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BIRDS AND ALL NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. V. FEBRUARY, 1899. NO. 2.

CONTENTS.

GINGER.

Zingiber officinale Roscoe.

DR. ALBERT SCHNEIDER,
Northwestern University School of Pharmacy.

"And ginger shall be hot i' the mouth, too."
—*Shakespeare, Twelfth Night, II., 3.*

THE well-known spice ginger is the underground stem (*rhizome*) of an herbaceous reed-like plant known as *Zingiber officinale*. The rhizome is perennial, but the leaf and flower-bearing stems are annual. The stems are from three to six feet high. The leaves of the upper part of the stem are sword-shaped; the lower leaves are rudimentary and sheath-like. The flowers occur in the form of conical spikes borne upon the apex of stems which bear only sheath-like leaves.

The ginger plant is said to be a native of southern Asia, although it is now rarely found growing wild. It is very extensively cultivated in the tropical countries of both hemispheres, particularly in southern China, India, Africa, and Jamaica. The word ginger is said to have been derived from the Greek "Zingiber," which again was derived from the Arabian "Zindschabil," which means the "root from India." It is further stated that the word was derived from Gingi, a country west of Pondecheri where the plant is said to grow wild.

True ginger must not be confounded with "wild ginger," which is a small herbaceous plant (*Asarum canadense*) of the United States. The long, slender rhizomes of *Asarum* have a pungent, aromatic taste similar to ginger. According to popular belief this plant has a peculiar charm. Friends provided with the leaves are enabled to converse with each other, though many miles apart and speaking in the faintest whisper.

The early Greeks and Romans made extensive use of ginger as a spice and as a medicine. During the third century it was apparently a very costly spice, but during the eleventh century it became cheaper, owing to extensive cultivation, and was quite generally used in Europe. Dioscrides and Plinius maintained that this spice was derived chiefly from Arabia. The noted traveler and historian, Marco Polo (1280-1290) is said to have been the first European who saw the wild-growing plant in its home in India. As early as the thirteenth century a considerable number of varieties of ginger were under cultivation, which received distinctive names as Beledi, Colombino, Gebeli, Deli, etc., usually named after the country or locality from which it was obtained.

At the present time Jamaica supplies the United States with nearly all of the ginger, and this island is, therefore, known as "the land of ginger." Cochin-China and Africa also yield much ginger. In Jamaica the process of cultivation is somewhat as follows: During March and April portions of rhizomes, each bearing an "eye" (bud), are placed in furrows about one foot apart and covered with a few inches of soil. The lazy planter leaves portions of the rhizomes in the soil from year to year so as to avoid the necessity of planting, such ginger being known as "ratoon ginger" in contradistinction to the "plant ginger." The planted ginger soon sprouts, sending up shoots which require much sunlight and rain, both of which are plentiful in Jamaica. The field should be kept free from weeds which is not generally done for several reasons. In the first place pulling the weeds is apt to loosen the soil about the rhizomes which induces the development of "ginger rot," perhaps due to a fungus. Secondly, the Jamaica ginger planter is naturally lazy and does not like to exert himself. The careful planter burns the soil over before planting so as to destroy the seeds of weeds. In brief it may be stated that ginger is planted, tended, and gathered much as potatoes are in the United States. As soon as gathered the rhizomes are freed from dirt, roots, and branches and thrown into a vessel of water preparatory to peeling. Peeling consists in removing the outer coat by means of a narrow-bladed knife. As soon as peeled the rhizomes are again thrown into water and washed. The object of keeping the "roots" in water and washing them frequently is to produce a white article. To this end bleaching by means of burning sulphur and chlorine fumes has been resorted to. Some ginger, especially that of Jamaica, is dusted over with powdered lime; this colors the ginger white very effectively. The bleaching processes also serve to destroy parasites which may infest the ginger before it is thoroughly dried.

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The drying or curing of ginger is done in the sun. A piece of ground is leveled and laid with stone and cement. Upon this the rhizomes are spread from day to day for from six to eight days. At night and during rains they are placed under cover. The small planter does the curing upon mats of sticks, boards, palm or banana leaves raised somewhat above the ground. Very frequently the drying is done upon leaves placed directly upon the ground.

Not by any means all the ginger upon the market is peeled. The Jamaica ginger usually is; the African ginger is usually unpeeled, and hence dark in color; the Chinese ginger is usually partially peeled. Peeling makes the product appear whiter and hastens drying very materially, but much of the ethereal oil and active principle is thereby lost since it occurs most plentifully in the outer coat.

The ginger crop impoverishes the soil very rapidly; every few years a new field must be planted. Forest soil is said to yield the best crops and in Jamaica thousands of acres of forest are annually destroyed by fire to prepare new ginger fields. Ginger appears upon the market either whole or

ground. Unfortunately the ground article is oftentimes adulterated; for instance, with sago, tapioca, potato, wheat, and rice starch, with cayenne pepper, mustard, and other substances.

Ginger has been an important commercial and household article ever since the first century of our era. Poets and prose writers of the past and present have praised ginger and the many preparations having ginger in composition, because of their aromatic pungent taste and stimulating effect. The opening quotation from Shakespeare indicates the properties of ginger. That it was a highly-valued spice during the time of Mandeville (1300-1372) is evident from a quotation from his "travels."

"Be alle that contree growe the gode gyngevere (ginger), and therefore thidre gon the Marchauntes for Spicerye."

FROM KŒHLER'S MEDICINAL-PFLANZEN. GINGER.

Explanation of plate:

A, plant abut natural size; 1, flower bud; 2, flower; 3, outer floral parts separated; 4, longitudinal section of flower; 5, nectary with rudimentary and perfect stamens; 6, pistil and rudimentary stamen; 7, upper end of style with stigma; 8 and 9, ovary in longitudinal and transverse sections.

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Green ginger pickled in sugar was highly prized during the middle ages. There are a number of beverages which contain ginger. Gingerade is water charged with carbonic acid gas and flavored with ginger, being almost identical with ginger-pop. Ginger-beer is prepared by fermenting cream-of-tartar, ginger, and sugar with yeast and water. Ginger-ale is supposed to be identical with ginger-beer. These ginger drinks are all refreshing, but I believe my readers will agree that there is usually too much ginger present; the hot, burning sensation in the mouth is not very pleasant. It may be that the trouble lies in taking too much of the drink at a time.

In my estimation ginger as used by the baker is most appreciated and here again I believe my readers will agree with me. Who has not heard of ginger-bread? This sweet cake flavored with ginger is not by any means of recent origin. The great English bard Chaucer sang its praises long ago (1328-1400):

"They fette him first the sweete wyn,
And mede eek in a maselyn,
And roial spicerye
Of *ginge breed* that was full fyn."

Shakespeare also must have valued this bread very highly, for in the play, "Love's Labor Lost," he says:

"An I had but one penny in the world thou shouldst have it to buy *ginger-bread*."

Ginger-bread is often made into fanciful shapes. Cats, dogs, horses, elephants and men are cut out of the rolled dough and then baked. Many of my readers are perhaps familiar with some of the beautiful playtime songs of Alice Riley and Jessie Gaynor. The following are the words of one of these songs, entitled, "The Ginger-bread Man." It describes the ginger-bread man very beautifully in the first verse. His awful fate, evidently in the hands of a small cannibal, is very graphically described in the second verse. I regret being wholly unable to supply the music. Here

are the words by Alice Riley:

"Oh the ginger-bread man, the ginger-bread man,
The round little, brown little ginger-bread man,
He has sugary eyes and a sugary nose,
And he's sweet from his crown to his sugary toes,
Is this dear little, queer little ginger-bread man,
This dear little ginger-bread man.

"Oh the ginger-bread man, the ginger-bread man,
The poor little, sad little ginger-bread man,
For he lost his poor arms, and he lost both his feet,
And he lost his poor head, it was so good to eat,
And his vest buttons tasted uncommonly sweet,
Ah, poor little ginger-bread man."

Gingersnaps are very much liked by many. I used to demolish them by the pound until someone whispered in my ear that "bad eggs were used in making them." Since then my appetite for gingersnaps has lessened. I hope what that man said is not true. Gingernut is another cake containing ginger and sweetened with molasses.

At the present time ginger is not very extensively used as a medicine. The powder or tincture is effective in some forms of indigestion. It is used to correct a bad breath, in tooth-ache, as a gargle and mouth-wash, in colic, and in dysentery. In a German work on pharmacy I find that it is recommended in catarrh of the stomach and for "Katzenjammer." It will not be necessary to explain Katzenjammer means.

SAP ACTION.

FRED. A. WATT.

IN order to understand this subject we must first ascertain the conditions under which sap is first produced, what it is, and how it circulates.

To do this we must first know something of the structure of those parts of the tree which serve as channels, or ducts, and those other parts which gather the sap and dispose of the waste after it has completed its mission.

To begin with, the tree is composed of small structures, too small for the naked eye to distinguish. Each structure is, at least for a time, a whole in itself, containing solid, semi-solid, and fluid parts which differ in their chemical nature. These structures are the cells, and when a large number of them are united in close contact they form a cellular tissue through which the sap passes from the roots to the leaves, and from the leaves to the growing parts of the young tree, or shoot.

This cellular tissue is superseded by another tissue which is much stronger and which takes up the work of the cellular tissue, when the tree becomes too large to be supported by the weaker form. It is more solidly formed and is composed of elongated cells which are joined together in a series with their ends overlapping. This is known as woody fiber. The cellular tissue now exists in the tree stem only in the pith, and in the medullary rays which we see in the grain of any hard wood, radiating from the pith.

With the statement, then, that these tissues form the timber, and that the bark and roots only present a modification of the same structures, we will pass to the tree as we see it with the naked eye.

If we saw the trunk of a tree, of any considerable size, squarely in two, we find three forms which differ in solidity, rigidity, and appearance; namely, the heart-wood, sap-wood, and bark. The heart-wood is the firm, solid wood surrounding the center of the tree, the sap-wood is the softer wood outside the heart-wood, while the bark forms the skin or outer covering for the whole.

Trees grow from the center outward, hence the present sap-wood will in time become heart-wood and be covered by a new layer of sap-wood, and the present heart-wood is simply sap-wood which has become solidified by the deposit within its tissues of resinous and other matter secreted by the tree. It is now useless for sap-carrying purposes and seems to exercise only the function of supporting the tree in its position. It is through the outer, younger layer or sap-wood that the sap ascends.

Now, if we examine the end of our stick more closely we see a series of rings, clearly marked, circling from the center of the tree and ranging in size from the tiny one which encloses the pith, to the large one which forms the outer surface next to the bark. They are caused by a constant annual deposit and outward growth, by which a layer is added to the outer surface of the sap-wood each season. Hence, by counting these we may determine the age of the tree. Less distinct rings may appear but they will not deceive us as we know that they are caused by a cessation of growth, which may have been caused by drouth.

As a general rule these rings are more distinct in trees inhabiting a climate where vegetation is entirely suspended by the cold after each layer is formed. In warmer regions they are not so distinct. This is especially interesting when we study fossils of trees which in many cases show a great difference in climatic conditions in the early ages from those we have at the present time.

The layers of bark are much thinner than those of the wood and are not so readily distinguished. They are formed from the interior so that the oldest are on the outside. The older ones fall off, however, so that we cannot trace as many rings in the bark as we can in the wood, although one is formed in each for every season that the tree lives. [Pg 55]

The roots of the tree spread out underground and are the agents through which the tree derives most of the moisture so necessary to its growth. They absorb moisture only at their extremities and usually spread to just such an extent that the water which falls off the outer branches of a tree during a rain, falls exactly where the tender rootlets can gather it up at once and hurry it back up the trunk of the tree. In ground that is springy, or naturally moist, the roots do not depend so much on the rainfall but reach out after moisture wherever it exists in the soil.

