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Birds and All Nature

IN NATURAL COLORS

A MONTHLY SERIAL
FORTY ILLUSTRATIONS BY COLOR PHOTOGRAPHY

A GUIDE TO THE STUDY OF BIRD-LIFE

TWO VOLUMES A YEAR

VOLUME V.

JANUARY, 1899, TO MAY, 1899

EDITED BY C. C. MARBLE

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BIRDS AND ALL NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. V. JANUARY, 1899. NO. 1.

CONTENTS

"TESS."

A REMARKABLE example of the human-like intelligence of a chimpanzee, rivaling that of the celebrated "Mr. Crowley," of New York, so long the chief object of admiration in the museum of Central Park, was that of the subject of this sketch. "Tess" was captured in Africa by Allan Grosch and brought to Boston, where she was purchased by Frank C. Bostock. She was brought up with Mr. Bostock's little girl and was dressed the same as any child of three years. She walked upright, ate with knife and fork, drank from a cup, had better table manners than the average child of the same age, wore finger-rings, ear-rings, and pin, and always surveyed herself in the glass to see that her pin was on straight, and her dress hung right; she smoked a pipe, drew lines on a blackboard, wrote with a pen, and imitated Mr. Bostock's little girl in many ways. She uttered a few sounds which were understood by her master, and seemed to understand what was said to her. She died of pneumonia while being exhibited in the East, was purchased by Mr. C. F. Gunther and presented by him to the Chicago Academy of Sciences. Her age was three years and seven months.

The chimpanzee (*Simia troglodytes*) is considerably smaller than the gorilla; old males reach a height of sixty-four inches; females, forty-eight inches. The arms are long, reaching a little below the knee, and possess great muscular power. In the feet the large toe is separated from the others by a deep incision; and the sole is flat. The hair of the chimpanzee is smooth, the color usually black, but in some specimens it is a dull, reddish brown. Chimpanzees walk on all fours, resting themselves on the calloused backs of their hands. The toes of the feet are sometimes drawn in when walking. Naturalists say there is a strong inclination in this species to show remarkably varying individual types, which has led to controversies as to whether there were not several different species.

That the chimpanzee was known to the ancients is made fairly certain by the famous mosaic picture which once adorned the temple of Fortuna, and which is said to be still preserved in the Barberini palace at Palestrina in Italy. This mosaic represents, among many other animals of the Upper Nile country, what is believed to have been the chimpanzee. A young specimen was taken to Europe in the beginning of the seventeenth century. They have been taken there repeatedly since and are not infrequent features of the European animal market. Several have been brought to the United States and placed in museums and menageries.

It was formerly believed that the chimpanzee was a gregarious animal, but it is now known that there are seldom more than five, or, at the utmost, ten living together. Sometimes, however, they gather in greater numbers for play. One observer claims to have seen at one time about fifty of them which had assembled on trees and amused themselves with screaming and drumming on the tree trunks. They shun human habitation. Their nests are built in trees, not at a great height from the ground. They break and twist and cross larger and smaller branches and support the whole on a strong bough. A nest will sometimes be found at the end of a bough, twenty or thirty feet from the ground. They change abiding places often in looking for food or for other reasons. Two or more nests are rarely seen in the same tree. Nests, properly so-called, consisting of inter-woven branches, as Du Chaillu describes, have not been seen by any of the other narrators. [Pg 2]

When in repose the chimpanzee in the wild state usually assumes a sitting posture. He is often seen sitting or standing, but it is said the minute he is detected he drops on all fours and flees. He is an adept at climbing. In his play he swings himself from tree to tree and jumps with amazing agility. His food consists of fruits, nuts, buds, etc.

While "Tess" was remarkably intelligent she was too young to show the maturity of one in Nills' Zoological Garden in Stuttgart, an account of which is given by the celebrated painter of animals, F. Specht. This chimpanzee could laugh like a human being. He took notice of this, for no other animal can show its joy by loud laughter. When he would take the sympathetic fellow under the arms, throw him in the air and catch him, the cage rang with his merry peals of laughter. One day he took along a piece of chalk and sat down on a chair. In a moment the chimpanzee was sitting on Specht's knees awaiting further developments. He put the chalk in the animal's hand, and leading it, drew several figures on the wall. When he released the chimpanzee's hand, the animal started to shade the drawings with such diligence that they soon disappeared, to the great amusement of the spectators.

