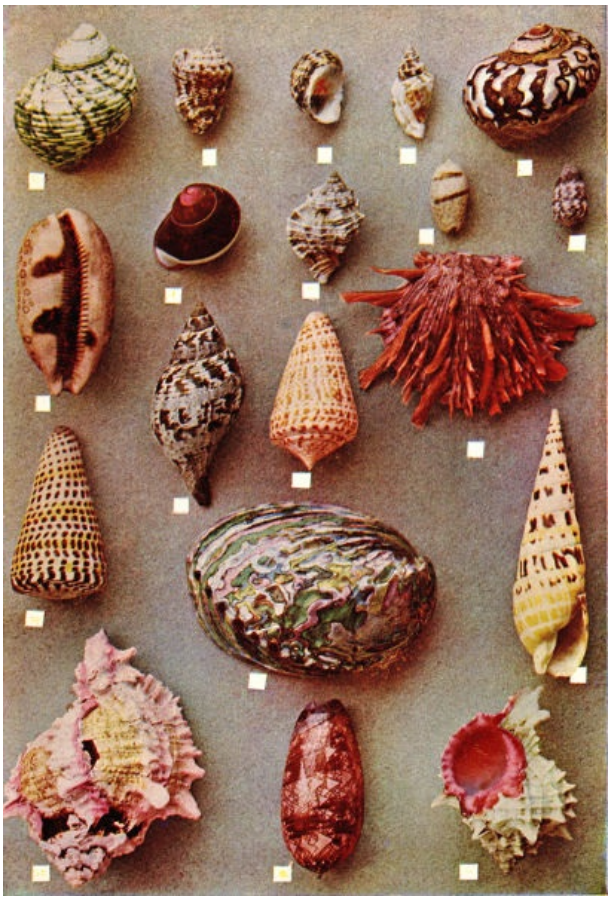

Shells kindly loaned by J. M. Wiers..

SHELLS.

CHICAGO:
A. W. MUMFORD,
PUBLISHER.

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SHELLS AND SHELL-FISH

	Scientific Name.	*Common Name.*	*Named by*	*Where Found.*
No. 1.	Turbo Argyrostoma.	Silver Mouth.	Linn.	Singapore.
No. 2.	Strombus Bituberculata.	Kid Conch.		West Indian Islands.
No. 3.	Nerita Peloronta.	Bleeding Tooth.	Linn.	West Indies.
No. 4.	Strombus Urceus.		Linn.	Amboina.
No. 5.	Turbo Sarmaticus.	Turk's Cap.	Linn.	Algoa Bay.
No. 6.	Cypræa Argus.	Eyed Cowry.	Linn.	New Caledonia.
No. 7.	Helix Hæmastoma.	Red Mouth Snail.	Linn.	Ceylon.
No. 8.	Murex Pomum.		Smet.	Florida.
No. 9.	Oliva Inflata.		Linn.	Singapore.
No. 10.	Conus Arenatus.	Sandy Cone.	Hwass.	Red Sea.
No. 11.	Fasciolaria Tulipa.		Linn.	West Indies.
No. 12.	Conus Leoninus.		Gmelin.	Florida.
No. 13.	Spondylus Pictorum.		Chem.	California.
No. 14.	Conus Litteratus.	Lettered Cone.	Linn.	Ceylon.
No. 15.	Haliotis Iris.	Green Abalone.	Gmelin.	Japan.
No. 16.	Terebra Maculata.	Marlin Spike.	Linn.	Sandwich Islands.
No. 17.	Murex Regius.	Red Murex.	Wood.	Panama.
No. 18.	Oliva Porphyria.	Tent Shell.	Linn.	Panama.
No. 19.	Murex Bicolor.	Pink Murex.	Val.	Mexico.

WHO does not love the beauty of shells? Who, when visiting the sea-shore, has not sought them with eagerness? Their beautiful colors are pleasing to the sight.

The Indians have always loved shells on account of their bright colors. No doubt they many times tried to paint their faces the same color. They used to make money from the pink or purple portions of them.

There are thousands of different kinds of shells. To get the full beauty of them we must see them in their native homes amidst the sands and stones and the roaring sea.

Mr. Emerson tells of finding the "delicate shells on the shore," and how the fresh waves seemed to add new beauty to them. He wiped away the foam and the weeds and carried them home. He could not take the foam and waves and sky and ocean's roar. He says the shells

"Had left their beauty on the shore,
With the sun and the sand and the wild uproar."

Did you ever place a large shell to your ear and listen to its roar? It sounds like the distant roar of the sea. Mr. Wordsworth says:

"I have seen
A curious child, who dwelt upon a tract
Of inland ground, applying to his ear
The convolutions of a smooth-lipped shell;
To which, in silence hushed, his very soul
Listened intensely; and his countenance soon
Brightened with joy, for from within were heard
Murmurings, whereby the monitor expressed
Mysterious union with its native sea."

We can not all go to the sea to study its wonders. So we will have to do the best we can studying pictures of shells, making collections of as many kinds as possible and studying about the animals that have lived in them.

Each shell, it matters not how small, has been the home of a living creature. Each has an interesting story for us if we will but read it.

Shell-fish have no bones as other fish have. They, therefore, need a solid house in which to live. The shells not only serve them for houses, but for bones to keep their pliable bodies in shape, for ships in which to sail, and for beautiful dresses, starched and shining.

If these soft animals had no solid shells they would immediately be eaten by other animals of the sea or dashed to death by the waves.

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But it is not alone the beauty of shells that renders them interesting. Conchology, which treats of shells, is as a science at least as old as the days of Aristotle, the study of which was resumed, along with that of the other sciences, when the dark ages had passed away. Since the beginning of the nineteenth century it has given place to a more extended and comprehensive study of molluscous animals, the presence or absence of a shell having been found not to constitute one of the most important characteristics which distinguish different classes of mollusks. Conchology was only the form of the science suited to a time when the shell was more considered than its

inhabitant. Yet it is claimed that the relations between shells and the mollusks which possess them are such that the labors of the merest conchologists have contributed to the real advancement of science, both zoölogical and geological.

Shells consist of carbonate of lime secreted by the animal and intermixed with some animal matter. In the species in which it is least developed it appears as a hollow plate, which serves as a protection to the breathing organ and heart. The protuberances and ridges seen on many univalve and bivalve shells appear in the course of their growth by the margin of the mantle, turning out at a considerable angle and thus building up a plate in this position for a certain distance. This growth then ceases, the mantle retracts, or may be regarded as changing itself into the shelly layers, and thus it extends in the original direction, carrying out the shell with it, till it turns again to form a second plate or ridge; and so the process goes on. Many mollusks possess the power of altering and enlarging their shells to adapt them to their growth, which they appear to do as if by an intelligent will.

The distinguishing marks of shells are the number of parts of which they are composed, and their peculiar forms and prominences. Some consist of a single piece, some of two pieces, and some of three. The textures of shells are described as pearl, fibrous, horny, and some are glassy and translucent. The pearly shells are in alternate layers of very thin albuminous membrane and carbonate of lime, which by their minute undulations give the pearly lustre. This structure is the least permanent and in some geological formations the shells that were provided with it have disappeared, leaving only their casts, while those of fibrous texture are preserved unchanged. Colors, however beautifully exhibited upon the surface of shells, are to them no more distinctive features than to the minerals and flowers upon which they are also prominently displayed. They are most richly developed upon those surfaces most exposed to the light and in the class of shells found in shallow waters.

The whole number of species of molluscous animals known is estimated at about twelve thousand recent and fifteen thousand fossil. Many of the living species furnish wholesome food, and some are esteemed as delicacies. The marine shells, by the immense numbers in which they are produced, perform an important office in abstracting from the sea-water its excess of calcareous matter and thus aid in maintaining its purity.

As objects of beauty, shells have always been admired and frequently been used as ornaments. Some varieties were used by the Athenians as ballots, with the name upon them of the person to be banished, whence the term ostracism. Some shells have served the purpose of coin among rude nations. Others are noted for the pearls which are secreted between their valves around some foreign substances. Mother-of-pearl is the polished shell of nacreous. Rare species of shells are highly prized by collectors, and single specimens have been sold for large sums. The South Sea Islanders use the conch as an instrument of music, blowing into the shell through the broken top, thereby producing a loud and mellow sound. It is a species of sea conch which is represented by the god Triton. In many rural parts of the United States conches are used in place of dinner bells or tin horns to call persons from a distance.

THE FLOWN BIRD.

R. H. STODDARD.

The maple leaves are whirled away,
  The depths of the great pines are stirred;
Night settles on the sullen day
  As in its nest the mountain bird.
My wandering feet go up and down,
And back and forth, from town to town,
Through the lone woods and by the sea,
To find the bird that fled from me.
I followed, and I follow yet,
I have forgotten to forget.

My heart goes back, but I go on,
  Through summer heat and winter snow;
Poor heart, we are no longer one,
  We are divided by our woe.
Go to the nest I built, and call,
She may be hiding after all,
The empty nest, if that remains,
And leave me in the long, long rains.
My sleeves with tears are always wet,
I have forgotten to forget.

Men know my story, but not me
  For such fidelity, they say,
Exists not—such a man as he
  Exists not in the world to-day.
If his light bird has flown the nest,
She is no worse than all the rest;
Constant they are not, only good
To bill and coo, and hatch the brood.
He has but one thing to regret,
He has forgotten to forget.

All day I see the ravens fly,
  I hear the sea-birds scream all night;
The moon goes up and down the sky,
  And the sun comes in ghostly light.
Leaves whirl, white flakes about me blow—
Are they spring blossoms or the snow?
Only my hair! Good-bye, my heart,
The time has come for us to part.
Be still, you will be happy yet,
For death remembers to forget!

FOREST PARK, SPRINGFIELD, MASS.

THIS is one of the most beautiful public parks in the United States. In his annual report, which is a handsomely printed and illustrated volume, President Marsh says that while there are few changes during the year in the make-up of the big family of birds and animals that compose the zoölogical and ornithological department, it continues to be an ever-increasing source of pleasure to the thousands of persons who visit the park for recreation, and no part of the park is more thoroughly appreciated. The departure from the usual plan of park menageries in arranging an exhibit of domestic animals has been a marked success, giving to the park visitors a chance to become acquainted with the more common breeds of the higher types of our domestic animals, an education in which the average city resident is sadly lacking. The exhibit of thoroughbred cows has been especially a source of pleasure and instruction. The collection comprises seven thoroughbred cattle, no two of the same breed, and children and grown people alike take delight in visiting the barns to see these splendid animals, finding it as instructive as it is entertaining.