Spring seems to give a new impulse to life, especially to vegetable life, which always responds promptly to the genial rays of the sun. During the winter, in our climate, the cells which form our trees are contracted by the cold and when the warm days cause them to resume their natural size, a small vacuum is formed in each cell, which the first warm days proceed to enlarge by thawing only the trunk and branches of the tree, leaving the roots below embedded in frozen soil from which but little moisture can be drawn, while evaporation draws moisture from the trunk and branches with irresistible force. A warm rain now comes, thaws out the soil, and sets the juices therein contained in motion. An immediate rush of sap up the trunk of the tree is the result. It clears out the pores or channels, as a spring freshet clears out the water courses, it rushes into the branches, and the branches rejoice and put on their livery of green; it rushes out through the porous surface of the limbs and rises in the air in the form of vapor, while that which does not escape becomes charged with life and returns down a devious pathway and lays the foundation for another season's growth.

But why should the sap ascend the tree?

This is only one of many questions that the tree will not answer and no one else ever has answered. If we take a strip of blotting-paper and insert one end of it in an ink-well, the ink immediately begins to climb up the blotting-paper by means of the force known as capillary attraction. Here, says the seeker for truth, is the reason for the ascent of sap, and many profound authors have agreed that he is right. Others claim, however, that he is wrong, while still others think he is only partly wrong and that this force has something to do with it. If we cut the roots from a tree and insert the stem in water we will soon find that this force is not the sole cause for the ascent of sap. Another student has made experiments with the force called diffusion, and claims that this explains the rise of sap to such remarkable heights; but diffusion does not work fast enough and hence must be thrown aside. Another finds that water is imbibed through fine porous substances with great force and that air can thus be compressed to several atmospheres, and this force is affirmed to be the one at work in our trees. But the fact that the amputation of the leaves and branches checks the ascent is brought forward and this theory falls to the ground. The fact that liquid films have a tendency to expand rapidly on wetable surfaces was next advanced, but the objection to the first theory met it at once.

Another interesting theory is now brought forward and has the advantage of practical demonstration, that is, an artificial model was made through which water ascended. It is based on the principle that water will pass through moist films that air will not penetrate, on the fact that evaporation takes place under right conditions with force enough to cause something of a vacuum, and also on the elasticity of the cells.

The model was constructed of glass tubes, closed at one end with a piece of bladder, and joined together in series by means of thick-walled caoutchouc tubing; the top which represented a leaf was a funnel closed by a bladder. This artificial cell chain was filled with water, mixed with carbolic acid to keep the pores from clogging, and was set up with its base immersed. The fluid evaporated through the membrane at the top of the funnel, which drew up more from the cells below, the space so caused being continually filled from the base. This is an interesting experiment and is said to solve the question, but it is open to the same objection, that a tree will not absorb fluid and carry it for any length of time after the roots are cut off. I regard it, however as a long stride in the right direction.

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To what source, then, must we look for an explanation of this process?

I think it is a fact that the small, new root-fibers imbibe fluid with considerable force, but it is undoubtedly a fact that they soon lose this force when deprived of the leaves; that the leaves with the aid of evaporation, exert a great force, which the above experiment plainly indicates; and I cannot consistently dismiss the idea that capillary attraction has something to do with it. If we also add to this the theory that the swaying of the stems and branches by the wind is continually changing the shape and size of the cells and is thus driving the juices wherever an opening will allow them to travel, thus bringing the elasticity of the tree to our aid, we have again advanced.

But the principle of life is not discovered. Whenever it is we may find it to be a force much greater than any we have so far examined, and which may even cause the overthrow of all theories heretofore advanced.

EMERSON AND THE WOODPECKER STORY.

NO squirrel works harder at his pine-nut harvest than the carpenter woodpeckers in autumn at their acorn harvest, says John Muir in the December *Atlantic*, drilling holes in the thick, corky bark of the yellow pine and incense cedar, in which to store the crop for winter use; a hole for each acorn so nicely adjusted as to size that when the acorn, point fore-most, is driven in, it fits so well that it cannot be drawn out without digging around it. Each acorn is thus carefully stored in a dry bin, perfectly protected from the weather, a most laborious method of stowing away a crop, a granary for each kernel. Yet they never seem to weary at the work, but go on so diligently they seem determined that every acorn in the grove shall be saved. They are never seen eating acorns at the time they are storing them, and it is commonly believed that they never eat them or intend to eat them, but that the wise birds store them and protect them solely for the sake of the worms they are supposed to contain. And because these worms are too small for use at the time the acorns drop, they are shut up like lean calves and steers, each in a separate stall, with abundance of food to grow big and fat by the time they will be the most wanted, that is, in winter, when insects are scarce and stall-fed worms most valuable. So these woodpeckers are supposed to be a sort of cattle-raiser, each with a drove of thousands, rivaling the ants that raise grain and keep herds of plant lice for milk cows. Needless to say, the story is not true, though some naturalists even believe it. When Emerson was in the park, having heard the worm story, and seen the great pines plugged full of acorns, he asked (just to pump me, I suppose): "Why do woodpeckers take the trouble to put acorns into the bark of the trees?" "For the same reason," I replied, "that bees store honey and squirrels nuts." "But they tell me, Mr. Muir, that woodpeckers don't eat acorns." "Yes they do," I said. "I have seen them eating them. During snowstorms they seem to eat little besides acorns. I have repeatedly interrupted them at their meals, and seen the perfectly sound, half-eaten acorns. They eat them in the shell as some people eat eggs." "But what about the worms?" "I suppose," I said, "that when they come to a wormy one they eat both worm and acorn. Anyhow, they eat the sound ones when they can't find anything they like better, and from the time they store them until they are used they guard them, and woe to the squirrel or jay caught stealing."

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FROM COL. CHI. ACAD. SCIENCES.

CRAB-EATING OPOSSUM.
7/9 Life-size.

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THE CRAB-EATING OPOSSUM.

THE crab-eating opossum (*Philander philander*) is one of the largest of the family. The body is nine and one-half inches long, and the tail nearly thirteen inches. It has a wide range, extending throughout all of tropical America. It is numerous in the woods of Brazil, preferring the proximity of swamps, which furnish it with crabs. It lives almost exclusively in trees, and descends to the ground only when it wishes to forage.

While it proceeds slowly and awkwardly on the ground, its prehensile tail enables it to climb trees with some facility. This opossum readily entraps smaller mammals, reptiles, and insects, and especially crabs, which are its favorite food. It preys upon birds and their nests, but it also eats fruit, and is said to visit poultry yards and to cause great devastation among chickens and pigeons.

The young of the crab-eating opossum differ in color from the old animals. They are completely naked at birth, but when they are sufficiently developed to leave the pouch, they grow a short, silky fur of a shining nut-brown color, which gradually deepens into the dark brownish-black color of maturity. All observers agree that the little creatures escape from the pouch and, moving around and upon the mother's body, afford a charming spectacle. The pouch is formed by two folds of skin, which are laid over the unformed young attached to the mammae.

The opossum is extensively hunted on account of the havoc it works among poultry.

The negroes are its enemies, and kill it whenever and wherever they can. The flesh is said to be unpalatable to most white persons, for two glands impart a very strong and repellent odor of garlic to it, but the negroes like it, and the flesh repays them for the trouble of the pursuit. The opossum, however, is not easily killed, and resorts to dissimulation when hard pressed, rolls up like a ball, and feigns to be dead. To anyone not acquainted with its habits, the open jaws, the extended tongue, the dimmed eyes would be ample confirmation of it, but the experienced observer knows that it is only "'possuming," and that as soon as the enemy withdraws it will gradually get on its legs and make for the woods.

It is said that the opossum was formerly found in Europe, but now only inhabits America. Nearly all of the species live in the forest or in the underbrush, making their homes in hollow trees, holes in the ground, among thick grass and in bushes. All are nocturnal in their habits and lead a solitary, roving life. The opossum lives with its mate only during the pairing time. It has no fixed habitation. In captivity it is the least interesting of animals. Rolled up and motionless, it lies all day, and only when provoked does it make the slightest movement. It opens its mouth as wide as possible, and for as long a time as one stands before it, as if it suffered from lockjaw.

The opossum can hardly be classed among the game animals of America, yet its pursuit in the South in old plantation days used to afford the staple amusement for the dusky toilers of the cotton states. It was the custom, as often as the late fall days brought with them the ripened fruit and golden grain, for the dark population of the plantation, sometimes accompanied by young "massa," to have a grand 'possum hunt *a la mode*. We would describe the method of taking it, were it the policy of this magazine to show approval of a most cruel practice. Happily the custom, through change of circumstances, has fallen into disuse.

The specimen of this interesting animal which we present in this number of BIRDS AND ALL NATURE was captured, with its mother and five young ones, in a car load of bananas, having traveled all the way from the tropics to Chicago in a crate of the fruit. The mother and young were kept alive by eating the bananas, another proof that the crab-eating opossum does not feed exclusively upon animal food.

WASHINGTON AND LINCOLN.

EMILY C. THOMPSON.

IT is natural that at this time our thoughts should turn toward two of our great national heroes. This month is to us not merely the month of February, marking one of the twelve divisions of our calendar year, but it is a continuous memorial of two of our revered statesmen. We read all we can about our glorified dead, we search the words spoken by them, we visit the places where they toiled for us, and we scan even their homes trying to form a picture of their lives. We do even more. We presume to imagine their thoughts and conjure up the very ideas which might have occurred to them as they stood in these spots now hallowed by memories of them.

It is a fascinating occupation to fathom the characters of truly great men and contemplate their attitude toward various subjects. Sometimes mere conjectures are the fruit of our toil. At other times sure conclusions are reached from facts which are brought to light. Stories galore are told of both Lincoln and Washington, which help us more vividly to picture their natures. The question in which we are interested could easily be answered if we knew these men, but still as we are acquainted with the manifestations of their characteristics we can answer it almost as satisfactorily. Did Lincoln and Washington love nature? Could they appreciate her beauties, and did they evince an interest in her creations?

Lincoln in his log-cabin home, splitting rails, working on the farm, hunting coons, driving the horses and cattle, must have found a glorious opportunity to become acquainted with this great mother of ours. The son of a pioneer who, with his great covered wagon, cattle, family, and household belongings, wanders over the country, whose only neighbors for hundreds of miles are the birds in the woods, the rabbits in the field, and the fish in the stream, the son of such a man certainly sees nature as few of our city-bred, World's Fair, Paris Exposition young people, can imagine it. Lincoln was content with these, his neighbors. Never do we hear sighs from him and wishes that his lot might be exchanged for that of another, even if his lot was toilsome and lonely. Who can tell but he thus imbibed his love for pure freedom undefiled and his lofty conceptions of this life in its relation to this world and something beyond?

We cannot doubt that the great, tall, clumsy lad had a real love in his heart for the little feathered and furry friends about him, and not simply a love for the beautiful ones, but what is far higher a feeling of sympathy even for the ugly and a genuine tender solicitude for all.

Even when the youth became a man perplexed by business and political problems his nature remained unaltered. Once when a party of his friends on a judicial circuit stopped to water their horses, Lincoln was not there. His companion on the way was asked of his whereabouts. He replied that the last he had seen of Lincoln he was hunting around for a bird's nest, two of the former occupants of which he held in his hand. The wind had blown the tiny nestlings from their snug little home and the greathearted man was trying to find the nest for the wee, helpless chirpers. The same great heart which felt the human cry of pain as keenly as the bewildered cry of the little birds gave its last throb to restore little black nestlings to the warm comfort of free homes protected by law.

There is an amusing incident, told probably as a "good one" upon the politician, but which has more than an amusing side to us. Lincoln was one of a party of ladies and gentlemen, dressed in their best, journeying along a country road. Their attention was arrested by the distressed squealings of a pig. There it was by the roadside, caught in a fence. Of course a general laugh followed. To the astonishment of all Lincoln, clad as he was, dismounted from his horse and released the poor animal. He could not see even an occupant of the pigsty suffer without feelings of sympathy.