There are now, or were a few years ago, two chimpanzees in the Stuttgart zoological garden, which are the closest of friends. The female had been there before and when the male arrived his box was put over night in her warm, roomy cage the presentation being intended for the morrow. When the box, which, by the way, had been upholstered, was opened and the male got out, they both stood on their hind legs for a few minutes earnestly gazing at each other. Then they flew into each other's embrace and exchanged hearty and repeated kisses; and the female brought her blanket, spread it on the floor, sat down on it and by gestures invited the male to do likewise. It made a charming picture to see these two taking their meals at a table. They both used spoons and did not in the least interfere with each other. The female had the peculiarity of cautiously taking the male's glass, and drinking a goodly portion out of that, too, after which she returned it. Both of these animals laughed heartily when at play.

Barnum, the American showman, had two chimpanzees, "Nip" and "Tuck," on exhibition in various cities and towns, but they did not display much intelligence, nor did they live long. Other attempts to introduce the chimpanzee have not been encouraging. The experiment of keeping one has not been tried in the South, however, where there are doubtless cities whose climatic

condition would prove to be favorable for keeping chimpanzees much longer than is possible in the more northern zoological collections.

CHIMPANZEE.
⅙ Life-size.

WHIPPOORWILL.

Hark! I hear the voice again,
    Softly now and low,
When the twilight's o'er the plain
    And the first stars glow.
This is what it uttereth—
In a rather mournful breath—
"Whip-poor-will! Whip-poor-will!"

What has Will been doing now?
    Has he truant played
With a sad, coquettish brow
    From some simple maid?
Did he steal her heart away?
For I hear you always say
"Whip-poor Will! Whip-poor Will!"

Tell me now what Will has done.
    Who's to whip him, dear?
Is he some scamp full of fun
    That is straying near?
Have you caught him at your nest
By the ones you love the best?
"Whip-poor-Will! Whip-poor-Will!"

That is all you seem to say,
    Little bird so shy.
Tell me now, without delay,
    Why whip Will, oh! why?
There! your voice fades in the lea—
Leaving this command to me,
"Whip-poor-Will! Whip-poor-Will!"

—*Monroe H. Rosenfeld.*

TONGUES.

W. E. WATT.

THE tongue is said to be the stomach begun. It is the first organ of the digestive system which acts upon the food. It is the source of much of the pleasure of life, particularly to young people. As it stands at the entrance to the alimentary canal it is endowed with powers of detecting the qualities of whatever the hands present to the stomach.

In early life the system demands abundant supplies of good material to build up growth and maintain activity. The sense of taste is then peculiarly keen, and the appetite for good things is strong. After maturity the desires become less and one has not so much pleasure in eating unless by active labor or from some other cause the digestive organs are kept in a robust condition.

With the years the tastes change. We wonder how children can possibly eat such quantities in such combination. The food which fairly delighted us long ago has little or no attraction for us, and with many adults there is need for strong seasoning and condiments which children avoid.

The child clamors for sweets. The adult is inclined to check the child in eating that which would not digest in the adult's stomach. But Herbert Spencer won the hearty esteem of the youngster when he gave scientific argument showing that growing children need highly concentrated foods to meet the demands of nature, and they may be permitted, in fact encouraged, to eat freely of foods which are unsuited to mature people.

The tongue's special work is telling us whether a given substance is good for us. Like other senses it may be deceived and is not always to be relied upon. And when it has told us once correctly we may make a serious mistake in following its advice too extensively so as to learn that too much of a good thing is not all good.

Nearly all substances have taste. That is, the tongue has power to tell us something about almost every substance in nature. Water is about the only substance found in nature that has no taste. But we rarely find water that is pure enough to be entirely without taste. Nearly all solids that can be dissolved in water have taste. So have nearly all liquids. When we say that water tastes good we recognize the mineral in it, or some combination of minerals that the human body needs in its economy.

The substances that the taste recognizes most readily are common salt, vinegar, quinine, pepper, and alcohol. Those least exciting to the tongue are starch, white of egg, and gum.

The tongue does its work by means of three sorts of papillæ which cover its surface. There are many very fine ones all over the tongue, but these are most numerous near the tip. Some larger ones which are not so pointed in form are also more plentiful near the tip of the tongue. And there are from eight to fifteen much larger still that are arranged in rows like the letter V at the base of the tongue.

Bitter is tasted mainly at the back of the tongue. Sweet is tasted all along, but is most delightful at the base of the tongue, and it is by this cunning arrangement that nature gets the tongue to pass the sweet morsel along to the throat where it is seized and hurried downward by the act of swallowing.