This is a departure that might be favorably considered by other boards of park commissioners. All of the domestic animals of superior breed might be annually exhibited with great advantage to the general public.

The ornithological and zoölogical exhibits of Forest Park are hardly surpassed anywhere, containing as they do one hundred and eighty-nine specimens of animals and three hundred and ninety-seven of birds.

MARBLES.

CHICAGO:
A. W. MUMFORD,
PUBLISHER.

OLD TENNESSEE.

ALPS GREEN.

SIENNA.

MEXICAN ONYX.

FLORENTINE VERMONT.

AFRICAN MARBLE.

MARBLES

MR. GEO. D. MERRILL,
Head Curator, Department of Geology, U. S. National Museum.

THE origin of the name marble, like that of many another name now in common use, is somewhat obscure. By many authorities the word is supposed to have been somehow connected with the Greek word meaning "sparkle." However this may be, a sparkling appearance is by no means universal among marbles, but is limited to those which, like the white statuary or other crystalline varieties, have a granular structure, the sparkling itself being due to the reflection of light from the smooth surfaces of the constituent minerals. As used to-day, the word marble is made to include any lime rock of such color and hardness as to make it desirable for ornamental, or even the higher grades of building work. Stones of precisely the same composition and origin, which are not of the desired color, are classed simply as limestones.

Accepting the definition given above, it follows, then, that with a few exceptions, to be noted later, marbles are but hardened and otherwise changed beds of marine sands and muds, containing, it may be, still recognizable fragments of the corals and mollusks of which they were originally composed. But inasmuch as these muds were rarely of pure carbonate of lime, but were contaminated with matter from seaweeds and animal remains, or by iron compounds, so the resultant marble is not always white, but, if containing matter from plants or animals, gray, blue gray, or even black; and if containing iron, buff, pink, or red. If the change in form of the original muds was just sufficient to produce crystallization, we may have a marble full of fossil remains which may be of a white or pink color, standing out in fine contrast with the darker ground. If, on the other hand, the change was complete, we may have a marble of small granules, pure white in color, and of a texture like loaf sugar, such as to render it suitable for statuary purposes.

At one early period of the geological history of the North American continent, all that portion now occupied by the Appalachian mountain system was sea bottom, and on it was being deposited not merely sediments washed down from the land, but, in favorable localities, deposits of lime, sand, and mud. This deposit went on, on a gradually sinking floor, for long ages, until the lowermost beds were buried under thousands of feet of the later formed materials. Then began the slow uplifting of the sea-bottom in the form of long, parallel folds to form the mountain ranges. During this uplifting the lime sediments, which are the only ones we need consider here, were changed to marbles, and have since been exposed and made available to the quarriers through the wearing-down action of rain and running streams. So, then, a quarry is but an excavation in the hardened mud formed on the bottom of a very ancient sea.

In the Vermont marble region the beds are highly inclined and of varying colors. From the same quarry there may be produced pure white, gray, blue-gray, and greenish varieties, often variously veined and blotched owing to the collection of their different impurities along certain lines. Some of these quarries have been worked a depth of two hundred feet and more.

Not all marble beds are upturned at this steep angle, however, nor have they been worked so deeply. In Georgia, the quarries are often in hillsides, extending scarcely at all, if any, below the surface of the ground. Where opened in the valley bottoms they have the form of huge rectangular pits, with perpendicular walls. In Tennessee, many of the sediments were so slightly changed that the fossil remains are still easily recognized, and the stone is of a pink or chocolate red color, owing to the abundance of iron.

The marbles are quarried mainly by channeling machines, which cut out the stone in blocks of any desired size, or at least in sizes such as the nature of the beds will allow. Blasting is never resorted to in a properly managed quarry, since the shock of the explosion is likely to develop flaws in so tender a material. When freed from the quarry bed and brought to the surface the stone is sawn into the desired shapes by means of "reciprocating" blades of soft iron, the cutting material being sand, washed under the blades by small jets of water. [Pg 65]

The use to which any particular marble is put is governed largely by its price and color, though texture or grain often are taken into consideration. The coarsely crystalline white and white clouded marbles of southern New York, Maryland, and Georgia, are used almost wholly for building purposes; the pink and variegated marbles of Tennessee for interiors and for furniture; while the white and blue-grays of Vermont find a large market for interiors, cemetery work, tiling, and, to a much smaller extent, for building.

It was stated before that not all our marbles were changed (metamorphosed) marine sediments. The exceptions are (1) the onyx marbles, which, though composed of carbonate of lime, like the last, are deposited from solution, and (2) the so-called verdantique marbles, which are mainly altered eruptive rocks. These last differ widely from those we have been describing, being of a prevailing green color, though often variegated with white or red. They are, in fact, not to be classed with the lime rocks at all. The names *verdantique*, *verte antique*, and *verde antique* are but varying forms of the same words, indicating a green antique marble. The term antique has been applied simply because stones of this type were used by the ancients, and particularly by the Romans.

The so-called onyx marbles are, as noted above, spring deposits, differing from ordinary lime deposits only in color and degree of compactness. The name has also been made to include the

stalagmites and stalactites in caves, such as were used by the ancient Egyptians in the construction of alabastrons, amphoræ, funeral urns, and various household utensils. The material is translucent and often beautifully clouded and veined in amber, green, yellow, and red colors. Owing to its mode of origin it shows a beautiful wavy banding, or grain, like the lines of growth in the trunk of a tree when cut across the bedding. This fact, together with its translucency, has been the cause of the wrong use for it of the name onyx, which properly belongs to a banded variety of agate. Equally wrong and misleading is the name "oriental alabaster," which is commonly applied to the Egyptian variety, the true alabaster being a variety of gypsum.

The larger part of our onyx marbles comes to-day from Mexico, though there are equally good materials of this type in Arizona and California.

The foreign supplies come in part from Egypt. Their use is almost wholly for interior decoration, as wainscotings, and the like, and for tops to small stands, bases for lamps, and so forth. These are by far the most expensive of all the stones to which the name marble is properly applied.

Some of the most noted of our foreign marbles are those of Carrara, Italy, which are ancient sediments thought to have been changed at the time of the uplifting which formed the Apennines. They are of white and blue-gray colors, sometimes beautifully veined. A beautiful, mellow yellow to drab variegated variety, very close in texture and almost waxy in appearance, is found near Siena, and is known as Siena marble. It is a great favorite for interior decorative work, as may be seen to advantage in the vestibule of the new public library building in Boston, and the rotunda of the National Library building at Washington.

Other marbles, which at the present time are great favorites with the architects, are the so-called Numidian marbles, from Algeria. These are of yellow, pink, and red color, and often beautifully mottled. Their textures are so close that they take a surface and polish almost like enamel. Since their first hardening these beds have been shattered like so much glass into countless angular fragments, and then the whole mass, with scarcely any disturbance, once more cemented into firm rock. The result is such that when large blocks are sawn into slabs, and the slabs then polished and spread out, the same series of veins, of angular blocks and streaks of color, may be traced from slab to slab, even repeating themselves with only slight changes throughout the entire series.—*Nature and Art.*

THE WHIPPOORWILL.

MRS. MARY STRATNER.

A VALUED pet of ours is the whippoorwill or *Antrostomus vociferus*. When most of the other songsters have tucked their heads under their wings our whippoorwill wakes up to the business of the night.

First, he darts about catching insects and moths for his babies' breakfast—for this is their breakfast time—or if his babies are not hatched he takes the insects to the faithful mother-bird on the nest. After this is done he thinks his business cares are over, and he feels free to enjoy himself.

Our especial whippoorwill always selects the same spot, year after year, just about ten yards from our front door, in a clear white space on the shell-walk, and there, squatted on the ground and facing us as we sit on the piazza in the moonlight, he vociferously demands that we "whip poor Will." This demand he keeps up for a minute or two. Finding that we do not intend to heed his request, as our sturdy six-year-old Will objects, he commences a low muttering kind of grumbling.

Suddenly he has a new idea and he now orders us to "Chuck Will's widow! Chuck Will's widow!" but this order, too, goes unheeded, as our Will has no widow, and if he had why should we chuck her?

Now he does some more grumbling and finally flies away. We had almost forgotten him, when back he comes and squats in the same place. First he gives a low "Chuck, chuck;" then cries out shrilly, "You free Wheeler! You free Wheeler!" We know of no Wheeler who needs freeing, so again we cannot comply with his wishes.

Then, as if disgusted with our unresponsiveness, he flies up in a near-by orange tree where he laments somewhat like an Irishman: "O whirr-r, whirro! O whirr-r, whirro!"

He keeps this up so long that it causes some sleepy boy to say: "I wish that old bull-bat would be still." And sometimes the boy feels tempted to get up and drive him away, but he remembers in time that this feathered friend rids us of many obnoxious insects. For this reason the southern whippoorwill, or bull-bat, is protected by law in many of the states.

We know where *our* whippoorwill nests every year in May, and we often pay the mother-bird a visit in order to get a peep at her brown speckled eggs, and later at her two brown babies; but we never bother them, contenting ourselves with taking their picture with a kodak.

This last is very difficult to do, for mamma whippoorwill always selects a dense, shady part of the woods for her motherly duties. The nest is flat on the ground, generally under a palmetto leaf, which keeps off the rain. It is composed of dry leaves which seem to have been just scratched together, and is not noticeable unless the bird is there. Even then, the brown color of the bird blends with that of the ground and leaves, so that it takes sharp eyes to detect her.

When the young birds first leave the nest they sprawl about in a comical manner. When in repose they squat flat on the ground, with wings spread out to the fullest extent, and they keep up a rolling motion with their bodies from side to side, for all the world as if they wanted to roll over, but were prevented from doing so by the position of their large wings.

TWILIGHT BIRDS.

COLE YOUNG RICE.

Swallow, I follow
  Thy skimming
Over the sunset skies—
Follow till joy is dimming
To sadness in my eyes.
And hollow seems now thy twittering
High up where the bittering
Night-blown winds arise.

Throstle, the wassail
  Thou drinkest
Daily of chalice buds—
Wassail in which thou linkest
Thy notes of springtime moods—
Should docile thy elfish fluttering
Where twilight is uttering
Sorcery through the woods.

Plover, thou lover
  Of moorlands
Drained by the surfing sea—
Lover of marshy tourlands,
What is the world to thee?
Nay rover, wing on unquerying
O'er mallows ne'er wearying
Over the pebbly sands!