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We expect different stories of Washington, a different attitude toward nature and animals, just as the nature of the man was different. Visit Mt. Vernon and at once you feel his relation to the natural world, a love and keen appreciation of the beautiful in nature, with a thorough conviction that where man tampers with the rough beauties of nature a severe orderliness, precision, and care must be manifested.

Seated upon his front veranda, Washington beheld every day a scene of beauty, one gaze at which stays with a stranger for months and for years. The green of his own lawn ending abruptly not far away with the decline of the bluff, the tops of a few trees farther down just visible, and the blue waters of the Potomac bounded in the distance by the bluff of the opposite bank; to the right a carefully mowed lawn sloping away in natural terraces to the bank of the river; to the left a small sward and orchard; behind the house a large green plot. It is to the left of the beautiful, sunny, open space behind the house that the garden is found. Every visitor must spend a few moments there, admiring the hedges, the neatly-trimmed boxtrees, the regular formal designs, and incidentally bidding "Good-day" to the saucy little squirrel who scampers about the paths. It is an interesting spot as revealing what Washington considered the beauty of scenic gardening.

Washington is said to have loved noble horses and to have taken great pride in his stables. He always drove white horses with hoofs painted black. Of dogs, too, he was exceedingly fond and kept an accurate account of the pedigree of every animal belonging to the estate. Usually he drove in a carriage drawn by a span while his family came next in a larger vehicle drawn by four horses. On state occasions he allowed himself the luxury of an elegant coach and six.

Varied are the feelings with which one views the estate of our first president. It is almost

impossible in the midst of all this beauty to realize that it was the same man who enjoyed this peaceful home of luxury and spent that awful winter at Valley Forge or crossed the Delaware amid the floating ice. The quiet restfulness of Mt. Vernon must have been a haven of peace to the valiant soldier who faced the enemy so bravely, to the statesman who toiled so assiduously for his country, and to the heart of human sympathy returning even from the cities of 1776.

At the foot of a gentle slope about midway between the house and the boat-landing is the tomb of the Washington family. The very aged, gray resting-place has been exchanged for one of more modern design. An open vault in front with a protection of iron grating and other chambers extending into the earth form the tomb. It is with awe that the visitor approaches the open vault to gaze upon the gray sarcophagi of George and Martha Washington standing out in bold relief against the dark gray walls and background. Few are the letters sculptured upon the stone caskets, but above in the wall behind them is a square slab bearing the words: "I am the resurrection and the life; he that believeth on me shall not perish but have everlasting life."

It is touching to see the tributes which have been paid to this great man, the trees planted in his honor, the monuments erected to his memory, but none is more touching than the unconscious tribute which nature herself is giving. The tomb is silent and cold. One thinks of the sterner qualities of the dead, when a bit of color catches the eye. There above the sarcophagi in a corner of the inscribed tablet nestle two little yellow birds, a fitting tribute of Mother Nature to her love and trustfulness in one of her noblest sons.

England holds the honor of having first formed societies for the prevention of cruelty to animals and of having first legislated for its punishment.

THE GEOGRAPHIC TURTLE.

MAP and mud-turtle (*Malacoclemmys geographicus*) are the more common names by which this animal is known; and as it is a characteristic species of the waters of Illinois and occurs in countless numbers in lakes, rivers, and flood-ground pools, it may be assumed that most of our readers have met with it. It is exceedingly common in the Illinois and Mississippi rivers, where it is often confounded with quite another species. It is the only species seen by Mr. F. M. Woodruff on the shores of Lake Michigan, whence he has frequently chased it to the water and caught it in his hands. It is timid and inoffensive in disposition, always sliding from bank or log when approached, and even when captured shows none of the ferocity of the snapper. The great strength of its jaws, unsurpassed in massiveness by any of our turtles, would enable it to inflict serious wounds, and it is not a little surprising to find such efficient weapons of offense unaccompanied by special ruggedness of temper. Our streams and lakes, with their numerous sandy shores, and their abundance of animal and vegetable life, would seem to form an ideal habitat for these reptiles. Their food consists ordinarily of fishes, frogs, and mollusks, crayfishes, aquatic insects, and vegetation. They trouble fishermen at times by devouring fishes which they have caught on trot-lines or in set nets. They are not rapid swimmers. An animal once within reach of their jaws must be very quick to escape capture. The eggs are white and are provided with a rather tough shell. They bury their eggs in sand on the shore and leave them to hatch by the sun's heat.

A gentleman who had a pet turtle which he kept in a tank tells some interesting things about its appetite. During the early spring he fed him on bits of meat, either raw or cooked. Having no teeth, he swallowed these whole, gulping them down with large quantities of water. Outside of his tank he would carry food in his mouth for hours at a time, but apparently was unable to swallow it with his head out of water. He always aimed well, and snapped up bits of meat as carefully and as quickly as if they had been bits of life that might escape him. When a morsel was too large to be swallowed whole, he held it down firmly with his fore feet and pulled bits off with his mouth. His owner once gave him a fish so large that it took him three hours to eat it, and in all that time he never removed his foot. Rival turtles and swift currents had probably taught him this bit of discretion in the days of his freedom. One time he put twenty small fish averaging three inches in length into his tank, thinking this would be a treat for him and would save the trouble of feeding him for some time. A treat he evidently considered it, for within half an hour he had disposed of the entire lot. This excited the admiration of the gentleman's boy friends, and the next day they brought in sixty small fish. At the end of the second day the turtle looked about with an Oliver Twist-like air, which plainly called for more. When there was any perceptible difference in the size of the fish it always ate the largest one first. It ate grasshoppers and dragon-flies, tadpoles, and little frogs—animal food of any kind. It would eat eggs as readily as meat. This voracity of appetite accounts for much of the destruction of young fish life in our lakes and streams, where these turtles are extremely abundant.

In the Philippines, it is said, there lives a turtle that climbs trees. The feet are strongly webbed, and each has three sharp claws.

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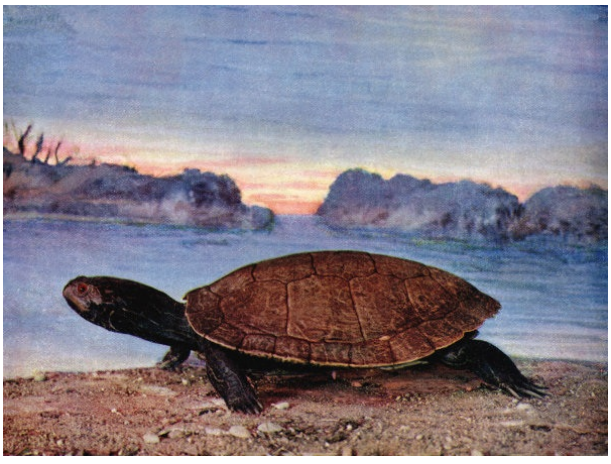

FROM COL. L. E. DANIELS. GEOGRAPHIC TURTLE.

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NOSES.

W. E. WATT.

THE Rev. Sam Jones says of a trained bird dog that he once saw in the tall grass jumping up to get signals from his master's hand, moving to the right or left, or lying down without a word spoken: "When I saw the faithfulness of that animal in carrying out the wishes of its human master I was ashamed of myself in the presence of the dog."

A hunting dog is busy with eye and ear. Every nerve seems strained to catch the slightest indication of game. But those who know the dog best know he is mainly occupied with his nose. That delicate organ dilates and adjusts itself constantly to every breath of air.

The bird dog knows of the presence of a game bird before he can see it. He scents its location at long range. He is trained to "stand" when he recognizes the scent. With one paw lifted, his nose and tail stretched out to their greatest reach, he points his master to the spot where the game is to be found. At the word of command he moves cautiously forward towards the bird, and when his master is ready another word causes the dog to "flush" the bird, or make it take wing.

The hound upon the track of fox or deer has remarkable power, not only of following the exact track made by the pursued animal, even when some hours have elapsed since the game passed that way, but his scent is so keen that in many instances he is able to tell, when he comes upon such a track, which way the deer or fox was running. Sometimes the hound "takes the back track," but the best dogs are usually so positive in this sense that they make no mistakes as to which way the animal has traveled.

It is common knowledge, but none the less marvelous, that an ordinary dog is usually able to follow his master by scent alone through the crowded streets of the city or across fields where a thousand fragrant flowers and grasses seem to arise on purpose to baffle him.

This marvelous power is not confined to dogs. Many other animals possess it in a remarkable degree. The keenness of this sense in deer, antelopes, and other wild ruminants is so well known that hunters despair of ever approaching them except from the side which gives them the wind in their faces so that their own peculiar scent may be carried away from the extremely sensitive nostrils of their game. The hippopotamus has this sense highly developed and can discover his human enemy without getting sight of him or hearing his approach.

The polar bear climbs upon an iceberg and sniffs afar the dead whale floating his way, although still miles toward the horizon. The camel in the desert is often saved from death by the keenness and accuracy of his olfactory organs, which tell him the direction he must take to fill his depleted reservoir with water.

The North American Indian smells as keenly as he sees, for he can not only detect the presence of human beings by his nose alone, but also surely tell whether they are of his own or the suspected white race. In the Massachusetts Asylum for the Blind was a mute girl named Julia Brace, who knew her friends and acquaintances by the peculiar odors of their hands. Not being able to see them or converse with them, she was compelled to distinguish them by the sense of smell alone. So remarkable were her powers that she was regularly employed in assorting the [Pg 66] clothes of the pupils as they came from the wash, that operation not being far-reaching enough to remove the signs which were known to her alone. The case of James Mitchell, who was deaf and blind from his birth, is remarkable, for he could detect the approach of a stranger in this way.

Those who have made a thorough study of the subject claim that there is a peculiar odor belonging to every class of living beings, and each is subdivided so that each order, family, species, race, and variety is distinct. Furthermore every individual is distinct from the rest of his kind in the odor given off so profusely and unconsciously in most instances.

Horses seem to be somewhat less keen than dogs in noting odors, for a horse which is accustomed to but one groom and will not consent to attendance from another may sometimes be deceived by having the new groom dress himself in the clothes of his predecessor.

Insects possess this sense to such a degree that flies have been the means of locating a dead rat under a floor by their settling over the body in large numbers, although there was no chance for them to reach it. Just where the organs of smell are in insects has been disputed among scientists. Sir John Lubbock is inclined to the opinion that they are located in the antennæ and palpi, though some contend that insects smell as the air is taken in at the spiracles or breathing-holes which are scattered over their bodies.

That fish have this sense to some extent is attested by fishermen who use essential oils upon their bait and secure readier attention from the inhabitants of the water. But fish seem to be less capable of smell than even the reptiles upon land who are not considered at all remarkable in this respect. To make up in some sort for this deficiency there are some kinds of fish which have four nostrils while all other animals that smell at all seem content with but two as a rule.

Only those animals having a backbone are equipped with noses that are unquestionably adapted to smelling, but insects, crabs, and mollusks perceive odors to a limited extent. Some of them are readily deceived by odors similar to those they seek. Lubbock calls attention to the fact that the carrion fly will deposit its eggs on any plant that has a smell similar to that of tainted flesh.

We are unable to say just what the nature of a smelling substance is which makes it so perceptible to our olfactory organs. Many things, both organic and inorganic, have the power to affect us in a way which cannot be perceived by the organs of taste nor touch. The upper third of the interior of the human nose has the sole function of recognizing them. We have almost no names for the various smells, but they are as distinct as day and night and arouse within us the most intense feelings.

We are not only without names for smells, but we are far from being agreed as to the qualities of them. To one person the odor of sweet peas is delightful, while to another it is quite the reverse. Sometimes we consider a smell pleasant merely because of the associations it brings. The odor of pine lumber is grateful to one who has spent a season in the lumber districts where sawmills abound; and so the smell of an ordinary lumber pile gives pleasure to one where to another it is somewhat disagreeable.