These papillæ have within them capillary blood vessels and the filaments of nerves. They are the seat of the tongue's sensibility. Whatever is tasted must come into chemical action over these little points. Moderate pressure helps the sensation, so we smack our tongues sometimes when we are not in company. Cold deadens taste to some extent and heat acts in nearly the same way. [Pg 6] Rinse the mouth with very warm or very cold water and then take in a solution of quinine at about forty degrees temperature and the bitter fluid will have almost no bitterness till the temperature of the mouth and its contents becomes somewhere near one hundred degrees.

Three things are necessary in a substance in order that it may be tasted, and it is curious to note how common are all three. First, it must be easily mixed with the saliva; second, it must easily spread itself about so that it may mingle with the mucus that always covers the papillæ; and third, it must be capable of acting chemically on the protoplasm of the end organs when once it gets into the taste bulb. All tasteless substances have one or more of these qualities lacking. Wipe the tongue dry and place a sugar crystal upon it. No taste will be experienced until the spot is moistened.

All substances do not taste alike to different tongues. We have noted the difference in appreciation of certain foods in infancy and in mature years. Water tastes differently to the fever patient and to the well man. As substances taste differently at different times to the same person, so they vary with individuals. One tongue is found on careful examination to have three times as many papillæ as another, one system is more susceptible to chemical action than another, and the nervous system varies enough in different subjects to make a considerable difference in the powers of taste.

One guest at table is delighted with a dish which appeals not at all to the palate of his neighbor. In fact there are cases where the power of taste has been temporarily or entirely lost. In such cases the patient goes on with his daily eating in a mechanical way, not because it tastes good, but because he must.

There seem to be different nerves for sweet, for bitter, for salty things, and for acids. Substances are known to chemistry which act differently on the nerves of the front and those of the back of the tongue. They very curiously taste sweet to the nerves of the tip of the tongue and at the same instant bitter to those at the base. If leaves of the *Gymnema sylvestre* be chewed, sweet and bitter things are tasteless for awhile although acids and salts are tasted as usual.

Let an electric current pass through the tongue from the tip to the root and a sour taste will be experienced at the tip. But no one has yet explained why when the same sort of current is passed through in the opposite direction the taste is alkaline.

Place a small piece of zinc under the tongue and a dime on top. The saliva which moistens them will cause them to form a small galvanic battery. As they are allowed to touch each other at the tip of the tongue a sour taste will be experienced and in the dark a spark will appear to the eyes.

There is a pretty microscopic formation on the sides of some of the papillæ. It consists of rows of small openings or sacs egg-shaped with very minute mouths at the surface. These are known to science as taste bulbs. They are so small that three hundred of them put together the long way will scarcely reach one inch. They are so numerous that 1,760 have been counted on one papilla of an ox's tongue. They are not entirely confined to the surface of the tongue, for they have been found in large numbers upon the soft palate and the uvula, and many have been discovered on the back side of the throat and down into the voice box, some of them even appearing upon the vocal cords. Their form is much like that of a long musk melon, but they are too small to be seen by the naked eye. The outer part or rind consists of rows of cells evidently formed to hold what is within. On the inside are from five to ten taste cells which are long enough to reach the whole length of the bulb and protrude slightly at the opening where they are finely pointed. They are attached at the other end and branch out as if to run to several extremely fine divisions of the nerves.

Birds and reptiles have no taste bulbs in their papillæ. Tadpoles and freshwater fishes have similar bulbs in their skin, and it is thought they enjoy the taste of things around them without the necessity of taking them in at the mouth. [Pg 7]

We give the sense of taste more credit sometimes than it merits. What we regard as tastes are often flavors or only smells. What is taken in at the mouth gets to the nose by the back way if it is of the nature of most spices, and so by use of the nose and the imagination we taste things that do not affect the tongue at all. A cold in the head shows us we do not taste cinnamon, we merely experience its pungency as it smarts the tongue while its flavor we enjoy only with the nose.

With some substances we have a mixed experience that passes for taste, but it is really a combination of taste, smell, and touch. With the nostrils held one can scarcely distinguish between small quantities of pure water and the same with a very little essence of cloves. The difference is easily observed with the nostrils open or after swallowing, for the odor of the mixture gets readily into the nose from either direction.

It is curious to note that, although there are so many varieties of taste, man has but few words to describe them with. We know the taste of a thousand substances, and yet we are in nowise superior to the veriest savage in the matter of speaking about their flavors. We are obliged to speak in the same manner as the wild man of the forest and say that a given taste is like the taste of some other thing, only different.