But sparrow, the care o'
  Thy nesting
Pierces thy vesper song—
Care o' the young thy breasting
Shall warm through the blue night long—
Till, an arrow, seems thy dittying,
Of pain to the pitying
Heart that knows earth's wrong.

AWESOME TREES.

WE made a side trip to the big trees of the Mariposa group, which are about one hour's ride from the hotel, says a correspondent of the Pittsburg *Dispatch*. If the smallest of these trees could be planted anywhere in Pennsylvania the railroads would run excursion trains to it and make money. The trees in this grove are so large that it takes a good while to fully appreciate the facts about the size of the biggest of them. The "Grizzly Giant" is thirty-four feet through at the base and over 400 feet high. This tree would overtop the spires on the Pittsburg cathedral by over 100 feet. The trunk of this tree is 100 feet clear to the first limb, which is twenty feet in circumference. Many other trees here are very nearly as large as this one, and there are 400 in the grove. Through several tunnels have been cut and a four-horse stage can go through these tunnels on the run and never graze a hub. You get an approach to an adequate idea of their size by walking off 100 yards or so while the stage is standing at the foot of a tree and glancing from top to bottom, keeping the stage in mind as a means of comparison. The stage and the horses look like the little tin outfit that Santa Claus brought you when you were a good little boy.

These trees are no longer to be called the largest in the world, however. A species of eucalyptus has been found in Australia as large or larger. Emerson warns us against the use of the superlative, but when you are in this region of the globe you can't get along without a liberal use of it. He himself says of Yosemite: "It is the only spot I have ever found that came up to the brag." And as I stood in the big tree grove I remembered that some one called Emerson himself "the Sequoia of the human race."

THE EDGE OF THE WOOD.

ELLA F. MOSBY.

THE ideal place for birds, says Mr. Frank Chapman, is the edge of the wood where field and forest meet, and a stream is not far off. If an orchard be in sight, so much the better. It was my delight to spend a summer, or part of it, in just such a spot not long ago, and I made many charming discoveries here. In the first place I learned that it is by no means necessary for birds to "be of a feather" in order "to flock together." I came one bright morning on a flock of indigo buntings near the water's edge, the proud father, in exquisite blue, like finest silk, with shimmering lights of green playing over it, the mother in siena brown, and the babies, neither blue nor brown, but a sooty black, with only a solitary wee feather now and then to show the blue that was coming. What an odd, but what a pretty, happy little family!

The banks of the stream were thickly overgrown with milk-white elder, orange butterfly-weed, and a thousand feathery grasses and nodding leaf-sprays, already touched on edge with crimson or gold "thumb-marks." On the tall stalks swung the goldfinches, "a little yellow streak of laughter in the sun," and every stake or post in the fence near by made a "coigne of vantage" for the merry wrens to call and whistle. The calls of birds express, bird-fashion, every feeling that the heart of man knows—surprise, fear, joy, hope, love, hate, and sorrow. If we could only contrive to think *bird-thoughts*, as perhaps an Audubon may have done, or a Wilson, we might understand these strange signals and cries, often uttered by invisible speakers from a world above ours.

I learned at this time that the quails, or Bob-Whites, have many calls instead of the *one* from which they are named. There is the low, sweet mother-talk to the brood, the notes of warning, the "scatter calls" of autumn from the survivors of an attack, "*Where are you? Where are you?*" and a sort of duet between male and female at nesting time. When she leaves the nest, she calls "*Lou-is-e!*" and he strikes in on the last syllable with "*Bob*;" she repeats, and he bursts forth "*Bob White*!" with emphasis. Then the clear, ringing whistles through midsummer sound up and down the meadow from one quail to another. The old farmer interprets their colloquy thus:—

"Bob White, Bob White,
  Pease ripe, pease ripe?"
"Not quite, not quite."

These birds are very tame during the spring and fall, and will come into town, on the edges of the streets, and call from roof and door-step without fear, sometimes even mounting into a tree close beside a window and whistling for an hour or two.

On the contrary, it is by the edge of the wood and after the brood is reared, that tree-top birds, like tanagers and cardinals, grow most friendly and fearless. Frequently, when I raised my glasses to look at some plain brown or gray bird, the scarlet of a tanager would flash across the field, and the rose glow of the cardinals appear in the grass. The female cardinal, with her lovely fawn tints and rose linings, and her beautiful voice, equals the male in interest. She is a bird of lively emotions, and being rebuffed by a catbird one day, made the lawn ring with her aggrieved cries, while her mate sought to comfort her most tenderly. They are not graceful on the ground, but they have a stout air of proprietorship that is not unpleasing. Both of our tanagers, the summer and scarlet, the cardinals, and the brilliant orioles, live together very peaceably, nor have I seen any sign of envy, malice, or spite among them. I suppose each one of us has his own Arcadia; mine—and that of these winged neighbors—assuredly lies at the boundary-line between shadowy forest and sunny meadow—at the edge of the wood!

268. ORES. CHICAGO: A. W. MUMFORD, PUBLISHER.

SPECIMENS AT TOP OF PAGE ARE GOLD BEARING ROCK.

SILVER QUARTZ. NATIVE COPPER. TIN ORE. B. H.

NICKEL PYRITES. LEAD CRYSTALS. BLUE CARBONATE COPPER.

SPATHIC IRON ORE. KIDNEY IRON ORE. ZINC ORE. NEEDLE IRON ORE.

ORES.

NICKEL is a silver-white, ductile metal, discovered by Cronstedt in 1751. It is closely allied to iron and cobalt, and is associated with many ores. Nickel, according to Deville, is more tenacious than iron. It is magnetic at ordinary temperatures. Many of the copper coins of the European continent and the United States are alloys containing various proportions of nickel. Nickel-plating has become an industry of great importance in the United States. It is used for magnetic needles, for philosophical and surgical instruments, and in watch movements.

SPATHIC IRON ORE.—Carbonate of iron, when found in a comparatively pure and crystallized state, is known as spathic or sparry. In its purest form it contains 48 per cent. of iron. The ore is found near Hudson, N. Y., and in Tuscarawas county, Ohio.

COPPER.—Copper is one of the most anciently known metals, and its name is derived from the island of Cyprus, where it was first obtained by the Greeks. In the earlier times it does not appear to have been employed by itself, but always in admixture with other metals, principally tin, forming bronze. Great masses of native copper have been found both in North and South America.

TIN.—Tin is a beautiful silver-white metal, with a tinge of yellow. There was no tin produced in the United States in 1896. The tin-producing countries are Malacca, Banca, Bolivia, Australia, and Cornwall.

ZINC.—A metal of a brilliant white color, with a shade of blue, and appearing as if composed of plates adhering together. It is not brittle, but less malleable than copper, lead, or tin; when heated, however, it is malleable, and may be rolled into plates.

LEAD.—A metal of a dull white color, with a cast of blue. It is soft and easily fusible. It is found native in small masses, but generally mineralized by sulphur and sometimes by other substances. It is the least elastic and sonorous of all the metals.

YOUNG WILD BIRDS.

THE thickness of the foliage on the trees, the high vegetation of the cultivated land, and the natural tendency of young birds to keep quiet and still, make the study of them a matter of some difficulty. In the hedgerows and by the wood-sides unfamiliar notes and calls of birds are constantly heard—the notes of young birds, which cannot be identified owing to the thickness of the foliage, and though in the large woods the cry of the young sparrow hawks and the flight of the pigeons and woodpeckers betray their presence, it is almost impossible to watch them, or to ascertain their way of procuring food. Probably most of the larger species are fed by the old birds long after they leave the nest.

Of game birds, young partridges are the most self-reliant, and young pheasants the least able to take care of themselves. The present writer has never seen young quails, but as those coveys which are hatched in England often number as many birds as the quail usually lay eggs, it may be presumed that these, the smallest of all the game birds, are not less active and precocious than the young of the partridge. The latter are almost as active upon land as young wild ducks are upon the water. They run swiftly and without hesitation, even among thick vegetation, when they are no bigger than a wren, and follow or precede their mother through mowing grass, hedgerows, or the sides of furze breaks and copses, seeking and catching insects all the while, and neither losing themselves nor betraying their whereabouts by unnecessary noise or excursions.

MANDIOCA.

ANNA R. HENDERSON.

MANDIOCA (*Jatropha Manihot L.*) is the principal farinaceous production of Brazil, and is largely raised in nearly all parts of South America; in fact, is the main bread food of that continent, and is therefore worthy of consideration.

It is difficult for dwellers in northern climes to conceive of a land which does not look largely to fields of wheat or corn for sustentation; yet millions inhabit such a region, and strange to say, derive their bread from a root which combines nutritious and poisonous qualities.

Mandioca is indigenous to Brazil, and the Indians, strange to say, discovered methods of separating its nutritive and detrimental qualities. The Portuguese, learning its use from them, invented mills for its preparation, and it became the bread food of a great tropical region where wheat and Indian corn do not thrive.

The plant has a fibrous stalk, three or four feet high, with a few branches and but little foliage; light-green five-fingered leaves. The roots are brown tubers, often several inches thick, and more than a foot in length.

It is planted from slices of the tubers and is of slow growth, taking eighteen months to mature. The poisonous quality is confined to the juice of the roots, and even this may be rendered innocent by boiling. It then becomes vinegar by fermentation. The leaves may be eaten by cattle. The roots must be ground soon after digging, as they become putrid in a few days.

The Indians scraped the roots to a pulp with oyster shells, and after pressing it, dried it before the fire, or cut it under water into thin slices which they dried.

I will now describe the Portuguese method of making farina from mandioca, as I witnessed it in my Brazilian home, a *fazenda*, plantation, near Rio de Janeiro, Brazil. The mandioca, which loves a dry soil, was grown on the hillsides among the orange and the coffee trees. It was cultivated by the hoe. When its great masses of tubers were mature they were dug and hauled to the farina house, a cool room, tile-roofed, dirt-floored, and which contained mill, presses, and drying-pans. Then the merry work began. The negroes, who love to work in company, would sing, as, seated on benches or stools, they scraped the brown skin from the tubers. These were washed and fed to the mill, while the children took turns riding the mule which pulled the creaking beam that turned the mill.