The sense of smell is one that tires most readily. After smelling certain odors for awhile one loses temporarily the power to notice them at all. The sense does not tire as a whole, but it merely becomes inoperative with respect to the odor continually present. Almost any perfume held to the nose soon loses its charm, and is only effective again after a temporary absence. But while one perfume is not sensed a new one presented to the nostrils is eagerly appreciated, showing the sense to be fatigued only with regard to what has been there for some time. The owner of a large rendering establishment in a city was called upon by a committee of citizens who objected to the smells arising from his plant. He went out with the committee to inspect the premises and [Pg 67] declared with evident honesty that he could detect nothing disagreeable in the air nor any sort of a scent that did not properly belong to a rendering establishment. Those who work where there are strong and disagreeable odors soon become so accustomed to peculiar smells that they do not notice them at all, although they are keen to detect any unusual odor, as when the liquor in a tanner's vat has not in it the proper admixture of materials.

All the lower animals seem to be positive as to the direction of the source of any scent, but man is powerless in the matter. He merely knows an odor is present, but is unable to tell without moving about whether it comes from one side of him or another. A blindfolded boy cannot tell which side of his nose is nearest to a suspended orange.

To affect this sense a substance must be dissolved or scattered through the atmosphere to be breathed. Whether such substances are divided and used up in giving out odors is still a question. Some of them, as the essential oils, waste away when exposed to the air, but a grain of musk remains a grain of musk with undiminished power after years of exposure. The experiment is such a delicate one in connection with the musk that it has never been settled to the satisfaction of science.

Substances which scatter themselves readily through the air are usually odorous, while those which do not are generally without smell. But many of these when transformed into vapors, as by the application of heat, become strongly odorous. Bodies existing naturally in the gaseous state are usually the most penetrating and effective as odors. Sulphuretted and carburetted hydrogen are examples of these.

College boys sometimes procure from the chemical laboratories of their institutions materials which are used with telling effect on the social functions of higher or lower classes; in one instance a banquet was cleared of guests by the conscienceless introduction of chemicals just before the festivities were to have begun. Efforts to introduce powerful gases as weapons in war have failed because the effect is not confined to the enemy.

Gases which are offensive are not always positively harmful, but as a rule those which offend the nose are to be avoided. Some deadly gases do not affect the sense of smell at all, as in the case of earth damp which stupefies and kills men in mines and wells without warning. But the nose is a great detector of bad air, especially that of a noxious character, and sewer gas as well as other poisonous airs which bring on the worst types of fever are offensive to one who is not living all the time within their range.

But a small part of the mucous membrane of the nose is the seat of this important sense. The olfactory cells are not as easily examined and traced in their connections as are the end organs of the sense of taste. Yet the anatomist finds in the structure of the noses of the flesh-eating animals sufficient indications of their superiority over man in the exercise of the sense of smell. The peculiar development of the membrane and the complicated structure of the nasal cavities in the region occupied by the cells which are supposed to connect with the extreme divisions of the olfactory nerve are all that one would expect from the differences in endowment.

Aside from peculiar powers of smell there are other endowments of noses which are remarkable. The common hog has a snout that is easily moved and has great strength. He can take down a rail fence with it quite as skillfully as a boy would do it. He can turn a furrow in the soil in search of eatable roots, and when the ground is frozen to a considerable degree of hardness he pursues his occupation with unabated zeal and no evident embarrassment.

The fresh-water sturgeon has a large gristle in his nose which boys sometimes convert into a substitute for a rubber ball. His nose is a useful instrument in securing food from the mud in the river bottom. The rhinoceros has a fierce horny protuberance rising from his nose which is valuable to him in war. Indeed some are equipped with two horns, one behind the other. The [Pg 68] female rhinoceros with one horn guides her calf with it, causing him to move ahead of her, but

the female of the kind with two horns does not use them upon her offspring at all except in anger, and her calf is content to follow her in feeding.

On the coast of California is a large seal called the sea elephant which is notable because the adult male has a proboscis fifteen inches in length when in ordinary temper, but under excitement it is noticed to extend itself considerably beyond its ordinary length. The shrew, the tapir, and the horse also possess something of a proboscis which is useful in feeding.

But the elephant is the greatest animal as to the development of this organ. Insect-eating animals have snouts of gristle, but the organ of prehension of the elephant is composed almost entirely of muscles of the most varied and curious structure. Cuvier counted twenty thousand muscles in an elephant's trunk, and then gave up his unfinished task.

This great mass of muscular endowment McCloskie says has improved his intelligence which is not so great as is popularly supposed. "Observation shows the elephant after all to be rather a stupid beast; it is the monkey, the fox, and the crow which are credited by the Hindoos with brute-cuteness, whilst the highest measure of rationality evinced by the elephant is when he plucks off the branch of a tree, using it as a whisk to drive off flies that torment him. It seems that he is very much afraid of flies, will take fright at a mouse, and is always timid and suspicious, none of these being traits of a large mind."

The nose has been connected always with the highest emotions of man. As cats are transported into the seventh heaven by the presence of their favorite weed and rats are similarly affected by rhodium, so man carries a perfume in his pocket-handkerchief for his own delectation or that of his friends, and in many instances weaves into his worship certain rites in which the burning of incense and the offering of a sweet savor has a prominent part. The Eskimo shows his appreciation of his organ of smell by putting it forward to touch that of his friend whom he meets on terms of special endearment.

Antony Van Corlear's large and rubicund nose is gravely recorded by Irving to have been the means of bringing a great boon to the early inhabitants of New Amsterdam because when he fell asleep in a boat one day, the effulgence of the sun at high meridian fell upon his shining feature, was reflected into the deep with such an undiminished power that the beam came into violent contact with a sturgeon, and, by causing the death of the fish at a time when the Dutch were willing to experiment a little in the matter of gustation, thus introduced the habit of eating this excellent fish to the founders of a great commonwealth.

That the near neighbors of the American Dutch also held the nose in high esteem is attested by the fact that when among the American English any of their divines in one of their interminable sermons came upon a series of unusually great thoughts and carried the congregation into the heights of sacred felicity they acknowledged the divinity of the occasion by "humming him through the nose." Much of their singing also was given an unction otherwise impossible to it by their peculiar nasal attitude while worshiping by use of the psalms.

While the nose is a most prominent feature of the countenance and the beauty of the face depends largely upon that member's appearance, there is no one who can say just what shape the nose should have to be most beautiful. Socrates proved his nose to be handsomer than that of Alcibiades because it was better adapted to use. As the nose is used for smelling and the eye for seeing, Socrates maintained that the handsome eyes and nose of the polished young Greek were less useful and less adapted to the purposes for which such organs exist, and therefore the bulging eyes and violently turned-up nose of the philosopher were held to be more beautiful than those of Alcibiades.

FROM COL. CHI. ACAD. SCIENCES.

WHITE IBIS.
3/10 Life-size.

CHICAGO COLORTYPE CO.,

THE WHITE IBIS.

(*Guara alba.*)

LYNDS JONES.

THE white ibis might well serve as the text of a symposium upon the evils of plume-hunting to supply the constant demand of the millinery trade. Suffice it to say here that this species, in common with many other members of its family, and many other birds as well, has decreased to the point of almost complete extermination within the last fifteen years from this cause alone. Surely it must be true that the living bird in its natural environment is far more pleasing to the æsthetic sense than the few feathers which are retained and put to an unnatural use.

As lately as 1880 the white ibis was decidedly numerous in the various rookeries of the southern states, wandering as far north as the Ohio river, and touching southern Indiana and southern Illinois. Two were seen as far north as southern South Dakota. They are now scarcely common even in the most favored localities in Louisiana and Texas, being confined to the gulf states almost entirely, and even there greatly restricted locally.

Like many of their near relatives, the herons, the ibises not only roost together in rookeries, but they also nest in greater or less communities. Before their ranks were so painfully thinned by the plume-hunters, these nesting communities contained hundreds and even thousands of individuals. But now only small companies can be found in out-of-the-way places.

The nest is built upon the mangrove bushes or upon the broken reeds and rushes in the swamps, and is said to be rather more carefully and compactly built than are the herons' nests. The eggs are three or four, rarely five in number, and are laid about May 1 in many localities, later in others. They appear large for the bird. In shape they are usually rather long ovate, and in color are gray or ashy-blue, irregularly and rather heavily blotched and spotted with reddish and umber browns of various shades. Some specimens are very pretty.

The story of their great abundance, persecution, rapid decline, and almost death, if written, would read like some horrible nightmare. Confident in the apparent security of their ancestral gathering-places, they fell an easy prey to the avaricious plume-hunter who, from some vantage-point, used his almost noiseless light rifle or air-gun with deadly effect, tallying his victims by the hundred daily. We are sometimes led to wonder if there is anything so sacred as money.

We might be able to derive some comfort from the thinning ranks of many of our birds, perhaps, if we could be sure that when these were gone the work of extermination would cease. But when one species disappears another, less attractive before, will be set upon, and thus the crusade, once begun, will finally extend to each in turn. This is not theory but fact. Nor will the work of extermination cease with the demand for plumes. Not until repeated refusals of offered plumes have impressed upon the mind of the hunter the utter futility of further activity in this line will he seek some other occupation. It is a shame upon us that killing birds should ever have become an occupation of anyone. A strong public sentiment against feather adornments will yet save from destruction many of our native birds. Can we not arouse it?

THE HELPLESS.

ELANORA KINSLEY MARBLE.

AS the nesting-season of our feathered friends approaches the mind naturally reverts to the grief in store for so many of them. Notwithstanding the efforts of the several Audubon societies, the humane journals, and in rare instances earnest pleas from the pulpit, fashion decrees that the wearing of bird plumage, and the birds themselves, is still *de rigueur* among women. The past season, certainly, showed no diminution of this barbarous fashion—a humiliating thing to record—and so the beautiful creatures will continue to be slaughtered, not by hundreds or thousands, but by millions upon millions, all for the gratification of woman's vanity and a senseless love of display.

Alas, that the "fair" sex in whom the quality of mercy is supposed to exist in a high degree, should still wear above their serene brows—often bowed in worship—the badge of inhumanity and heartlessness. That mothers who have experienced all the pangs as well as joys of motherhood can aid in breaking up thousands of woodland homes by wearing the plumage which makes the slaughter of these birds one of commercial value and necessity. Soon accounts will be published of the fabulous sums to be gained by the heron hunters, and in order to supply the demand for the filmy, delicate *aigrette* to adorn my lady's bonnet, the nesting colony of these snowy egrets will be visited by the plume-hunters and the work of slaughter begin. Love and anxiety for their nestlings will render them heedless of danger, and through all the days of carnage which follow, not one parent bird will desert its nest. Fortunately the birds are instantly killed by the bullet, else, stripped of the coveted plumes they will be thrown in a heap, there slowly to die within sight and hearing of their starving, pleading little ones. These have no value for the plume-hunter, and so off he goes with his spoil, leaving thousands of orphaned nestlings to a painful, lingering death. And all this for a plume, which, in these days of enlightenment marks the wearer either as a person of little education, or totally lacking in refinement of feeling. It is trite to say that motherhood no more than womanhood necessarily implies refinement in the individual, but surely in the former, one would, in the nature of things, expect to find engendered a feeling of tender pity for any helpless animal and its offspring.

It is this phase of the question which particularly appeals to people in whom love, as well as compassion for *all* helpless creatures is strong, not a sentiment newly awakened, or adopted as a fad. That genuine love for animals is inherent and not a matter of education the close observer, I think, will admit. Not that a child cannot be brought to recognize, when caught in any act of cruelty to some defenseless creature, the wanton wickedness of his act, but that no amount of suasion can influence him to treat it with kindness for *love's* sake rather than from the abstract moral reason that it is right.

How can this love for animals exist in a child who has never known the joy of possessing a household pet? In whose presence an intrusive dog or cat is ever met with a blow, or angry command to "get out?" When somebody's lost pet comes whining at the door, piteously pleading for a kindly pat, and a morsel to eat, and is greeted with a kick, or possibly a bullet, under the pretense that the exhausted, panting little animal might go mad? How can a child who has witnessed these things view a suffering animal with any other feeling but calm indifference, or a brutal desire to inflict upon it additional pain? In his estimation every dog is subject to rabies, and every cat infested with fleas.