One of the lowest forms of tongues is that of the gasteropod. All snails and slugs are gasteropods. They have instead of a regular tongue a strip that is called a lingual ribbon, one end of which is free and the other fastened to the floor of the mouth. Across the ribbon from left to right run rows of hard projections almost like teeth. Whatever the mouth comes against is tested for food qualities by this rasping ribbon which files away at the substance and wears away not only what it works upon but the ribbon itself. This loss of tongue is no serious affair to the gasteropod, for he finds his tongue growing constantly like a finger-nail and he needs to work diligently at his trade or suffer from undue proportions of the unruly member. Snails in an aquarium gnaw the green slime from the sides of the vessel with their lingual ribbons, and the process may be seen to more or less advantage at times.

Taste is not all confined to tongues. Some people have papillæ on the inside of the cheek. Medusae (Jelly Fish) have no tongues, but the qualities of the sea-water are noted by them. As soon as rain begins to fall into the sea they proceed directly towards the bottom, showing a decided aversion to having their water thinned in any way.

Leeches show their powers of distinguishing tastes when they take in sweetened water quite freely, but suck at the skin of a sick man much less than at that of one in good health.

Taste in insects has its probable seat in many instances in a pair of short horns or feelers back of the antennæ. These are constantly moving over the parts of that which the insect is feeding upon, and so apparently enjoyable is the motion of them that many scientists have concluded that these are the taste organs of the insects having them. At the same time it is quite probable that in all insects furnished with salivary glands, a proboscis, or a tongue, the power of taste is also or exclusively there.

Fishes seem to do most of their tasting somewhere down in the stomach, for they pursue their prey voraciously and frequently swallow it whole. With their gristly gums, in many cases almost of the toughness of leather, there can be but little sensation of taste. Their equally hard tongues,

many times fairly bristling with teeth constructed for capturing, but not for chewing, cannot possibly afford much of a taste of what is going down the throat with the rushing water passing through the open mouth and gills.

Serpents which swallow their food alive can get but little taste of their victims as they pass over the tongue, although they are deliberate in the act and cover them with a profusion of saliva.

[Pg 8]

It is quite possible that cattle in chewing the cud get the highest enjoyment possible from this sense. They enjoy their food at the first grasp of it, and prove it by their persistence in struggling for certain roots and grasses, but their calm delight afterwards as they lie in the shade and bring up from the recesses of their separate stomachs the choice and somewhat seasoned pellets of their morning's gleanings is an indication of their refined enjoyment of the pleasures of this sense.

Sir John Lubbock calls attention to the remarkable instances of certain insects in which the foods of the perfect insect and of the larvæ are quite different. The mother has to find and select for her offspring food which she would not herself touch. "Thus while butterflies and moths feed on honey, each species selects some particular food plant for the larvæ. Again flies, which also enjoy honey themselves, lay their eggs on putrid meat and other decaying animal substances."

Forel seems to have found that certain insects smell with their antennæ, but do not taste with them. He gave his ants honey mixed with strychnine and morphine. The smell of the honey attracted them and they followed what seemed to be the bidding of their antennæ, but the instant the honey with its medication touched their lips they abandoned the stuff.

Will fed wasps with crystals of sugar till they came regularly for it. Then he substituted grains of alum for the sugar. They came and began their feast as usual, but soon their sense of taste told them there was some mistake and they retired vigorously rubbing their mouth parts to take away the puckering sensation of the alum.

Cigar smokers who really enjoy the weed confess that they cannot tell except by sight when the cigar goes out. In the dark they keep right on drawing air through the cigar, and the pleasure of the smoke seems to be in nowise diminished after the cigar is out unless the smoker discovers he has no light. This seems to show that the sense of taste has little to do with the pleasure of smoking.

Tongues are used in tasting, seizing food, assisting the teeth to chew, covering the food with saliva, swallowing, and talking. Man and the monkey, having hands to grasp food, do not use their tongues for this purpose. The giraffe does so much reaching and straining after food in the branches of trees that his tongue has become by long practice a deft instrument for grasping. The woodpecker uses his tongue as a spear, and the anteater runs his long tongue into the nest of a colony of ants, so as to catch large numbers of the little insects on its sticky surface.

Cats and their kind have a peculiarity in that instead of having cone-shaped papillæ their tongues are covered with sharp spines of great strength. These are used in combing the fur and in scraping bones.