The tubers are very juicy and, on being ground, make a milky white mass, which is put into soft baskets made of braided palm leaves. These baskets are placed under a heavy screw press, and the milky juice which flows from them is caught in tubs and set aside to settle. In twenty-four hours in the bottom of the tub is a deposit of starch several inches thick. This is the well-known tapioca of commerce, extensively used for puddings and other delicate foods; good also for starching clothes. The clear juice above it, a deadly poison, is drawn off through underground tiles—that no chicken or other living creature may taste it. The damp pulp in the baskets is transferred to large concave trays of brass or copper placed over a slow fire, where it is constantly stirred until entirely dry. It is now ready for use, is as coarse as corn meal, but very white, and has a pleasant flavor, resembling popcorn. It cannot be made into loaves, as much moisture would make it too glutinous to bake. It is eaten dry or mixed with beans or other vegetables at the table, or it is dampened and salted and baked on a griddle in a hoe-cake half an inch thick. In this way it is very nice and sweet. It is a favorite breakfast dish made into a clear glutinous mush called *pirao* (pronounced *pe-rong*). Brazilians are very fond of the dry farina and throw it into the mouth by a movement so dexterous that it does not powder the face. [Pg 73]

This is the bread of Brazil. Though wheat bread is sold in the bakeshops of the cities, it is not used to any great extent in the rural regions.

There is another species of mandioca called *aipin* (pronounced *i-peen*), which cannot be converted into *farinha*. It matures in eight months and has no poisonous qualities. It is a staple article for the table, being baked like a potato, and its taste resembles that of a roasted chestnut.

TRAVELING BIRDS.

Cleaving the clouds with their moon-edged pinions,
  High over city and vineyard and mart;
April to pilot them; May speeding after;
  And each bird's compass his small red heart.
—*Edwin Arnold.*

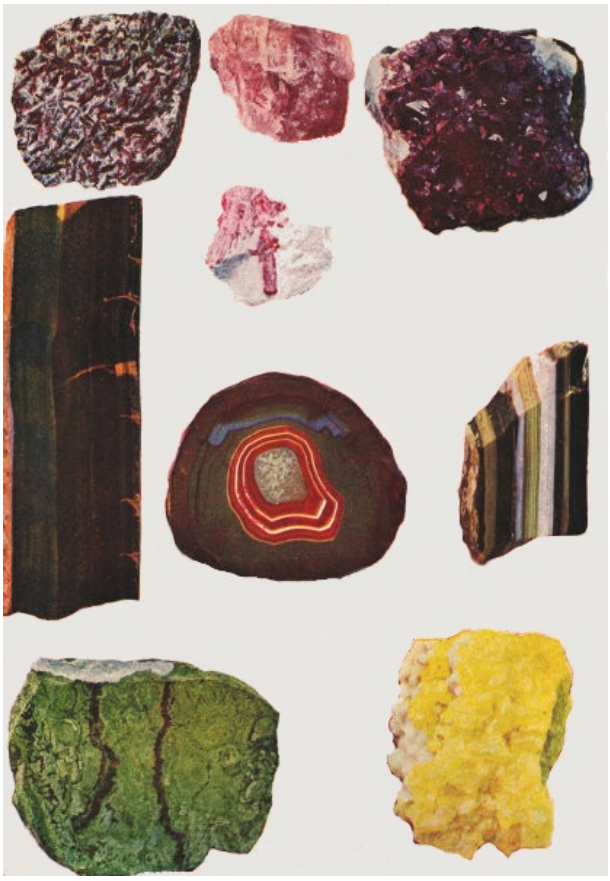
RIVER valleys, coast lines, and mountain chains are the ways followed by the migrating birds; and frequent observations have determined the fact that birds travel at great heights, many as much as a mile from the earth. This may be one of the reasons why the tiny creatures have such keen sight; for from this distance they can obtain a far-reaching view of the surrounding country and distinguish landmarks readily.

If the weather is stormy or foggy, then the birds are obliged to fly much lower; and, too, it is then that the lights along the coast attract them and such countless numbers perish by being beaten against the lighthouses, many more birds being killed in the fall season of migration than in the spring, when the weather is less stormy.

They fly in vast numbers, and often on still nights they can be heard calling to each other. A good idea of their number can be obtained by the use of a telescope, which, if focused on the moon, will often show the birds on a brilliant background so that they can readily be discerned. The motion of their wings can easily be seen in this way, and the immense numbers of them better realized.

A good way to form an idea of the distance covered each year by the birds as they migrate is to take a single bird and note its journey. The bobolink makes his winter start in August, rests awhile in the marshlands and then visits the rice belt of the Southern states, doing damage directly and indirectly each year to an amount covering several millions of dollars. Then he flies over Cuba, and there his name is *chambergo*. Next he lingers along the coast of Yucatan, then goes on south through Central America and the island of Jamaica, in which place they call him "butter-bird," on account of his great plumpness, the result of the rice-feeding, no doubt; and from this place he makes one continuous long journey for over four hundred miles to Brazil, where he spends the winter. Here he stays until early spring, and then, if no accident has come to him, he will again brighten our months of blossoms by his chipper presence and his delightful song.

One of the most curious things observed in the fall migration of birds is in this same bobolink. By some manner of means many of these birds have gone west, some as far as Utah, to spend their summers, and when the winter is coming they, too, take their flight south, but not by the direct way through Mexico, and then to Central America, as would seem most natural, but following their hereditary instincts they come back to the Atlantic coast and journey down it, along the whole way to Florida, then across to Cuba, and on with those from New Jersey and New England until the winter resting-place is reached. This bird gives a most conclusive and interesting illustration of the permanency of bird routes and the "hereditary habit" of the winged flocks. —*Bangor Commercial.*



269. MINERALS. CHICAGO: A. W. MUMFORD, PUBLISHER.

HORNBLENDT. ROSE QUARTZ. AMETHYST

PINK TOURMALINE
RUBELLITE.

CROCIDOLITE. AGATE. SERPENTINE

MALACHITE. SULPHUR.

MINERALS.

HORNBLENDE.—A mineral species, placed by Dana in the augite section of the anhydrous silicates. In common use the name is limited, as it was formerly applied only to the dark crystalline minerals which are met with in long, slender prisms, either scattered in quartz, granite, etc., or generally disseminated throughout their mass. The color of the mineral is usually black or dark green, owing to the presence of much iron. It appears to have been produced under conditions of fusion and cooling which cannot be imitated in the laboratory, the crystals obtained artificially being of augite type.

MALACHITE.—One of the native carbonates of copper. It is sometimes crystallized, but more often occurs in concretionary masses of various shades of green, which are generally banded or arranged in such a manner that the mineral, which takes a fine polish, is much prized as an ornamental stone. Great quantities of it are found in the Siberian mines, and many beautiful objects are manufactured from it.

QUARTZ.—The most abundant of all minerals, existing as a constituent of many rocks, composing of itself the rock known as quartzite or quartz rock and some of the sandstones and pure sand, forming the chief portion of most mineral veins. In composition it is silica, and when uncontaminated with any foreign intermixture it appears in clear, transparent crystals like glass or ice. Pure quartz is largely employed in the manufacture of glass and is commonly obtained for this purpose in the form of sand. Quartz veins with few exceptions form the gangues in which gold is found.

TOURMALINE.—A name applied to a group of double silicates, composed of many other minerals. The color of tourmalines varies with their composition. The red, called rubellite, are manganese tourmaline containing lithium and manganese, with little or no iron; the violet, blue and green contain iron, and the black are either iron or magnesium-iron tourmalines. Sometimes the crystals are red at one extremity and green at the other, or green internally and red externally, or *vice versa*. Pink crystals are found in the island of Elba. Tourmalines are not often used in jewelry, although they form beautiful gems and bear a high price. A magnificent group of pink tourmalines, nearly a foot square, was given by the king of Burmah to Col. Sykes, while commissioner to his court. The tourmaline appears to have been brought to Europe from Ceylon by the Dutch about the end of the seventeenth century, and was exhibited as a curiosity on account of its pyro-electric properties.

AGATE.—Of the quartz family, and is one of the modifications in which silica presents itself nearly in a state of purity. Agates are distinguished from the other varieties by the veins of different shades of color which traverse the stone in parallel concentric layers, often so thin as to number fifty or more to an inch. Externally the agates are rough and exhibit no appearance of their beautiful, veined structure, which is exposed on breaking them, and still more perfectly after polishing. Though the varieties of agate are mostly very common minerals in this country as well as in the old world, those localities only are of interest which have long been famous for their production and which still furnish all the agates required by commerce.

AMETHYST.—So named because it was supposed by the ancient Persians that cups made of it would prevent the liquor they contained from intoxicating. The stone consists of crystallized quartz of a purple or blue violet color, probably derived from a compound of iron and soda. The color is not always diffused through it, and is less brilliant by candlelight.

SERPENTINE.—Serpentine differs in composition from the other marbles. It is a soft mineral of different shades of green, of waxy luster, and susceptible of a high polish. It is better adapted to ornamental work within doors than to be exposed to the action of the weather. [Pg 77]

SULPHUR.—An elementary substance belonging to the class of metalloids. It has been known from the earliest times as the product of volcanoes, and as a natural mineral deposit in clay and marl formations. It also exists in primitive rocks, as granite and mica.

ACCIDENTS TO BIRDS.

GUY STEALEY.

STRANGE accidents happen to birds as well as to people, and some of them are as unexplainable as those that fall to our lot. I remember finding a meadow lark suspended from a barbed-wire fence several years ago, dead, its throat pierced by one of the sharp barbs. The bird had apparently attempted to fly between the wires and, miscalculating the distance, had dashed against the barb.

Another curious case which came under my notice was that of a small water bird. While walking along the bank of the river flowing through our place, I discovered the little fellow dangling from a willow, his head firmly wedged in one of the forks. He had been there some time, and how he ever got caught in that fashion is a mystery.

But the strangest mishap of all I ever witnessed occurred last summer. I was picking peas in the garden when my attention was attracted by the fluttering and half choked cries of a bird a little distance from me. Hastening to the place I found a brown field bird hanging from a pea vine. Around its neck was a pea clinger, which formed a perfect noose. As nearly everyone knows, pea clingers form into all imaginable shapes. The bird was feeding under the vines and, being frightened by my approach and in trying to escape, had thrust its head through the clinger with the above result. I soon freed it and saw it fly away but little the worse for the adventure.

To the Editor of BIRDS AND ALL NATURE:

I find your periodical most interesting and instructive, as it brings one into closer relation with all forms of life.

Better than a knowledge of Hebrew, Greek and Latin is it to know what the birds, the trees, and flowers all say, what the winds and waves, the clouds and constellations all tell us of coming events.

There is a world of observation, thought and enjoyment for those who study nature in all her varying moods that is denied those who, having eyes see not and having ears hear not.