Paternal apathy in this direction may, to some extent, be remedied by the child's instructors, especially in the kindergarten, where the foundation of character is supposed to be laid. But even there the teacher will fail in arousing a feeling of compassion in a naturally cruel child's mind, unless her own sympathies are genuine, and not assumed for the time or place. Here more than anywhere else, it seems to me, intelligence, if not love, should prompt the teacher to familiarize herself with the treatment necessary not only to the well-being but to the happiness of the little captives held for the purpose of nature-study in her class.

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As spring opens, thousands of would-be naturalists, stimulated by nature-study in schools, will, no doubt, begin their universal search for birds' eggs, not from any particular interest in science, but as they collect stamps or marbles, simply to see how many they can get. In this way millions of birds are destroyed with no thought beyond the transitory triumph and pleasure of getting them. This egg-collecting should not be encouraged by the teachers. On the contrary every boy should be told that a *true* naturalist does not slaughter animals, or rob birds' nests promiscuously; that he is the first to remonstrate against wanton waste of life; that he does not take eggs of common birds at all, and never *empties* a nest unless of a rare bird, and sometimes not always then. These arguments will prevail among a few who have the real naturalist's instinct, but to the many who either do not know, or do not care, about the cruelty they inflict upon the parent birds in thus robbing them of their treasures, another appeal must be made. Picture the family life of the innocent little creatures—a lesson indeed to people of larger growth; how they guard their nests with almost human care and wisdom, and how they cherish their young with as faithful and self-sacrificing love as parents of human families. Impress upon their young minds how many days of toil the mother-bird, aided by her mate, spent in building the nest which they purpose to rifle, of her joy and pride when the first egg was deposited, and all the patiently borne days of brooding which followed. Surely a boy not wholly depraved would be moved by such a recital, and thus thousands of birds be saved, and through their influence, protected. In this way, too, might not the whole question of slaughtering birds for millinery

purposes be solved, for what mother or sister could turn a deaf ear to the reproaches of a child, or to pleadings from young lips for more humane treatment of their feathered friends?

That the small boy is not without wit, and quick to perceive the difference between precept and practice, the following anecdote, I think, will aptly prove:

She was smartly dressed, and when she met one of her scholars bearing off a nest in which were five pretty little speckled eggs, she did not hesitate to stop him.

"You are a wicked boy," she exclaimed indignantly. "How could you rob the birds of their nest? No doubt, at this very minute, the poor mother is hovering about the tree grieving for the loss of the eggs which you carry."

"*Oh, she don't care*," replied the urchin, edging off with a derisive smile, "*she's on your hat*."

FEBRUARY.

The old, old wonder of the lengthening days
  Is with us once again; the winter's sun,
  Slow sinking to the west when day is done,
Each eve a little longer with us stays,
And cheers the snowy landscape with his rays;
  Nor do we notice what he has begun
  Until a month or more of days have run,
When we exclaim: "How long the light delays!"
So let some kindly deed, however slight,
  Be daily done by us, that to the waste
  Of selfishness some light it may impart—
Mayhap not noticed till we feel the night
  Is less within our souls, and broader-spaced
Has grown the cheerful sunshine of the heart.

—*Samuel Francis Batchelder*.

THE IRIS.

IN botany this is the generic name of a number of beautiful plants belonging to the natural order of *Iridaceæ*. The plants have a creeping rootstock, or else a flat tuber, equitant leaves, irregular flowers, and three stamens. They are represented equally in the temperate and hotter regions of the globe. The wild species of iris are generally called blue-flag, and the cultivated flower-de-luce, from the French *fleur de Louis*, it having been the device of Louis VII. of France. Our commonest blue-flag, *Iris versicolor*, is a widely distributed plant, its violet-blue flowers, as may be seen, upon stems one to three feet high, being conspicuous in wet places in early summer. The root of this possesses cathartic and diuretic properties, and is used by some medical practitioners. The slender blue-flag found in similar localities near the Atlantic coast, is smaller in all its parts. A yellowish or reddish-brown species, resembling the first named in appearance, is found in Illinois and southward. There are three native species which grow only about six inches high and have blue flowers. They are found in Virginia and southward, and on the shores of the great lakes; these are sometimes seen as garden plants. The orris root of commerce is the product of *Iris Florentina*, *I. pallida*, and *I. Germanica*, which grow wild in the south of Europe; the rhizomes are pared and dried, and exported from Trieste and Leghorn, chiefly for the use of perfumers; they have the odor of violets. The garden species of iris are numerous, and by crossing have produced a great many known only by garden names. The dwarf iris, *I. pumila*, from three to six inches high, flowers very early and makes good edgings to borders; the common flower-de-luce of the gardens is *I. Germanica*; the elder-scented flower-de-luce is *I. sambucina*. These and many others are hardy in our climate, and readily multiplied by division of their rootstocks. The mourning or crape iris is one of the finest of the genus, its flowers being very large, dotted and striped with purple on a gray ground. The flowers of most of the species are beautiful. Some of them have received much attention from florists, particularly the Spanish, English, and German, or common iris, all corm-rooted species, and all European. The Persian iris is delightfully fragrant. The roots of all these species are annually exported in considerable quantities from Holland. The roasted seeds of one species have been used as a substitute for coffee.

THE LANGUAGE OF FLOWERS.

THE language of flowers is a study at once interesting and innocent, cultivating, as it does, a taste for the works of nature, filling the soul with the sweetest emotions and presenting to view one of the most enchanting phases of a beautiful world full of wonders. Following are a few of the best known flowers and the sentiments which they represent:

Sweet alyssum, worth beyond beauty; apple blossom, preference; bachelor's button, single and selfish; balm, sympathy; barberry, sourness; candytuft, indifference; carnation pink, woman's love; Chinese chrysanthemum, cheerfulness under misfortune; clematis, mental beauty; columbine, folly; red clover, industry; dahlia, dignity; white daisy, innocence; faded leaves, melancholy; forget-me-not, remembrance; jonquil, affection returned; lily of the valley, return of happiness; myrtle, love in absence; pansy, you occupy my thoughts; moss rose, superior merit; red rose, beauty; white rose, I am worthy of love; sunflower, haughtiness; yellow rose, infidelity.

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IRIS.

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THE PEACOCK.

ANNA R. HENDERSON.

AS THE rose among flowers, so is the peacock among the feathered tribes.

No other bird has so many colors in its plumage. Its hues are all beautiful; the brilliant blue and black, shot with gold, of the eyes of the tail, the satin-like peacock blue of its neck and breast, the shining green of its back, each feather with its tiny eye of brown, the clear brown of the stiff fan that supports its tail, the soft gray down that clothes its body—all are fit robing for this royal bird.

In keeping with his kingly raiment is his regal movement; so graceful, so dignified, that one seems disposed to believe the legend of India, his native home, that he contains the metamorphosed spirit of a peerless prince. I have said that his step is kingly, yet I am often disposed to yield to the opinion of an old man who declared that the gait of the peacock is queenly, much like that of a beautiful and graceful woman with a long train. Certain it is, that nothing else can make such an addition to a green lawn as a peacock, stepping lightly along, keeping his brilliant feathers swaying just above the grass.

My West Virginia home has many beauties of nature, shady dells where waters sparkle, pastures that slope toward the shining Ohio, lofty trees that give shade to sleek cattle and spirited horses; but amid all these charms we have always rated highly the gorgeous peacocks which have so long adorned its grounds that it has become known as the "Home of the Peacocks." Though now sadly diminished by poachers and hunters, there were many years in which scores of them, sometimes nearly a hundred, strutted around our rural home.

The peacock's tail does not assume full length and beauty until his fourth or fifth year. The feathers begin to grow in January, and by early spring are long, and then his season of strutting begins; and he spends a large part of every day in this proud employment. Each peacock has his favorite place of strutting, and frequents it day after day. Open gateposts are much sought after; and our front gateposts have always been favorite resting-places on sunny afternoons, where these beauties seemed posing to order.

For many seasons a very handsome one strutted in front of our sitting-room window. Some of the family slipped over its neck a cord on which hung a silver dime, which shone on its blue feathers. Alas for his majesty! Strutting in the road one day, a horse shied at him, and its owner threw a stone and killed the beauty.

The peahen, a meek-looking matron with a green neck and long gray feathers, is very secretive as to a nest, and seeks an orchard or wheatfield. When the little gray brood, from three to five in number, are a few weeks old she brings them to the yard.

Peafowls scorn the shelter of a house and roost in the loftiest trees. Near our home are some tall oaks and under them they gather on summer evenings, and, after many shrill good-night cries, fly upward to the high limbs.

In cold weather they do not come down until late in the day. Sometimes on snowy days they get so weighted with snow that they cannot fly up, and so settle on the ground, and their long feathers freezing, have to be cut loose. In June or early July their feathers begin to drop, and to secure them they must be plucked. Though so docile as to frequent the porches, they do not like to be caught, but take to the wing, so a rainy day is selected, when their feathers are weighted with water, and they are soon chased down. After being plucked they are unsteady in gait and hide in the bushes for days.

Peafowls have a strong home-feeling and when taken away are hard to retain; as they wander off, striving to return. They are enemies to young chickens, and are exasperating to the good housewife, as they are hard to drive away, performing a circle and returning. The peafowl is almost as good a table fowl as the turkey.

OWLS.

JOHN WINTHROP SCOTT.

BIRDS that fly in the night and whose wings move so smoothly through the air that they make no noise act much like the burglar that gets into your house quietly when you are asleep to steal your money. But the owl is not a burglar. He is the friend of man. There is no other bird that does the farmer so much good as the owl. The owl comes out in the dark to get the small animals that are out at that time stealing things from the farmer. So we may call the owl the night watchman of the farm. He sometimes comes out in the daytime, but most owls prefer the night or at least a dark day.

The owl has been called a wise bird for the same reason that some men are thought to be wise—he looks wise. One reason he looks so steadily at you that you think he is studying you is because the light is so strong in the daytime that his sight is bad. But the owl is not as wise as he is said to be. He does some foolish things as well as other birds. In fact he is sometimes more foolish than any other bird would be in the same place. One owl was known to sit for more than a half day under a leaking water tap. The water fell at the rate of twenty drops a minute right down upon the owl's head, and yet he was not wise enough to move out of the wet.

All owls are not too stupid to learn. Puffy, a tame young owl, caught and ate a two-pound pullet. An old hen afterwards took a fancy to his perch. She went in and gave the little owl a sound whipping, and after that shared the perch with him. He never forgot the lesson the hen had given him and always treated her well.

Owls have a way of hiding from notice by making believe they are something besides owls. They can move their feathers so as to change their looks entirely. The great horned owl sometimes makes himself a frightful mass of feathers a yard wide, and at other times he seems to be a very slim bird, too thin for an owl. Puffy once got away from his master. He flew to the top of a stump and sat like a stake for an hour while his master looked all round the place for him without knowing there was a bird on the stump in plain sight. Owls draw the feathers away from their mouths in an odd way when they eat, and when walking softly to steal upon a mouse tuck up their feathers as a lady lifts her skirts.

Owls are fond of mice. A boy who had a half-grown barn owl tried him one day to see how many mice he would eat. The first four mice went down the owl's throat very quickly. Then number five and number six were eaten in a short time. Number seven did not go down quite as rapidly and number eight was slower still. Number nine was taken greedily, but the owl could not swallow it. The tail hung out of the owl's mouth for awhile before it could be fairly counted. Then no more were eaten till about three hours after, when the owl was pleased to take four more mice.

The gopher is a small animal that does damage to growing things. It digs up corn after it is planted, and it gnaws the roots of fruit trees so as to hurt them badly. Owls catch gophers and eat them. This is one reason why the farmer likes the owl so well. Barn owls sometimes roost with pigeons, but they are good friends. We know they do not eat the pigeons because owls swallow their food whole and have to throw up the bones afterwards, and it is known that the owls living with the pigeons throw up bones of rats and mice but not of pigeons.