Two characteristic accomplishments of man would not be his if it were not for his versatile tongue; they are spitting and whistling. The drawing of milk in nursing is an act of the tongue, and the power of its muscles as well as the complete control of its movements is an interesting provision of nature. It is believed by some that the pleasures of the taste sense are confined to such animals as suckle their young.

Tongues are rough because the papillæ, which in ordinary skin are hidden beneath the surface, come quite through and stand up like the villi of the digestive canal. The red color of the tongue is due to the fact that the papillæ are so thinly covered that the blood circulating within shows through.

[Pg 10]

FROM COL. CHI. ACAD. SCIENCES.

PUMA.
⅛ Life-size.

CHICAGO COLORTYPE CO., CHIC. & NEW YORK

THE MOUNTAIN LION.

THIS is only one of the names by which the puma (*Felis concolor*) is known in the United States. He has different local names, such as tiger, cougar, catamount and panther, or "painter," as the backwoodsmen entitle him, and silvery lion.

The puma ranges the whole of both the Americas from the Straits of Magellan to where the increasing cold in the north of Canada blocks his passage. Like many other large animals, however, the puma has retired before the advance of civilization, and in many of the more thickly populated portions of the United States a straggler, even, is rarely to be found.

The haunts of the puma depend upon the nature of the country. In sections well-wooded he decidedly prefers forests to plains; but his favorite spots are edges of forests and plains grown with very high grass. He always selects for his abode such spots as afford some shelter, in the vicinity of rocks which have caverns for secure concealment, and in which to bring forth his young. He spends the day sleeping on trees, in bushes, or in the high grass; in the evening and at night he goes forth to hunt. He sometimes covers great distances in a single night, and sportsmen do not always find him near the place where he struck down his prey.

All smaller, weak mammals are his prey—deer, sheep, colts, calves, and small quadrupeds generally. When, however, his prey is so large that it cannot all be devoured at one meal, the animal covers it with leaves or buries it in the earth, returning later to finish his repast. This habit is sometimes taken advantage of by his human enemy, who, poisoning the hidden carcass with strychnine, often manages to secure the lion when he comes back to eat it. The use of poison against these and other carnivorous animals by the farmer and stock-raiser has become so general in the West they are rapidly becoming exterminated. If it were not for some such means of defense as this, the sheep-raisers and cattle-growers would be quite powerless to protect their herds from the attacks of the mountain lion and other beasts of prey.

The puma is a very bloodthirsty animal, and whether hungry or not, usually attacks every animal, excepting dogs, that comes in his way. When hungry, however, he disdains no sort of food, feeding even upon the porcupine, notwithstanding the quills which lacerate his mouth and face, or the skunk, heedless of that little animal's peculiar venom. Ordinarily the puma will not attack man, fleeing, indeed, from him when surprised, but he has been known when emboldened by hunger to make such attacks. He, of course, sometimes kills the hunter who has wounded him, though even then, by the cautious, he is little feared; but an unprovoked assault, such as the mangling of a woman in Pennsylvania in the eighties, is rare.

It is the habit of the puma to spring upon his prey from an eminence such as a ledge of rocks, a tree, or a slight rise of ground. If he fails to strike his victim, he seldom pursues it for any considerable distance. In northern regions, however, he sometimes pursues the deer when they are almost helpless in the deep snow. When he has seized his victim, he tears open its neck, and laps its blood before he begins to eat. He devours every part of a small animal, but the larger ones he eats only in part—the head, neck, and shoulders—burying the rest.

Very young cubs when captured soon become thoroughly tamed, enjoying the liberty of a house like a dog. When petted they purr like cats and manifest their affection in much the same manner. When displeased they growl, but a roar has never been heard from them. There is one drawback to a tame puma, however, says Brehm. When he has great affection for his master and likes to play with him, he hides at his approach and unexpectedly jumps on him. One can imagine how startling and uncomfortable would be such an ill-timed caress. An old puma, when captured, sometimes rejects all food, preferring starvation to the loss of liberty.

Every movement of the puma is full of grace and vigor; he is said to make leaps of eighteen feet or more. His sight is keenest in the dusk and by night; his sense of smell is deficient but his hearing is extremely acute. [Pg 12]

The lair in which the female brings forth her young is usually in a shallow cavern on the face of some inaccessible cliff or ledge of rocks.