In looking over BIRDS AND ALL NATURE I have noticed with pleasure some articles from the pen of Caroline Crowninshield Bascom that have particularly pleased me. Her interpretations of what her pet cats and birds have to say, their manifestations of intelligence, and the sentiments of affection, or envy, jealousy, and malice; their obedience and their moralities under her judicious training. A woman who can train a cat to live in harmony with a bird, to see each other caressed in turn by a beloved mistress, should be on the county school board as a successful educator. For boys and girls can be more easily trained than those in the lower forms of life. I trust Miss Bascom will not try to harmonize the cat with rats and mice, lest those natural-born thieves increase to such an extent that every municipality will be compelled to have traps and police in every nook and corner, in every cellar and garret of all our private and public buildings. There is a limit, dear Miss Bascom, to peace and good will on earth.

ELIZABETH CADY STANTON.
NEW YORK, JULY 1, 1899.

THE INFLUENCE OF PICTURES.

J. P. M'CASKEY.

IF IT is a very good thing to hang attractive pictures on the walls of the home, then it is doubly so thus to ornament the walls of the schoolroom. "In the emptiest room," says Ruskin, "the mind wanders most, for it gets restless like a bird for want of a perch, and casts about for any possible means of getting out and away. Bare walls are not a proper part of the means of education; blank plaster about and above them is not suggestive to pupils." The landscape makes a bright opening through the dead wall like a window; flowers and ferns are suggestive of the garden, the lane, the field, the woods, the purling stream; of song-birds in the air or among the branches, and blue sky overhead. Animals suggest a life with which we should be more or less familiar. The portrait speaks the man, what we know of him, suggesting trains of thought that may be most interesting and profitable.

A mother wondered why her three brave lads had all gone to sea from an inland home. She was speaking, in her loneliness, with a friend who had called upon her, and she could not suggest any reason why they should all have adopted the sea-faring life when none of their friends or relatives had been sailors. The man observed a picture of a full-rigged ship hanging above the mantel. It was perhaps the only picture in the room, at least the only one at all conspicuous. A thought struck him. "How long has that picture been hanging there?" he asked. "Oh, it has been there ever since the boys were little children." "It was that," he said, "that sent your boys away. The sea grew upon their imagination until they longed for it, and sought it, and so they are gone."

So a striking or attractive picture, in the schoolroom as in the home, may sink deep into the heart of the child, and mean far more to him than much of the work which the school program usually imposes. He may forget the name and lose all recollection of the personality of the teacher and of most of his schoolmates, but the striking picture is a picture still. That he will always remember. In our experience, as we grow older, if we are at all observant, we know more and more the value of these things—how great a factor in education they may become!

Men wonder sometimes how they can expend a modest sum of money to good purpose in giving pleasure and profit to others. Get some pictures of good faces, and flowers, and landscapes, and other proper subjects, and put them upon the walls of your nearest school-house, or of some other in which you may be interested. When you have done this for one school you may want to do it for a second, or you will suggest to some other generous heart the like gift of enduring value. What chance have boys and girls with a dead-alive teacher in a school-house whose blank walls are eloquent of poverty? Oh, the weariness of it!

Real, genuine, helpful, beautiful art is now brought within reach of the million. The arts of chromo-lithography and half-tone engraving are putting exquisite pictures, at low cost, wherever there is taste to appreciate and enjoy them. In our homes they are everywhere. Why not everywhere also upon schoolroom walls bare of these choice educational influences? To many a child good pictures come like the ministrations of the angels. We feel this, we know it; and for the years remaining to us shall do what we can to make school-life better for the pictures on the wall.

THE SEA-CHILDREN.

COLE YOUNG RICE.

"Oh, mother, I lay
A-dreaming one day
By the wreck of the Alberdeen,
And I heard a singing
Under the sea
Of children swinging—
Their hair was green!—
In seaweed swings, and they called to me—
Oh, mother, they called to me"—

"Hush, hush thee, my child!
Thy prattle is wild,
For the children that dwell in the sea
Are the fishes swimming
Amid white shells
Whose pearly hymning
But echoed to thee
The strangled songs of the sinking swells—
My child, 'twas the song of the swells."

"And, mother," they said
"Come to us!—oh, dread
Not the waves tho' they fret and foam;
They're far, far over
Us while we play
Beneath the cover
Of our sea-home,
All day, all day o'er the beds of the bay!
Oh, mother, the beds of the bay!"

"Hush, hush thee, my child!"—
But strangely he smiled
As he gazed at the weird-lit waves.
For he heard a singing—
"Come to us, come!"
He saw them swinging
In crystal caves,
And cried, "I'm coming! I'm"—ah, how numb
His death-dewy lips—how numb!

NATURE STUDY IN THE PUBLIC SCHOOLS.

AT THE Shaw banquet in St. Louis the subject for the evening was "Horticultural Education," and a good deal was said as to the introduction of the study in the public schools.

On the question of its interfering with other school work, Prof. Jackman of Chicago said: "The intimation has been thrown out here to-night that perhaps the child's study of nature might interfere with something else in the schools. I can assure such objectors that it will interfere with some of the things they are taught. It will interfere with some of the dull routine that you and I can recollect, which we passed through when we were in these schools. The children have waited all too long for such an interference."

State Superintendent of Schools Kirk, said: "It is my firm conviction that a large part of what we now call 'geography' should be eliminated from the school curriculum. Much of it is so worthless or misleading as to retard education and exhaust the children's energies without any definite purpose. Children should learn about the country they live in, rather than the remote regions of Asia and the Arctic Zone."

One speaker declared that the recreation time can be restfully utilized for nature-study work. Memory is good but observation is better, and teachers are asking for specimens of fruits, nuts, grains, grasses, woods, leaves, twigs, buds, and flowers.

BIRDS AND ORNITHOLOGISTS.

BIRDS has entered upon a new year with the satisfaction of having pleased its readers as well as having rendered actual service to the cause of education, ornithological literature and art. Nature with her usual prodigality has scattered thousands of rare and attractive birds throughout the world, and of these the editor of BIRDS selects the most interesting species, the loveliest forms and the richest plumage for preservation by means of magnificent illustrations, obtained through the expensive process of color photography. A unique treatment of text makes the magazine interesting and instructive to old and young alike. The people of this locality are noted for being lovers of birds and students of nature, and it has given the three greatest naturalists the world has ever known. This is the native heath of Audubon and Robert Dale Owen. Mr. S. G. Evans, the well-known dry goods merchant of this city, has a very fine and complete set of Audubon's birds. All this fills our eyes to think what the world lost in the death of William Hamilton Gibson. He made all life seem related to our lives, all being to appear one substance, all to be worthy of interest, sympathy, love, and reverence. There are strange and beautiful stories told of his power to attract and handle the shyest creatures. Once, it is said, he went to a public library in Brooklyn to make a sketch of some rare butterfly, and had found a book of plates from which he was studying his subject, when, lo! there floated into the great room one of the very specimens he desired to picture, fluttered down upon the open page, and at last rested with throbbing wings beside its own portrait. On one election day, Mr. Gibson went to vote, and as he was studying his ticket, there came in at the open door, no one knew whence, a stray pigeon, which flew at once to him and perched upon his shoulder. He caressed it in his tender fashion, and murmured to it, and then it flew away, no one knew whither. Once, too, as he sat upon his veranda at The Sumacs, his country home in Connecticut, describing to a visitor the peculiar markings upon the wings of a certain song-bird, he suddenly arose, stepped to a bush upon the lawn, and coaxed into his hand the very bird of which he was talking, and which he brought to show to his astonished guest. This sympathy with the world of life outside of man fills his text and his illustrations to overflowing.—*Evansville (Ind.) Courier.*

ACCORDANCE OF NATURE.

For Nature beats in perfect tune,
And rounds with rhyme her every rune,
Whether she works in land or sea,
Or hide underground her alchemy.
Thou canst not wave thy staff in air,
Or dip thy paddle in the lake,
But it carves the bow of beauty there,
And the ripples in rhymes the oar forsake.
The wood is wiser far than thou;
The wood and wave each other know.
Not unrelated, unaffied,
But to each thought and thing allied,
Is perfect Nature's every part,
Rotated in the mighty heart.

—*Emerson.*

O painter of the fruit and flowers,
We thank thee for thy wise design,
Whereby these human hands of ours
In Nature's garden work with thine.
And thanks that from our daily need
The joy of a simple faith is born.
That he who smites the summer weed
May trust thee for the autumn corn.
Give fools their gold and knaves their power,
Let fortune's bubbles rise and fall,
Who sows a field or trains a flower
Or plants a tree is more than all.
For he who blesses most is blest,
And God and man shall have his worth
Who toils to leave as a bequest
An added beauty to the earth.

—*Whittier.*

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270. WATER LILIES.

CHICAGO:
A. W. MUMFORD,
PUBLISHER.

THE WATER LILY.

THIS is the name of an aquatic plant of the genus *Nymphæa*, distinguished for its usually very fragrant flowers and large, floating leaves; applied also to the yellow pond lily of the genus *Nuphar*. The species alba has a large flower filled with petals, so as almost to appear double; it raises itself out of the water and expands about seven o'clock in the morning, and closes again, reposing upon the surface, about four in the afternoon. The roots have an astringent, bitter taste. They are used in Ireland and in the island of Jura to dye a dark brown or chestnut color. Swine are said to eat it, goats not to be fond of it, kine and horses to refuse it. The flowers, the herb, and the root were formerly used in medicine, but are all now obsolete.

The lotus resembles our common white species in the form of the flower and leaves, but the latter are toothed about the edge. It is a native of the hot parts of the East Indies, Africa, and America, is very common in parks, lakes, and rivers in Jamaica and grows in vast quantities on the plains of lower Egypt, near Cairo, during the time they are under water. It flowers there about the middle of September and ripens toward the 12th of October. The Arabians call it *nuphar*. The ancient Egyptians made a bread of the seed of the lotus dried and ground.

All the species of water lilies grow well in large pots of water with a few inches of rich soil at the bottom. They are propagated by dividing the root, and some sorts which produce bulbs are increased by the offshoots from these. Mr. Kent, who cultivated these plants to great perfection, found that the bulbous-rooted nymphæa, if limited in their growth for want of water, or from cold or excessive heat, were apt to form bulbous roots and cease growing for the season. Hence the necessity of water and heat to make them flower freely.