Sometimes so many mice have come upon the farms in England that it looked as if everything would be eaten up by them. But a great many owls always came when the mice were so thick and helped the farmers save their crops. One owl was seen to make, in thirty minutes, seventeen trips to her young with food. [Pg 79]

A gentleman living in the West when there was so much damage done by grasshoppers found that the owls were living on them and not eating much of any other kind of food. The only way he could tell what the owls had for supper was to shoot an owl once in awhile and see what was in its stomach. One barn owl had thirty-nine locusts, twenty-two other insects, and one mouse which it had just taken. Screech owls and burrowing owls usually had more than two dozen locusts, and some of them had other kinds of insects.

A rabbit, a weasel, a mink, or even a skunk is good eating for the owl. And there are times when one owl will make a meal of another owl of smaller size. A large red-tailed hawk was once put into a garret where there was a snowy owl. That night the hawk was killed and partly eaten by the owl. A tame great horned owl and a little screech owl were shut up in a hay loft together. The wings of the big owl were cut so he could not fly. After about a week they both became one owl, and that owl threw up the claws, beak, bones, and feathers which had once been useful to the little screech owl.

Owls sometimes catch partridges and quails. This is not so bad, for they pick out the weak birds that are not well, and so keep disease from spreading among the fine birds. A hunter once shot a bob white so that it was not killed but could not fly. He and his dog were chasing the bird in the grass along a fence hoping to catch it. An owl saw the wounded bird and thought it belonged to him because it was not well. He came out of the woods very swiftly and picked up the bob white right before the eyes of the hunter.

In woods where there are panthers one will often hear in the night fearful cries that make it seem as if some wild beast were about to jump down from some tree near by to kill the one who is out so late. Most of these cries which frighten people so are made by hoot owls. But it is not easy to

tell whether the sound comes from a hoot owl or from the throat of a wild cat. There is a saying among country people who wish to seem wise: "I wasn't brought up in the woods to be afraid of owls."

The hoot owl has so many wild notes in his voice that it is not at all strange that he scares people who have not been brought up in the woods. Before he sends out his proper hoot he sometimes seems to try to frighten everybody out of the forest with his awful shrieks. Sometimes several hoot owls get together in the night to hold a concert. One of them seems to tell a funny story and all the rest break out with shouts of *he-he-he-he-hi-hi-hi-hi-ha-ha-ha-ha*, and then they become as solemn as any other owls, and the stillness of the night is perfect until another owl has a droll story or song to set the rest a-shouting at.

The owl is brave. One that weighed less than six ounces once fought a nine-pound rooster. A teamster in Maine once went to sleep on top of his load while his horses ate their oats beside a forest road. When he pulled the blanket away from his face an owl pounced down upon it, perhaps thinking his white skin was a rabbit, and tore his cheeks fiercely. He was much frightened, having just awakened. But he caught the owl and killed it after a short struggle, and called himself lucky because his eyes were not put out by the bird.

If the owl is a sober and wise bird he forgets all about it when he woos his mate. Such awkward dancing and foolish boo-hoo-ing is never seen except when the owl is trying to choose a mate for life. But he makes up for his awkwardness when there are eggs to sit upon, for the owl is the best husband a bird ever had. When there is room in the old hollow where the nest is he will sit on the eggs with his wife and help her hatch the puffy little owl children.

Owls are the best of parents, too, for they will risk their own lives freely to protect their young. If their nests are robbed and the old birds can find where their young ones are caged they will come daily with food for them though they are in great danger in doing so.

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They lay their eggs earlier than other birds, and often the falling snow covers the back of the sitting bird. The warmth of her body melts it so that water runs gently down through the nest and forms icicles that hang below and glisten in the sunshine to tell of the faithful conduct of the mother owl.

Small birds, as a rule, hate owls, and they delight in getting round these great awkward fellows whenever they can catch them by day and doing all they can to hurt their feelings. Bird-catchers sometimes catch small birds because they are so fond of teasing owls. An owl is caught and tied to a tree. The tree is covered with sticky stuff called bird lime. As soon as a little bird sees the owl in the tree he cries to his friends and they come in great crowds to tease the owl. But the small birds find their desire to torment ends in their own capture, for they cannot get away from the bird lime until the trapper comes along and gathers all the little birds that are hanging to the sticky limbs and twigs about the big bird they were trying to tease.

THE DUCK MOLE.

WE ARE indebted to Dr. George Bennett for the first good description of the duck mole (*Ornithorhynchus anatinus*) which was an object of wonder to naturalists long after its discovery. This enthusiastic investigator traveled to Australia for the sole purpose of observing the animal. Up to that time little was known of it. We simply knew that the duck mole lives in the water and was persistently hunted by the natives, as it yielded a savory flesh and laid eggs. The latter discovery was made by Caldwell in 1884.

The duck mole is about two feet in length, six inches of which are included in the tail. The males are larger than the females. The legs are very small, all four feet being five-toed and webbed. All the toes are very strong, blunt, and excellently adapted for digging. The middle toes are the longest. The tail is flat and is broad at the end, the extremity being formed by long hairs. It is abruptly cut off, and in old animals is either entirely naked beneath or covered with a few coarse hairs. In young animals it is quite hairy. The adult animal has only four horny teeth in its two jaws, of which the upper front tooth is broad and flat and resembles a grinder.

The fur of the duck mole consists of a coarse outer coat of a dark brown color with a silvery-white surface tinge, and a very soft, grayish inner fur, similar to that of the seal and the otter. A peculiar fish-like odor is given forth by the fur, especially when it is wet. The Australians, however, are very fond of the flesh of the animal in spite of its disgusting odor. The duck mole is said to be fondest of calm spots in rivers filled with aquatic plants and the banks of which are shaded by the dense foliage of trees; and it constructs more or less complicated burrows in the banks. A tunnel about eighteen feet long terminates in a large chamber, both the chamber and its approaches being strewn with dry aquatic plants. The chamber usually has two entrances, one below the surface of the water, and the other about twelve inches above.

The duck moles are seen at all times in the rivers of Australia, especially during the spring and summer. They emerge from their retreats at dusk, though they sometimes also appear in the day time, searching for food. When the water is clear, the observer can follow with the eye the movements of the animal as it dives and reappears above the surface. It likes to stay near the shore, amidst the mud, searching for its food between the roots of the plants, where insects abound. The mollusks which it captures in its forays it stores temporarily in its cheek-pouches and then consumes them at greater leisure.

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From col. Chi. Acad. Sciences. DUCK-BILLED PLATYPUS. 3/7 Life-size.

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"On a beautiful summer evening," says Bennett, "I approached a small river in Australia, and as I knew the predilection of the duck mole for the hour of dusk, I tried to obtain a glimpse of one. With a constant grasp on our guns, we patiently stood on the shore. It was not long before we saw a black object appear near us on the top of the water, the head being raised but little above the surface. We stood motionless, lest we should scare the animal, carefully observing and following its movements, for one must be ready to shoot just as the duck mole reappears after diving. Only a shot in the head is effective, as the loose, thick fur will not allow a bullet to penetrate it readily. We wounded one which gave evidence of severe injury and sank immediately, but soon rose again. When the dog brought it to us we found it to be a fine male. Several minutes after it had been brought out of the water it apparently revived, and, instantly rising to its feet, staggered toward the river. About twenty-five minutes later it turned over several times and then died. As I had heard much about the danger of being pierced by its spur even when the animal is mortally injured, I put my hand near the so-called poisonous spur at the first grasp. In its violent exertions to escape the animal scratched me slightly with its hind paws and also with its spur, but despite the roughness with which I seized it, it did not wound me intentionally. I had also been further told that the duck mole lay on its back when it wished to use the spur, which statement will not be received as at all probable by anyone who knows the animal in ever so slight a way. I put it in this position, but it only strove to regain its feet without attempting to wound me by using its spur. In short, I tried in every way to induce the animal to make use of its spur as a weapon, but in vain; and I am perfectly convinced that the spur has

another function than that of a weapon. The natives characterize the spur as 'mischievous,' that being with them a word which in general conveys the idea of dangerous or poisonous character; yet they use the same expression in speaking of the scratches inflicted by the animal with the hinder feet, and they are not at all afraid of seizing a living duck mole. When the queer creature runs along the ground, it produces an impression of something unnatural, and its strange shape easily startles a timid person. Cats instantly take flight at its appearance, and even dogs, which are not specially trained, stare at it, prick their ears, and bark, but are afraid to touch it."

On another voyage Bennett discovered a burrow containing three young ones, upon which the hair had already grown, and which he could observe for some time. When he found the nest with the young ones and placed them on the ground, they ran to and fro, but did not make such savage attempts to escape as did the old ones. The natives, whose mouths watered at the sight of these fat young animals, said that they were about eight months old, and added that the young duck moles were fed milk by their mother only during their early infancy and later were given insects, small shells, and mud.

At evening Bennett's two little pets emerged from their cage at dusk and usually ate their food; then they began to play like a couple of young dogs, attacking each other with their beaks, lifting their fore paws and climbing over each other. They were very lively. Their little eyes gleamed and the apertures of the ears opened and closed in remarkably rapid succession. As their eyes stand quite high on their heads they cannot see very well straight ahead, and therefore are apt to come into collision with near-by objects. The young animals survived only five weeks.

The duck mole lays several soft-shelled eggs. The eggs are hatched in the nest. The newly-hatched young are small, naked, blind and as helpless as those of the pouched animals. Their beaks are short.

In the zoölogical garden at Melbourne duck moles have occasionally been kept of late years, but none have, thus far, reached Europe or America alive.

Brehm says that the duck mole is the last among the known mammals.

THE HIBERNATION OF ANIMALS.

NATURE presents no greater or more curious phenomenon than the habit of certain animals to conceal themselves and lie dormant, in a lethargic sleep, for weeks and months. It is known that in perfect hibernators the processes of nature are interrupted during the period of this long insensibility. Breathing is nearly, and in some animals, entirely suspended, and the temperature of the blood even in the warmer blooded animals, falls so low that how life can be maintained in them is a great mystery.

A variety of Rocky Mountain ground squirrels, when in perfect hibernation, says an observer, has a temperature only three degrees above freezing point of water, and when taken from their burrows are as rigid as if they were not only dead, but frozen. But a few minutes in a warm room will show that they are not only alive, but full of life.

As to the suspension of breathing in hibernators, the fact is proved sufficiently in the instances of the raccoon and the woodchuck. When they have laid themselves away for the winter sleep they roll themselves up comfortably and press their noses in such a position against their hinder parts that it would be an absolute impossibility for them to draw a breath. It is generally supposed that the bear rolls itself up in this way and does not breathe, but the holes melted in the snow beneath which the animal frequently stows itself, under a covering of leaves, prove that it does breathe while in its lethargy.

The marmot family produces the soundest winter sleepers. When the marmot is in its peculiar state of hibernation the electric spark will not rouse it. The most noxious gases do not affect it in the slightest. If its temperature is raised above that at which the animal breathed in its natural state it will die almost immediately.

Our own familiar wild animals, the bear, the raccoon, and the woodchuck—the so-called ground-hog—are classed as perfect hibernators, because they store no food for winter, but have acquired or provided themselves with a thick, fatty secretion between the skin and flesh, which, it is supposed, supplies them with sustenance. As a matter of fact, although dormant animals absorb fat, it does not enter into their digestive organs. Food introduced into the stomach of a hibernating animal, or reptile, by force or artificial means, will be found undigested at all stages of its lethargy, for it invariably goes into its peculiar state on an empty stomach. That is one of the mysteries of the phenomenon, not so great, however, as the fact that bears and woodchucks produce their young during their winter sleep. The male bear is frequently roused from his sleep and is found by the woodsman roaming about in mid-winter, but they have never known, they say, a female bear to be killed after the season for hibernation has set in.

Squirrels are only partial hibernators, from the fact that they work all summer and fall storing great quantities of food to supply them when hunger wakes them up during the winter, some of them, no doubt, spending very little time in a lethargic sleep.

The common land tortoise, no matter where it may be, and it is a voracious feeder, goes to sleep in November and does not wake up again till May, and that curious animal, the hedgehog, goes to sleep as soon as the weather gets cold and remains in unbroken slumber six months.

Bats, at the beginning of cold weather, begin to huddle together in bunches in hollow trees, dark corners in deserted houses, and in caves and crevices in the rocks. They gradually lose all sensibility, and continue in a comatose state until the return of genuine warm weather. When you see the first bat of the season fluttering at nightfall you can be sure that warm weather has come to stay. The little hooks at the end of one of the joints of each wing are what the bat hangs itself up by when it goes to sleep, whether for a day or for months. When the bats are clustering for hibernation one of the number hangs itself up by its hooks, head downward, and the others cling to it. It is on record that sixty bats have been found in one cluster, the entire weight of the lot being sustained by the one bat clinging with its hooks to whatever it had fastened them to at the start—a weight of at least ten pounds. The position of the central bat in such a cluster would be like that of a man hanging by his thumb-nails and supporting the weight of fifty-nine other men. So completely is animation suspended in the bat during the cold months that no test yet applied has induced it to show the least sign of life. Torpid bats have been inclosed by the hour in air-tight glass jars and not a particle of oxygen in the jars has been exhausted when they were taken out, showing that the bats had not breathed.

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As cold drives certain animals, insects, and reptiles to a state of torpidity, so heat and lack of water bring about the same condition in others. The animal or reptile that hibernates, or goes to sleep in cold weather, arranges its body so that it will conduce to the greatest warmth, while those that estivate, or become torpid in warm weather, place themselves in positions that show that they want all the coolness the climate will permit. The tenric, a tropical animal, carnivorous and insectivorous, becomes torpid during the greatest heat, and lies on its back with its body drawn to its greatest length, and its limbs spread wide apart. Snakes estivate in the South, all kinds together, just as snakes hibernate in the North, but instead of rolling themselves in great balls, as the northern snakes do, they lie singly, and stretched to their full length.

Want of water will cause the common garden snail to go into a state of the most complete and curious lethargy. This is the snail of the genus Limax, not the larger one of the genus Helix. In the latter the phenomenon of hibernation is especially remarkable. In November the snail forms just a soft, silky membrane across the external opening of its shell. On the inner surface of that it

deposits a coating of carbonate of lime, which immediately hardens the gypsum. This partition is again lined with a silky membrane. The snail then retires a little further into the shell and forms a second membranous partition, retiring again and again until there are six of these partitions between the snail and the lime-coated door at the entrance of the shell. In the recess behind all these partitions the snail lies torpid until May. All this time it lives without motion, without heat, without food, without air, without circulation or the exercise of any of its functions. If this snail is prevented from hibernating for several seasons by keeping it in a warm room, it will gradually waste away and die. A case is known where several snails of this genus were shut in a perforated box without food or water. They retired into their shells and closed them with a thin membrane. They remained so for three years, but revived when put into torpid water. They had been driven into torpidity by drought. The blood of this animal is white.

It may be of interest to state in connection with these animals who pass half the year, or less, in sleep, that there are several species of fish, reptiles, and insects which never sleep during their stay in this world. Among fish it is now positively known that pike, salmon, and gold-fish never sleep at all. Also that there are several others of the fish family that never sleep more than a few minutes during a month. There are dozens of species of flies which never indulge in slumber, and from three to five species of serpents which the naturalists have never been able to catch napping.

Apollo has peeped through the shutter,
And awakened the witty and fair;
The boarding-school belle's in a flutter,
The two-penny post's in despair.
The breath of the morning is flinging
A magic on blossom and spray,
And cockneys and sparrows are singing
In chorus on Valentine's day.

—*Praed.*

THE CAPE MAY WARBLER.

(*Dendroica tigrina.*)

LYNDS JONES.

THERE is hardly another group of birds that yields so satisfactory returns for earnest study as the American wood warblers. All shades and patterns of color are theirs, from somber to brilliant, from the plainest to the most intricate and exquisite pattern. Almost all degrees of vocal ability are found among them, from the simple twitter of the Tennessee to the wild thrilling challenge of the Louisiana water thrush or the ventriloquial antics of the yellow-breasted chat. Many bird students, it is true, regard the group as too difficult for any but the professional ornithologist to attempt; and that may be true of the females and of the autumnal plumages of the young, but the spring males are a constant inspiration and delight to one who admires variety in beauty.

It may be objected that the small size of the warblers renders their field study difficult, even if the foliage does not prove a serious hindrance. One must remember, however, that most small birds are not wary and that they may be closely approached, so that, with a good field-glass (and every bird-student should use one) their colors and the pattern of their dress can readily be made out even in the lower tree tops, where many of them feed. Foliage is always in the way, but even that can be circumvented by patience and perseverance.

The study of adult males in spring is greatly aided by the fact that each species, with some exceptions, has one or more patches of color peculiar to itself. Thus in the Cape May warbler the ear patches are rufous. Other species possess rufous colors, but none of them in this place.

The Cape May warbler belongs among the less common species, but may be common for a day or two during the height of the migration. It is very fond of orchards where it feeds among the foliage, snatching an insect here, a larva there, and cleaning the bundle of eggs from the leaf over yonder with an untiring energy. They also associate more or less with the other warblers in the woods. They are of great value to the fruit grower.

This species is found from the Atlantic coast west to the plains and north to Hudson's Bay, passing the winter in the tropics. It breeds from northern New England to Hudson's Bay and probably in northern Minnesota. The nest is built in a low bush in a wooded pasture or open woodland, said to be partially pensile. The nest and eggs are not readily distinguishable from those of several other warblers. The males sing frequently from their perch on the topmost twig of a spruce tree, thus misleading one as to the whereabouts of the female and nest. The song resembles somewhat that of the black and white warbler, but is rather less wiry. It cannot be represented on paper.

The tongue of this bird is worthy of special notice. It is cleft at the tip, and is provided with somewhat of a fringe. This character is not peculiar to this species, but is found in some honey creepers and in at least one foreign family of birds, thus suggesting, at least, the relationship of the warblers as a group. It might be asked, what is the significance of this character as regards feeding-habits? Apparently nothing, since the feeding-habits and food do not differ from those of other warblers not having the cleft tongue as greatly as the tongues themselves differ in structure. It is apparently an aberrant character developed somewhat at random among groups nearly related, or perhaps a remnant of structure.

FROM COL. CHI. ACAD. SCIENCES.

CAPE MAY WARBLER.
Life-size.

SNOWFLAKES.

Falling all the night-time,
Falling all the day,
Silent into silence,
From the far-away;

Stilly host unnumbered,
All the night and day
Falling, falling, falling,
From the far-away,—

Never came like glory
To the fields and trees,
Never summer blossoms
Thick and white as these.

To the dear old places
Winging night and day,
Follow, follow, follow,
Fold them soft away;

Folding, folding, folding,
Fold the world away,
Souls of flowers drifting
Down the winter day.

—*John Vance Cheney.*

A TIMELY WARNING.

WHILE a British brig was gliding smoothly along before a good breeze in the South Pacific, a flock of small birds about the size, shape, and color of paroquets settled down in the rigging and passed an hour or more resting. The second mate was so anxious to find out the species to which the visiting strangers belonged that he tried to entrap a specimen, but the birds were too shy to be thus caught and too spry to be seized by the quick hands of the sailors. At the end of about an hour the birds took the brig's course, and disappeared, but towards nightfall they came back and passed the night in the main-top. The next morning the birds flew off again, and when they returned at noon the sailors scattered some food about the decks. By this time the birds had become so tame that they hopped about the decks, picking up the crumbs. That afternoon an astonishing thing happened. The flock came flying swiftly toward the brig. Every bird seemed to be piping as if pursued by some little invisible enemy on wings, and they at once huddled down behind the deck-house. The superstitious sailors at once called the captain of the brig, who rubbed his eyes and looked at the barometer. A glance showed that something was wrong with the elements and the brig was put in shape to out-ride a storm. The storm came down about twenty minutes after the birds had reached the vessel. For a few minutes the sky was like the waterless bottom of a lake—a vast arch of yellowish mud—and torrents of rain fell. Why it did not blow very hard, no one knows; but on reaching port, two days later, the captain learned that a great tornado had swept across that part of the sea. The birds left the vessel on the morning after the storm and were not seen again.

A WINDOW STUDY.

OLIVE THORNE MILLER.

ONE of the best places to study birds is from behind the blinds of a conveniently-placed window, where one can see without being seen.

My window one July looked into the tops of tall spruce trees, relieved here and there by a pine, a birch, or a maple. This was the home of the most fascinating and the most bewildering of feathered tribes, the warblers, and a rugged old spruce tree was a favorite "Inn of Rest" for every bird in the vicinity.

In all the years that I have known birds I have carefully avoided becoming interested in warblers, so tiny, so restless, so addicted to the upper branches, so every way tantalizing to study. But here, without intention on my part, fate had opened my windows into their native haunts, even into the very tree-tops where they dwell. "He strives in vain who strives with fate." After one protest I succumbed to their charms.

My principal visitor was a beauty, like most of his distinguished family, having a bright yellow head, set off by a broad black band beginning at the throat and running far down the sides, and he bore the awkward name "black-throated green warbler."

A bewitching and famous singer is this atom in black and gold. And not only is his song the sweetest and most winning, but the most unique, and—what is not generally known—the most varied.

The song that has been oftenest noticed, and is considered characteristic of the species, is sometimes syllabled as "trees, trees, beautiful trees," sometimes as "hear me Saint Theresa." But in my intimate acquaintance with some of the family that July I noted down from my window alone eight distinctly different melodies. My special little neighbor, who spent hours every day in the old spruce, sang the regulation carol of his tribe, but he also indulged in at least one other totally unlike that. Those two I have heard and seen him sing, one directly after the other, but he may have had half a dozen arrangements of his sweet notes.

Sometimes the mate of my spruce-tree neighbor appeared on the tree, going over the branches in a businesslike way, and uttering a loud, sharp "chip."

One morning there suddenly broke out in the old spruce a great clatter of "tick-et! tick-et!" in the voice of a nestling. I snatched my glass and turned it at once upon a much-excited warbler, my black-throated green. He was hopping about in a way unusual even with him, and from every side came the thread-like cries, while the swaying of twigs pointed out a whole family of little folk, scrambling about in warbler fashion and calling like bigger bird babies for food. They were plainly just out of the nest, and then I studied my spruce-tree bird in a new role, the father of a family.

He was charming in that as in every other, and he was evidently a "good provider," for I often saw him after that day going about in great anxiety, looking here and there and everywhere, while a small green worm in the beak told plainly enough that he was seeking his wandering offspring.

During the remainder of the month I frequently saw, and more frequently heard, the little family as they followed their busy parents around on the neighboring trees.

One day I noted the singer flitting about the top of the spruce, singing most joyously, and almost as constantly as before the advent of the nestlings, while the mother was hurrying over the lower branches of the same tree, collecting food for one youngster. Suddenly the song ceased, and the tiny papa joined the family party below, and addressed himself with his usual energy to the business of filling that greedy mouth. [Pg 91]

Over and under and around and through the branches he rushed, every few seconds returning to stuff a morsel into the always hungry mouth, till he actually reduced that infant to silence, and then he slipped away, returned to his tree top, and resumed his lovely "tee-tee-tweetum!"

Somewhat later I heard the baby black-throats at their practice, droll, quavering attempts to imitate the musical song of their father. They soon mastered the notes, but the spirit was as yet far beyond them.

This happy life went on before my window till, almost at the end of July, a heavy fog swept in one evening from the ocean, and when, the next day, a cool north wind blew it back whence it came, it seemed to take the whole tribe of warblers with it. August was now upon the threshold, and in the bird world at least

"Summer like a bird had flown."