The plant known especially in this country as the water lily, frequently as pond lily and sometimes as water nymph, was dedicated by the Greeks to the water nymphs. The fruit, which ripens under water, is berry-like, pulpy and thin, and each of its numerous seeds is enveloped in a thin sac. Of about twenty species two are found in the United States. Our common species has almost circular leaves, which often cover a broad surface of water on the margins of lakes and ponds, forming what are known as lily pads. The flowers are often over five inches across, of the purest white, and have a most agreeable sweet scent. In some localities the flowers are tinged with pink, and they are found, though rarely, with the petals bright pink throughout. The leaves also vary in size and sometimes are crimson on the under side. The root stalk, as large as one's arm and several feet long, is blackish outside and marked with scars left by the leaves and flower-stems; it is whitish within. Though the plant often grows in water several feet deep, the leaf and flower accommodate themselves to the depth, and they may sometimes be found where there are but a few inches of water.

At a place called Dutchman's Slough, we are informed by Mr. George Northrup, about half a mile above the outlet of Calumet Lake, south of Chicago, grow great quantities of water lilies, which are gathered every season for the Chicago market.

THE WHITE SWAN.

THIS magnificent bird is well known from being kept in a half-domesticated condition throughout many parts of Europe, whence it has been carried to other countries. In England, according to Newton, it was more abundant formerly than at present, the young being highly esteemed for the table. It was under special enactments for its preservation, being regarded as a "bird royal," which no subject could possess without license from the crown, the granting of which license was accompanied by the condition that every bird in the "game," the old legal term, of swans should bear a distinct mark of ownership on the bill. Originally this ownership was conferred on the larger freeholders only, but it was gradually extended, so that in the reign of Elizabeth upwards of nine hundred distinct swan marks, being those of private persons or corporations, were recognized by the royal swanherd, whose jurisdiction extended over the whole kingdom. At the present time the Queen's companies of Dyers and Vintners still maintain their swans on the Thames. The largest swanery in England is that belonging to Lord Ilchester.

It has been stated that the swan was introduced into England in the reign of Richard Cœur de Lion; but it is now so perfectly naturalized that birds having the full power of flight remain in the country. There is no evidence to show that its numbers are ever increased by immigration from abroad, though it is known to breed as a wild bird in the extreme south of Sweden, whence it may be traced in a south-easterly direction to the valley of the Danube.

The nest of the swan is a large mass of aquatic plants, is often two feet high and six feet in diameter. The eggs are from five to nine in number, of a grayish-olive color. The young are hatched in five to six weeks, and when hatched are clothed in sooty-gray down, which is succeeded by feathers of dark soot-gray. This suit is gradually replaced by white; but the cygnets are more than a year old before they lose all trace of color and become wholly white.

The swan of North America is considerably larger than that of the old world. The first species is the trumpeter, so-called, of which the bill is wholly black, and the second (*Cygnus columbianus*, or *americanus*) has the colored patches on the bill of less extent and deepening almost into scarlet.

Fossil remains of more than one species of swan have been found.

Our picture presents this stately bird swimming among water lilies, a sight that may be seen in summer in some of our American parks, notably the Central Park of New York City. Chicago and Cincinnati have some fine specimens. For portrait and sketch of the black swan, see Vol. III, pp. 66, 67.

NEBRASKA'S MANY BIRDS.

NEBRASKA is distinctively the bird center of the United States. It contains more species than any other state in the Union, and ornithologists who have studied its feathered possessions have classified 417 distinct species that may be seen within its boundaries. Of these 225 species breed here and the remainder are migrants who drop in on us at certain seasons and then pass on to their breeding-grounds. The natural features of Nebraska are largely responsible for this remarkable variety of feathered population. It includes a diversity of country that offers attractions for hundreds of songsters. For instance, the mocking-bird and the cardinal grosbeak, who are distinctive Southern birds, frequently appear in the southern corner of the state, and in the west we have a large number of what are usually regarded as mountain birds, but which come down from the foothills at intervals to the kingdom of Quivera.—*Omaha Bee.*

LURLALINE.

Old Irish Air.

There was a little water sprite, her name was Lurlaline;
Amid the water lilies white sometimes she might be seen.
She was a fairy child, Lurline, could sit secure and cool,
Upon those lily leaves so green you see in some lone pool.

There would she sit the summer day, singing a song so bright;
You never heard the song, you say, and don't believe it quite?
But that perhaps is just because when you quite near her stood,
You did not notice where she was, or listen as you should.

It happened in the month of June, the happy summer time.
She always sang a lovelier tune and wove a lovelier rhyme,
And you, too, like to Lurlaline, a lovelier song would sing,
If only you knew what they mean, the flowers and ev'ry thing.

If you were like a water sprite—the water sprites know well
The wondrous things of day and night, and all they have to tell;
They know and love the creatures wild, and all the flowers that grow;
They live with them and love them well, God's hidden pets they know.

And now if you want more to know what Amodine saw there,
You first must love all things below, in water, earth, and air;
You first must love all things that move among the trees and flowers,
And then you shall have more to love in shining fairy bowers.

A CONTRIBUTION TO CHILD-STUDY LITERATURE.

IT HAS been a blessed thing for the child and for humanity that the former has at last attracted our attention in a way to force upon us the conviction that it is time we found out what to do with him. People of scientific bent think this can be done by measurement and test experiments. Many fond and utterly unscientific mammas think it can be done by an all-absorbing deference to the child's whims; by setting the child on a pedestal and pouring ointments over him and bringing him sweetmeats and nectar on silver platters. I am not sure but it was this latter conduct on the part of the parent that called the attention of teachers to the need of a thorough study of the child and his requirements. For nothing else is so detrimental to the child's development as this growing tendency to pamper him.

The old method of treating the child was to ignore him; to let him be seen and not heard; to think that because he was young he could run errands all day, eat what was left at table, sleep in the coldest bed at night, and be thrust into the corner as an undesirable piece of furniture. Now the custom is exactly the reverse. In most well-to-do families the child is the central figure, and the parents stand around to minister to him. Nothing is too rich for him, and he becomes the darling, terror, and tyrant of the household.

As between the old boxing-glove method and this modern kid-glove method of handling the child the former is preferable—the hardier ones survive; but no character is proof against the seductive enervation of pampering.

These facts in regard to the development of youth have not escaped the notice of that keenest of observers, Rudyard Kipling. In "Captains Courageous" he has given us his opinion as to the best means of rescuing boys and girls who threaten to become utterly worthless, and of transforming them into useful men and women.—*Child-Study Monthly.*

271.
Subject loaned by Chicago Academy of Sciences.

YELLOW PERCH.

CHICAGO:
A. W. MUMFORD,
PUBLISHER.

THE YELLOW PERCH.

(*Perca fluviatilis.*)

THIS is a fresh-water fish and is generally distributed over Europe, northern Asia, and North America, and so well known as to have been, it is said, selected for the type of an entire family of spiny-rayed fishes, the *percidas*, which is represented in European fresh waters by several other fishes such as the pope and the pike-perch. It inhabits rivers as well as lakes, and thrives best in waters of a depth of not less than three feet; in large, deep lakes it frequently descends to depths of fifty fathoms and more. It occurs in Scandinavia as far north as the 69th parallel, but does not extend to Iceland or any of the islands north of Europe. In the Alps it ascends to an altitude of four thousand feet.

The shape of the body of the perch is well proportioned, but many variations occur, some specimens being very high-backed, others low and long-bodied. Sometimes such variations are local, and Agassiz and other naturalists at one time thought it possible to distinguish two species of the common perch of Europe; but it can be separated specifically from the North American form. The brilliant colors of the perch render it easily recognizable even at a distance. A rich greenish-brown, with golden reflections, covers the back and sides, which are crossed with five or seven bands. A large black spot covers the membrane between the last spines of the dorsal fin, and the lower parts are bright vermillion. In the large, peaty lakes of North Germany a beautiful variety is not uncommon, in which the golden tinge prevails, as in a gold-fish.

The perch is carnivorous and voracious. It wanders about in small shoals within a certain district, playing havoc among small fishes, and is therefore objectionable in waters where more valuable fry is cultivated. Perch of three pounds in weight are often caught; one of five would now be regarded as an extraordinary specimen, though in rare instances we read of individuals exceeding even that weight. An old fisherman, Mr. George Northrup, a man of rare intelligence, tells us that of thousands of perch caught by him he never took one that weighed above three pounds.

Perch are good, wholesome food and highly esteemed in inland countries where marine fish can be obtained only with difficulty. The nearly allied pike-perch is one of the best European food fishes. It is very prolific, begins to spawn when three years old, in April or May, depositing the ova on water plants.

MOUNTING OF BIRDS.

THE mounting of birds and the small animals of the field and forest is an art which is possessed by few people, yet which is not difficult and which especially appeals to the lover of nature. It is an art which it is well worth while popularizing, for it can be made the vehicle for the expression of a great deal of beauty, while preserving and making use, in the interests of scientific study, of materials which otherwise would be irretrievably lost. There has been need for some time of an authoritative work on the subject, something which would enable the amateur to mount birds and animals and which would be full and complete as to the information it conveyed. This want has been met by Mr. John Rowley, the chief of the Department of Taxidermy in the American Museum of Natural History, who has written a convenient volume of something over two hundred pages on "The Art of Taxidermy," which has just been published by the Appletons. In the foreword with which the author introduces the book he says that the name "taxidermy" was formerly applied to the trade of most inartistically upholstering a skin, but that of late years it has made wonderful strides.

BIRDS IN TOWN.

ELLA F. MOSBY.

WRENS are friendly to man. The little house wren in summer, and the Carolina wren in winter, give us a merry roundelay for all sorts of weather. Bewick's wren, Mr. Torrey says, "greatly prefers the town to woods and meadows," and even the winter wrenkin, dear little saucy brownie that he is, vouchsafes us a glimpse of himself now and then in the city. As for the bigger kinsfolk, the mocking-bird and catbird, they love the shrubbery of our lawns, and gardens, and sing close at hand. Nor are the thrushes, shy as they are in the breeding season, hard to discover during the migrations. A Swainson's thrush will sit for an hour or so, almost within touch, his big liquid eyes regarding his human neighbors placidly.

Strange to say, I have seen but few swallows or sparrows in town, except the chipping or "door-step" sparrow and the purple martin which belongs to the swallow tribe, though the misnamed chimney swallow does *not*. The song of the martin, "like musical laughter rippling through the throat," and the "giggling twitter" of the chimney dweller, often seem to drop to us out of the air as they dart overhead. Even pewees and cuckoos visit us after their broods are reared, the wistful cry of the first and the rattling call of the latter, sounding oddly from some tall tree close by the crowded street. At this time too, the grackles perch upon the roofs, and nighthawks and whippoor-wills are heard overhead in the dusky twilights.