FIVE LITTLE WOODMEN.

E. F. MOSBY.

OUT of the woods they come, visiting our homes wherever they see a standing invitation in the shape of a tree. But each one has his preferences. One likes the evergreens best, another the bare trunk where it is easy to break the bark, and still another likes a fresh tree like the magnolia, glossy and full of life even in winter. You have guessed these are birds? Yes; and the small downy woodpecker comes first, and in all weathers. The other day after a sun-rise of gold and a splendid rainbow arch, swiftly blotted out by a black storm with scudding rain and flying leaves, I caught sight of a tiny downy, in the very heart of all the uproar of the elements, busily pecking his way up a tree near my window. On another winter day, sunny and calm, he came flying overhead with a loud rattling note that spoke of good cheer in most neighborly fashion. It is a family, at the very least, that visits us. There are variations in size, if I mistake not, and one day a pair arrived together; the female with her glossy black velvet crown almost as handsome with her broad white satin stripe down the middle, and black and white markings, as her mate, who, indeed, only outshines her by the lovely band of red on the head or nape of his neck, as you choose to call it. I fancy she is the more anxious housekeeper. At least, it was her persistent call-note, rather sharp in tone, that drew me from my lounge to watch her quick movements on the bark, and it is she that more quickly takes flight. He seems never disturbed by his inquisitive human neighbors, nor even the impudent sparrows—though he can send these to the right about if he pleases—and his tap, tap, tap, like a small drummer on the tree-trunk, is always pleasant to hear. I am glad to know they both have a cozy little home, a hole on the southern side of a tree, where the sun shines on good days, and fancy them tucked into round balls of feathers, only to be distinguished by the red on top, and comfortably asleep, when neither pleasure nor necessity invites them abroad.

The yellow-bellied sapsucker is also a winter guest, but he is far more timid than the downy, and I have often seen him routed by the sparrows or scared off by a sudden sound. The male is very gay in plumage, with much mottled yellowish brown on back, conspicuous white stripes on wings, beautiful clear yellow and black in front, scarlet on his head and cardinal at his throat. The [Pg 92] female has a white throat and cardinal or black cap. I have noticed one with a cardinal cap that had little black feathers sticking here and there like an emery bag. They are very full of fun, even riotous in play, and shout, in their summer home—the woods of the north—but they are very quiet when wintering with us, and often flit away without a sound.

Of the nuthatches, the pretty white-breasted one with his soft bluish-grey coat and shining black head, is our familiar resident and the red-breasted an occasional winter companion. They are charming little birds, not specially musical, though their call is vigorous and friendly, but very pretty and gentle, and awakening perpetual wonder and admiration at their feats as acrobats, running as lightly head downwards as in a natural position, and showing equal swiftness and grace in every movement, whether with aid of wings or without. They never seem in the least afraid of us, but raise their softly rounded heads and look at us with a most delightful confidence.

The brown creeper is like a bit of the trunk in his brown tints, mottled as if in mimicry of the play of light and shadow on the bark. He is as truly a tree-creature as ever Greek fable devised, and can so flatten himself, when alarmed, against a tree that no inch of his light breast is visible, and it is difficult, indeed, to recognize him as a separate being. He is the one species found in America of quite a large Old World family, and has some odd characteristics. First, his long tail, used to aid him in climbing, is rather curved and stiff and generally worn by constant use. His bill is also curved, so that the profile of his figure is like a relaxed bow as he works his plodding way up the side of the tree, diligently seeking insects, eggs, and larvæ, in the minute crevices of the bark. He sticks his little nest, made, of course, of bits of dead wood, bark, and twigs, between the tree and a strip of loose bark, very like a part of the tree itself, and the eggs are spotted and dotted with wood colors, brown in different shades, and lavender. Altogether his life is a tree-study; the tree is to him home, model, hunting-ground, hiding-place, and refuge. He never descends by creeping, but when he wants to search a lower part of the trunk, he flies to the base, and begins it all over again. In the summer fir-wood, farther northward, it is said he sings, but in winter-time we hear only a faint squeak, a little like one bough scraping against another.

The black-and-white creeping warbler is very like our sober brown creeper in habit, but he, like most of his gay brethren, is only a summer guest. In his place we have Carolina chickadees and golden-crowned kinglets—and even, by good luck, an occasional ruby-crowned. All these tiny creatures have the most charming and airy ways of flitting from bough to bough, swinging lightly from the utmost end of a bough, daintily dropping to unexpected resting-places, and rarely pausing for a second's breathing-time anywhere. The Carolina chickadee is said to have a longer note and more varied *repertoire* than his northern cousin, yet whenever I have heard him in winter weather, there is the same silvery and joyous tinkle of showering *Chick-a-dee-dee-dees* from the pretty gray and black-capped flock that I have heard in Massachusetts. Perhaps the variations are more evident in his summer singing.

I have left the kinglet for the last, but it is hard to do justice to this lovely little bird that, if the food-supply be all right, will often elect to stay with us in winter rather than migrate to Mexico. His colors are exquisite, olive-green bordered by darker tints that throw the green above and the yellow-tinted white below into fine relief; a brilliant crown of reddish-gold, bordered by black and yellow, and every feather preened to satiny smoothness. He gleans his food merrily, singing or

calling softly to himself as he works. His nest is built in the far northern forests, sometimes swinging as high as sixty feet, and woven of pale green mosses, lined with strips of the silky inside back and down for the many nestlings.

[Pg 94]

Butter-nut.

Edible pine.

Cross section Black Walnut.

PRES. BY CUNEO BROS.

Cocoa-nut.

Butter-nut in husk.

Black Walnut.

[Pg 95]

THE COCOA-NUT.

THE fruit of the cocoa-nut palm, (*Cocos nucifera*), which is the most useful tree of all its tribe to the natives of the regions in which it grows, is one of the most valuable and important of commercial products. On the Malabar and Corvomandel coasts of India the trees grow in vast numbers; and in Ceylon, which is peculiarly well situated for their cultivation, it is estimated that twenty millions of the trees flourish. The wealth of a native in Ceylon is estimated by his property in cocoa-nut trees, and Sir Emerson Tennent notes a law case in a district court in which the subject in dispute was a claim of the twenty-fifth twentieth part of an acre of palms. The tree is very beautiful and lofty, growing to a height of from sixty to one hundred feet, with a cylindrical stem which attains a thickness of two feet. It terminates in a crown of graceful leaves. The leaf sometimes attains a length of twenty feet, consists of a strong mid-rib, whence numerous long, acute leaflets spring, giving the whole, as one traveler described it, the appearance of a gigantic feather. The fruit consists of a thick external husk or rind of a fibrous structure, within which is the ordinary cocoa-nut of commerce. The nut has a very hard, woody shell, inclosing the kernel, within which again is a milky substance of a rather agreeable taste.

The cocoa-nut palm is so widely disseminated throughout tropical countries that it is impossible to distinguish its original habitat. It flourishes with equal vigor on the coast of the East Indies, throughout the tropical islands of the Pacific, and in the West Indies and tropical America. It is most at home, however, in the numerous small islands of the Pacific Ocean. Its wide dissemination is accounted for by the shape of the fruit, which, dropping into the sea from trees growing along the shores, would be carried by the tides and currents to be cast up and to vegetate on distant coasts.

The uses to which the various parts of the cocoa-nut tree are applied in the regions of their growth are almost endless. The nuts supply a considerable proportion of the food of the people, and the liquor enclosed within them forms a pleasant and refreshing drink. The liquid may also be boiled down to sugar. When distilled it yields a spirit which is known as "arrack." The trunk yields a timber which is known in commerce as porcupine wood, and is used for building, furniture, and firewood; the leaves are plaited into fans and baskets, and for thatching roofs of houses; the shell of the nut is employed as a water vessel, and the outer husk or rind yields the fiber which is used for the manufacture of ropes, brushes, cordage and the like. Cocoa-nut-oil is an important article of commerce. It is obtained by pressing or boiling the kernels, which are first broken up into small pieces and dried in the sun. It is estimated that one thousand full-sized nuts will produce upwards of twenty-five gallons of oil. The oil is a white, solid substance at ordinary temperature, with a peculiar rather disagreeable odor. Under pressure it spreads into a liquid and a solid, the latter being extensively used in the manufacture of candles.

Within late years the oil has also been manufactured into cocoa-nut butter, retaining, however, in a greater or less degree a distinct flavor of the nut.

The monkeys and orang-outangs are very expert in destroying the tough outer covering of the cocoa-nut, though quite two inches thick. They insert their teeth into the tapering end of the nut, where the shell is very uneven, hold it firmly with the right foot, and with the left tear the covering to pieces. Then thrusting a finger into one of the natural apertures they pierce a hole, drink the milk, break the shell on some hard object and eat the kernel.

THE BLACK WALNUT AND BUTTERNUT.

THE black walnut (*Juglans nigra*) is found in the rich, deep soils, from western Massachusetts, west to southern Minnesota and southward to central Texas and northern Florida. It is not found along the gulf or Atlantic coasts to any extent, but abounds west of the Allegheny mountains, especially in the Mississippi Valley. The tree grows rapidly and to a great size, one specimen on Long Island having attained a circumference of twenty-five feet.

The wood is dark-colored, becoming almost black when properly seasoned, and was formerly extensively used for cabinet work, inside finish, gun stocks, and many ornamental purposes; it is not in so much demand at present, as other cheaper woods may be had which seem to answer the purposes quite as well, but it is still numbered among our valuable forest productions.

The nut has a thick, hard shell, which is deeply and unevenly corrugated with rough, sharp points and ridges, and is almost too well known to admit of description. The kernel is large and sweet, but has usually a rather strong, rank taste, less oily than the butternut. An oil is expressed from its kernel which is known as nut-oil, and is much used by painters as a drying oil. A kind of dye is also manufactured from the husk, or outside cover, of the nut.

The butternut, as its name *Juglans cinerea* implies, is somewhat related to the black walnut, in fact, rare instances are recorded in which the two species have become mixed, forming a tree which resembled both species. It is found in about the same regions frequented by the black walnut, but extends further east and north into New Brunswick, Maine, Quebec, and Ontario, and does not extend quite so far west. It is most abundant in the Ohio River Valley. It is not so plentiful in the forest as the black walnut, and where it is so found does not fruit well. Its favorite resort is an open grove or along a fence row. Attempts to cultivate it generally yield only disappointment, but under right conditions the trees are very fruitful, one tree having been known to produce forty bushels in a single season, and trees bearing twenty bushels are frequently reported.

The fruit is longer than that of the black walnut and tapers to a point at both ends, with the ridges somewhat more pronounced, but aside from the difference in shape they present a similar appearance.

THE EDIBLE PINE.

THE edible pine, or piñon (*Pinus edulis*), is only one of many varieties of pine nuts which grows on the Pacific Slope of the United States and in Colorado, New Mexico, Arizona and Mexico.

The pine nut has a rich, marrowy kernel in a shell that varies in thickness from that of a chestnut to that of a hazel-nut. The form and size of the nuts also vary greatly according to the species. They are but little known to the people of the eastern states, but in some of the cities of California they are marketed in large quantities. The larger ones are valued for dessert and confectionery purposes and will doubtless become popular in the East.

They are well known to the Indians and have formed a staple article of their diet for centuries. Their method of harvesting them is very simple. They collect the cones after they have fallen from the trees, then heat them until they open, then rattle them out upon their blankets.

Of the twenty-four species of pine which grow along the Pacific Slope one-half furnish seeds that are esteemed by the Indians as food. When a Mexican Indian starts out on a long trip across the country and does not wish to burden himself with food he fills a small pouch with piñon nuts and can subsist on a small number of them for a remarkably long time.

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.
- The Ginger illustration was moved from page 51 to page 50 and its explanation was moved from page 53.
- The Contents table was added by the transcriber.

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