One would not naturally expect to find game birds or birds of prey in a city, yet the Virginia quail frequently sends forth his ringing "bob white!" from any low roof or fence in the spring or early fall; and more than once long-billed water-birds have been caught by the street lamps at night. The eerie, tremulous cry of the little screech-owl sounds from the apple tree, and in winter he flies with a soft thud against the window pane, attracted by the light shining through the snow. Some owls choose a belfry tower as their favorite shelter, and live there year after year.

Our most glorious bird-day is when the orioles appear in flashing black and gold with ringing whistle, or their orchard cousins in ruddy chestnut tints, alternately singing and scolding, *chack! chack!* and little later, come the scarlet and summer tanagers to the parks and public gardens, lighting up the tall trees with their splendid color, and making the neighborhood ring with their *chip-chur* and *chicky-tuck!* as if in call and answer. One day I saw these, and not far away, the crested cardinal, glowing like a tropical flower, and the red-headed woodpeckers close by, and some redstarts glittering and flitting from bough to bough, truly a study in red!

As for the smaller birds, humming birds, kinglets, vireos, and warblers, the trees of any city yard will be a frequented hostelry for all during their wonderful journeys, and for many as a summer home. Those that love the tree tops are seen all the better by human inhabitants of upper stories, and some of our most charming bird-books give us the experiences of a busy woman in a New York flat, or of another in a Chicago back yard, and of more than one invalid, watching these free, joyous lives with unenvious delight. A good glass, either opera-glass or field-glass, will open many a pretty bit of house-weaving, and brood-rearing to an observer shut in by walls and pavements, and bring many a pleasant acquaintance. At this very moment, a slender grey catbird glides through the boughs close by my upper window, with a low *chuck, chuck!* as I glance at him. He knows I am a friend, but would fain enjoin silence, for a black cat prowls below.

THE OVENBIRD—GOLDEN-CROWNED THRUSH.

NELLY HART WOODWORTH.

A MARVELOUS choral is the rare ecstasy song of the ovenbird (see Vol. III, 126-7). It was first recorded, at a comparatively recent date, by that versatile writer—poet, essayist, naturalist—Mr. John Burroughs. After speaking of the bird's easy, gliding walk, it being one of the few birds that are *walkers*, not *hoppers*, he says its other lark trait, namely, singing in the air, seems not to have been observed by any naturalist. Yet it is a well-established characteristic, and may be verified by any person who will spend a half-hour in the woods where this bird abounds on some June afternoon or evening. I hear it frequently after sundown when the ecstatic singer can hardly be distinguished against the sky. Mounting by easy flights to the top of the tallest tree, he launches into the air, with a sort of suspended, hovering flight, and bursts into a perfect ecstasy of song—clear, ringing, copious, rivaling the goldfinch's in vivacity and the linnet's in melody. Its descent after the song is finished is rapid, and precisely like that of the titlark when it sweeps down from its course to alight on the ground.

The same writer speaks of waking up in the night, just in time to hear a golden-crowned thrush, the ovenbird, sing in a tree near by. It sang as loud and cheerily as at midday. My first acquaintance with this rare overture was at the close of a hot day in July, as I was walking with a naturalist. A splendor floated in the air like a musical cloud as strange notes of gladness rang through the twilight with the clearness of a silver bugle. It came again, a clear, sweet, outpouring song, which I recklessly attributed to several goldfinches singing, as they often do, in concert. The trained ear of the naturalist was not so easily deceived, and when my attention was called to the more gushing character of the melody I wondered that it could have escaped notice. It was a very irrigation of song, the bursting of some cloud overhead that scattered melodious fragments all about, a mating-choral unheard, probably, after the nesting season is over.

Entering the woods in early summer this bird is sure to shake out its ordinary, rattling chorus —"Teacher, *Teacher*, TEACHER," the notes delivered with tremendous force and distinctness and the emphasis increasing—a vibrant, crescendo chant as unlike the brilliant ecstasy song as can be imagined.

The ovenbird is also called the golden-crowned thrush, for no conceivable reason unless it is that the bird is *not* a thrush, but classed with the warblers. Or is it that its white breast, thickly spotted with dusky, resembles the thrush's? There is a peculiar delicacy in the texture of its olive-green robes, as fine as if woven in kings' houses, while, set deep in hues of the raven's wing, it wears that regal appurtenance—a crown of gold.

While watching from a rocky height a pair of hermit thrushes that were housekeeping in a hemlock beneath, an ovenbird flew from a maple bough to a high clump of ferns near by. In its beak was a quantity of dry grass, bulky material that interfered sadly with both walking and flight. The small burden-bearer managed, however, to progress slowly, moving its head from side to side to disentangle the grasses and lifting its little feet in the daintiest manner, until it disappeared where the ferns were thickest. Pretty soon it came in sight again, sauntered about with diverting nonchalance, and was off, alighting upon the same bough to drop down into the same corner of the thicket. This behavior was not without an inference; it was an advertisement of future hopes too plainly written to escape notice; I might have been stone blind and seen straight into the future! The nest must have been within a circle of a few feet, but with rank greenery above and underfoot the accumulated leafage of the ages, soft and penetrative as if placed layer by layer for the bird's special accommodation, any square foot might have held the treasure and kept the secret of possession. [Pg 91]

Soon after a farmer told me of a strange nest, a curiously covered house with a low door, within which the sitting bird could be seen. The bird's flight as it left the nest first attracted his attention, just in time to prevent his foot from crushing through the roof. He had never heard of ovenbirds or of roofed-over nests, and was so interested in this new page of natural history that "once a day when he went for the cows he went round that way to see how things were getting on there."

"Every time I went," he said, "I expected to find that the cattle had spoiled it!"

After describing his interesting tenants he offered to share the pleasure of their acquaintance, saying most kindly, "I wouldn't mind leaving the hay field any time to take you there! I've done my share of haying, I guess; the boys don't want me to work so hard; come up to-morrow and I'll go with you!"

I was there with to-morrow and was, if possible, more amazed at the adaptation of the "oven" to its surroundings than with the structure itself.

The bird was sitting and not at all disposed to leave on our account; she merely drew in her pretty head, cuddled closer to the ground, and waited. Both house and tenant were so thoroughly blended in color with the environing leafage that, when pointed out, it was difficult for the eye to locate them. Possibly the brave little housekeeper divined the situation; or did she presume upon a previous acquaintance with the friendly farmer? The proprietor of the establishment, a little man-milliner with a bow of orange ribbon in his bonnet, sang through the fragrant morning as if glad of an opportunity of speaking to a gracious audience, interlarding his song with rushing over to his family—*vault*, I was going to say, for being sunken a bit in the ground and dark within, it

suggested a mausoleum. A tiny ledge of slate, tilted vertically, made a strong wall upon one side of the small estate; young beeches, kept down by browsing cattle, grew where the rear-gates should have been, and a maple twig partially screened the entrance. Evergreen ferns crowded between the "oven" and the wall, their leaves interlaced, above the roof, with others opposite, the tips of two being caught down and interwoven with the roofing. The nest was made of dry leaves, lapped and overlapped, padded and felted in one compact arch—a veritable arch of triumph! Upon July 15th six creamy-white eggs, dotted with brown and lilac, lay safe within, these being duly replaced by a round half-dozen "little ovens," whose mouths were always open. Indeed, more food was shoved into those open-mouthed storehouses than would have supplied a village bakeshop, and still there was room for more. Warm rains soon gave the nest an unyielding texture; so matted and felted that the full weight of the hand left no impression, and I questioned whether the foot, set plumply down, would have crushed it out of shape entirely.

When the young birds had flown I brought home the nest as a unique souvenir of summer. Removed from the picturesque setting it was no longer interesting; its charm was that of environment; its beauty the marvel of adaptation.

So surely does Nature equip each bird with an individuality that distinguishes it from all others! Not only have they common rules followed in obedience to the law of instinct, but each species has special gifts developed according to the law of its nature, a law of harmony so delicately enforced that the law itself is not perceptible.

INSECT LIFE UNDERGROUND.

L. O. HOWARD, PH. D.,
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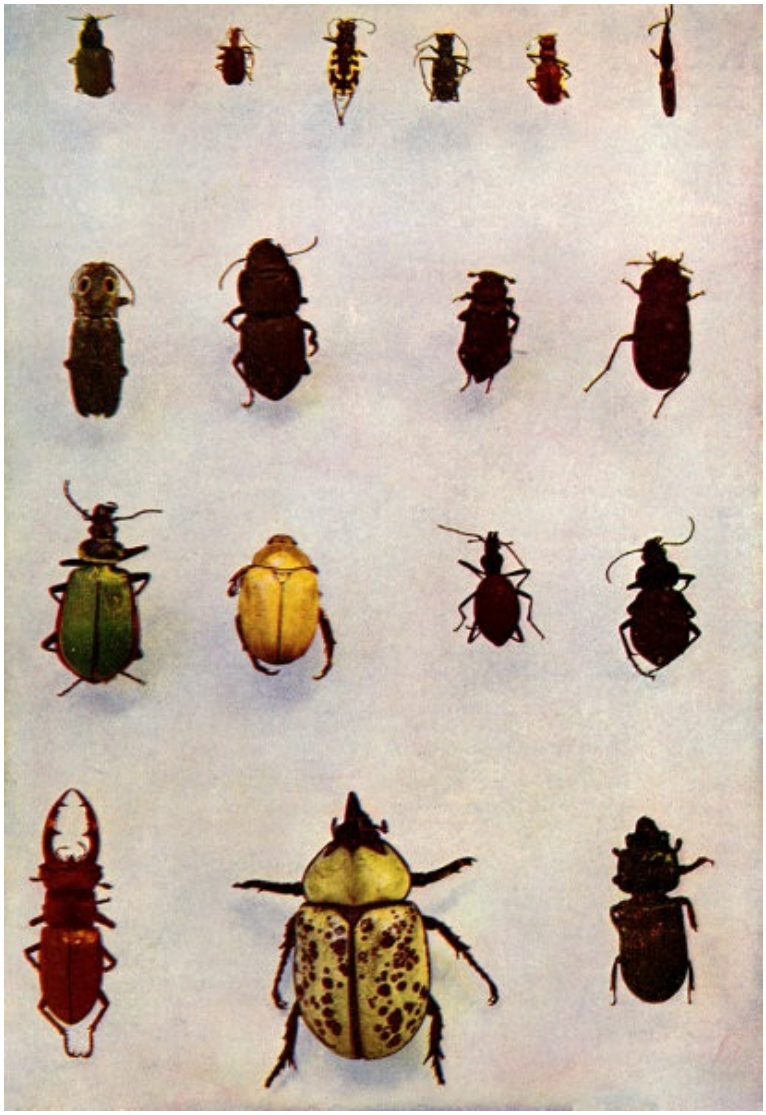
THERE is an old German child's story of a little girl who being told that if she could find a place to hide her first silver piece where no eye could see her, and then dance round it three times, she would have her wish. She sought everywhere for such a place, but always some bird or squirrel or mouse or insect was near by, and even when she dug beneath the ground, there too were little crawling creatures watching her.

It may be said that this story was meant to show that animal life is found almost everywhere, and certainly beneath the surface of the ground there are hundreds of kinds of insects working steadily away at their different occupations; for whatever disagreeable things you may find to say about insects, you can never justly call them lazy. The scriptures recognized this fact in the well-known command to the sluggard, and the old nursery rhyme about the "busy bee" emphasizes the same characteristic.

The truest underground insects are those which pass their entire lives beneath the surface of the earth; which are born there, live and grow and die without seeing the light of day. Such, for example, are the true cave insects, a number of forms of which are found in the great caverns in different parts of the world. Some of these insects feed upon the vegetable molds and low forms of plant life found in caves; others feed on dead animal matter and still others upon living insects. Nearly all are of pale colors and are blind or nearly so, for they have no use for eyes in the darkness. All are supposed to be descendants of above-ground forms, which through many generations of life in the darkness have lost their color and their power of sight. The genealogy of these true cave forms may be guessed at with some certainty, for we know insects which are only partly transformed in structure from above-ground forms to true cave species. Such are certain beetles which live in the catacombs of Paris, and certain other insects which have been found in the old and deep burrows of the land tortoise in Florida.

But we do not have to go to caves to find many other true underground insects. Rich, loose soil abounds in such creatures which live upon the decaying vegetation (soil humus or vegetable mold) or upon one another. The most abundant in numbers of individuals are the little spring-tails or bristle-tails, minute creatures seldom more than a sixteenth of an inch in length and which frequently swarm in the ground in such numbers that the earth seems fairly alive. These little creatures are by no means confined to the surface soil, but have been found in great armies at a depth of six feet or more in stiff clay, which they have penetrated by following the deeper rootlets of trees. Certain of these little insects have also become so accustomed to this lightless life that they have lost their eyes.

Other true underground insects are found in the nests of ants, where they fill many different functions. They may be grouped, however as follows: 1. Species which are fed by the ants and from which the ants derive a benefit by eating a certain secretion of the insect. 2. Species which are treated with indifference by the ants and which feed upon the bodies of dead ants and other animal and vegetable debris to be found in ants' nests. The ants are certainly not hostile to these insects and evidently gain some unknown benefit from their presence. 3. Species which live among the ants for the purpose of killing and feeding upon them. The first true ants' nest insect was only discovered and studied at the beginning of this century, but since that time hundreds of other species have been found, and a mere catalogue of their names fills a book of over 200 pages.



BEETLES.

272.

CHICAGO:
A. W.
MUMFORD,
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(CHLAENIUS SERICEUS.) (LIBIA GRANDIS.) (CICINDELLA REPANDA.) (CICINDELLA GUTTETA.) (CICINDELLA LECONTEI.) (BRENTHOS MANTIS.)

(ALAUS GARGOPS.) (PASMACHUS MARGINATUS.) (NECROPHORUS ORBICOLLIS.) (DICAELUS PURPURATUS.)

(CALOSOMA SCRUTATOR.) (COTALPA LANIGERA.) (CYCHRUS ANGUSTICOLLIE.) (CALOSOMA CALIDUM.)

LUCANUS ELEPHAS (Male). CYNASTES TITYUS. PASSALUS CORNUTUS.

Such insects are called "myrmecophilous species" or "ant lovers." The man who has done the most in the study of these interesting creatures is Dr. Wasmann, a Jesuit priest, who lives in Holland, and who has devoted many years to this work, and a difficult task it has been! If one digs into an anthill the inhabitants are at once alarmed and the greatest confusion results, so that it is necessary to study them in artificial nests in glass jars, or in some other way. [Pg 95]

Although the most of these "ant-loving" insects are strictly subterranean species, living their whole lives underground, the ants, among which they live, do most of their foraging above ground, and thus may be taken as typical of a second group of underground insects—those which have their homes below ground for protection or concealment, but which themselves live, at least part of the time, above ground. Volumes have been written about the wonderful habits of ants, of their community life, of the division of labor among them, of their slave-making customs, of their courage, patriotism, and indefatigable industry, of their highly developed instinct, which, in fact, becomes real intelligence; so that almost everyone knows the main facts about these wonderful little insects, and we can spend our time to better advantage on those underground creatures about which there is less general information. It will suffice to say that most ants have their nests, consisting of tunnels and chambers, underground; that there their queen lays her eggs and the young are carefully tended by workers until they have reached the adult stage, and there the food is stored for use in the winter months. There is a curious kind of ant in the southwestern states and Mexico called the honey ant. Certain individuals in a colony of these honey ants have enormously distended stomachs and are fed by the other ants with a kind of grape sugar, or honey, during the summer, as they hang suspended by their legs from the roof of an underground chamber. When winter comes the other ants are fed by these honey-bearers, which give put the stored-up honey from their mouths drop by drop.

There is an interesting class of underground insects which, in their early stages, hide in especially dug pits and lie in wait for their prey, but which, when full grown, live above ground. Such are the ant-lions and the tiger-beetles. The young ant-lion is a heavy-bodied, clumsy-looking creature, with very long and sharp jaws, which digs for itself a funnel-shaped pit in loose, dry sand, using its flat head and jaws as a spade in digging. Then it hides itself at the bottom of the pit, its body completely covered with the sand, and waits until some unlucky little insect comes along and stumbles over the edge of the hollow. The side of the hole is made at such an angle that the sand slips down with the weight of even an ant and carries it towards the open jaws of the ant-lion. Every struggle which the poor creature makes to escape causes the sand to slide down faster, and the ant-lion at the bottom jerks up a shower of sand with its head, which hastens the miniature avalanche until the poor victim is within reach of the powerful jaws and is devoured. The adult ant-lion is a beautiful, gauzy-winged creature, not at all like its blood-thirsty larva.

The young tiger-beetle, or "doodle bug," as it is called in the South, digs a straight burrow in hard soil, such a hole as would be made by pushing a small lead pencil into the ground. This creature, like the young ant-lion, has a clumsy body and powerful jaws, and on its back are two projections armed with hooks which help it to climb up and down in its burrow. It waits for its prey at the mouth of its hole, which it closes with its head, thus making a sort of trap-door. The little insect which steps upon this trap-door doesn't have time to say its prayers before it is devoured by the voracious "doodle." Should a large, strong insect walk over the burrow, the tiger-beetle larva retreats precipitately to the bottom of its hole, which is sometimes eighteen inches below the surface of the ground.

[Pg 96]

There are many other insects which, when young, live below ground, and become above-ground flying creatures, when full grown, which have not the carnivorous tastes of the forms we have just mentioned. Many of these species live on the roots of plants and others upon the vegetable mold of rich soils. The large white grubs so often found in the soil of grass lands belong to both of these classes. They are the larvæ, or young, of several kinds of the clumsy beetles known as scarabs. The larvæ of the common brown May-beetles, for example, are root-feeders, living mainly on grass-roots, and they are sometimes so abundant and destructive as to destroy valuable lawns. The roots are sometimes so uniformly eaten off by these white grubs that the sod may be rolled up like a roll of carpet. The white grubs of the beautiful large green beetles, known as June-beetles, or fig-eaters, in the South (they do not occur in the more northern states), although they look almost precisely like the May-beetle larvæ, are not injurious and feed only upon the vegetable mold of the soil. The wire-worms, which are the young of the click-beetles, or "snapping-bugs," feed upon the roots of plants; there are plant lice which live underground and suck the sap from plant roots, like the famous grape-vine phylloxera; there are caterpillars which live almost entirely underground and feed upon living roots; there are maggots which have the same habit; and there are even bark lice or scale insects which live attached to rootlets in the same way that the other species live above ground on the limbs and twigs of trees.

Other insects living above ground all their lives hide their eggs underground. Most grasshoppers, for example, do this, and many of the closely related crickets not only hide their eggs in this way, but live underground themselves in the day time, and come forth at night to feed, or to collect grass leaves, which they carry into their burrows and eat at leisure. Other insects also hide below ground during the day and feed only at night. The full grown May-beetles do this, and the cut-worms also. The cut-worms are soft-bodied caterpillars and are greedily eaten by birds and carnivorous insects, so it is essential to their safety that they conceal themselves as much as possible. There is an interesting cut-worm which occasionally becomes so numerous that it has to migrate in great armies in search of food, and these great masses of caterpillars hurry on, driven by hunger, by day as well as by night, followed by flocks of birds and other enemies until the majority of them are destroyed. This cut-worm is generally called the "army worm."

Other caterpillars, while living above ground and feeding on the leaves of plants, instead of spinning cocoons for their protection when they transform to the helpless chrysalis or pupal condition, burrow beneath the surface of the ground and there transform without a cocoon. Hundreds of species do this and sometimes these brown pupæ are so abundant that they are turned up in numbers with every spadeful of earth.

We are now able to say that the insects found beneath the surface of the earth are as follows:

1. Insects which live underground during their whole lives, feeding (*a*) on roots and rootlets; (*b*) on dead and decaying vegetable matter; (*c*) on other insects.

2. Insects which live in the nests of ants.

3. Insects which have their nests underground, but which get their food elsewhere.

4. Insects which live underground only in their younger stages of life.

5. Insects which hide their eggs or pupæ underground.

6. Carnivorous insects, and insects which feed on decaying animal matter, which occasionally burrow underground in search of food.

I hope it will be clear from what we have said that insects must take an important part in the changes in the character of the soil which are constantly going on, quite as important indeed as do the earthworms about which Darwin wrote.

Transcriber's Note:

- Minor typographical errors have been corrected without note.
- Punctuation and spelling were made consistent when a predominant form was found in this book; otherwise they were not changed.
- Ambiguous hyphens at the ends of lines were retained.
- Mid-paragraph illustrations have been moved between paragraphs and some illustrations have been moved closer to the text that references them.
- The Contents table was added by the transcriber.

*** END OF THE PROJECT GUTENBERG EBOOK BIRDS AND ALL NATURE, VOL. 6, NO. 2, SEPTEMBER 1899 ***

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