In the southern states, Audubon says, where there are no caves or rocks, the lair of the puma is generally in a very dense thicket or in a canebrake. It is a rude sort of bed of sticks, weeds, leaves and grasses. The number of cubs is from two to five. In captivity two usually are born, but sometimes only one.

THE HOLLY TREE.

O reader! hast thou ever stood to see
The Holly tree?
The eye that contemplates it, well perceives
Its glossy leaves,
Ordered by an intelligence so wise
As might confound the atheist's sophistries.

Below a circling fence its leaves are seen
Wrinkled and keen;
No grazing cattle through their prickly round
Can reach to wound;
But as they grow where nothing is to fear,
Smooth and unarmed the pointless leaves appear.

I love to view these things with curious eyes,
And moralize;
And in this wisdom of the Holly tree
Can emblem see
Wherewith perchance to make a pleasant rhyme,
One which may profit in the after-time.

Thus, though abroad perchance I might appear
Harsh and austere,
To those who on my leisure would intrude
Reserved and rude,
Gentle at home amid my friends I'd be
Like the high leaves upon the Holly tree.

And should my youth, as youth is apt, I know,
Some harshness show,
All vain asperities I day by day
Would wear away,
Till the smooth temper of my age should be
Like the high leaves upon the Holly tree.

And as when all the summer trees are seen
So bright and green,
The Holly leaves a sober hue display
Less bright than they,
But when the bare and wintry woods we see,
What then so cheerful as the Holly tree?

—*Robert Southey.*

THE LEMON.

DR. ALBERT SCHNEIDER,
Northwestern University School of Pharmacy, Chicago.

THE lemon is the fruit of a small tree from ten to fifteen feet high. It is not particularly beautiful, being rather shrubby in its appearance. It is an evergreen, bearing leaves, flowers, and fruit all the year round. The flowers occur singly in the axils of the leaves. The calyx is persistent, that is, it does not drop off like the corolla, and may be found attached to the base of the fruit. The corolla consists of five spreading petals of a purplish-pink color.

The lemons of the market are from cultivated plants of which there is a large number of varieties. These cultivated varieties or forms took their origin from the wild lemon trees native in northern India, in the mountain forests of the southern Himalayas, in Kumoan, and Sikkim.

Lemons have been known for a long time. They were brought to the notice of the Greeks during the invasion of Alexander the Great into Media where the golden-yellow fruit attracted the attention of the warriors who gave them the name of Median apples (*Mala medica*). Later, Greek warriors also found this fruit in Persia, and hence named it Persian apples (*Mala persica*). The eminent Greek philosopher and naturalist Theophrastus, 390 B. C., described the fruit as inedible, though endowed with a fragrant odor, and having the power to keep away insects. On account of this latter property the so-called Median apple was, by some, supposed to be identical with the fruit of the cedar (*Kedros*) and therefore received the name "*Citrus*" from which is derived "citrone," the German name, and "citronnier," the French name for the fruit. Our word lemon is said to have been derived from the Indian word *limu* and the Arabian word *limun*. It seems that at the time of the great Roman historian and naturalist, Pliny (23-79 A. D.), the lemon was not yet extensively cultivated. Dioscarides (50 A. D.) speaks highly of the medicinal virtues of the bitter and acrid wild-growing lemon. Cælius Aurelianus recommends lemon juice in gout and fevers. In 150 A. D., the lemon tree, evidently introduced, was found growing about Naples and in Sardinia, but the fruit was still inedible. About the third century cultivation had so far improved the fruit that it could be eaten.

The Arabians are credited with first having introduced the lemon tree into southern Europe. The noted Arabian geographer, Edrisi, twelfth century, describes the lemon as very sour and about the size of an apple and the plant as growing only in India. This latter statement is, however, erroneous as the lemon had already been extensively cultivated in southern and eastern Spain, where it was introduced by the agriculturally-inclined Moors. It has been cultivated for many centuries in nearly all of the countries bordering on the Mediterranean Sea and is now also extensively cultivated in the tropical and sub-tropical countries and islands of the Western Hemisphere. One variety or species, (*Citrus lemetta*), is a native of the East Indies and is extensively cultivated in the West Indies. Lemon trees are found everywhere in the larger green houses and conservatories along with the closely related orange (*Citrus vulgaris*.)

As the result of cultivation there are now about fifty varieties of lemons in existence. Some of these are comparatively sweet or rather insipid and are therefore known as sweet lemons. The sour varieties are, however, more generally cultivated. Lest I forget I will here state that the lemon is not identical, though closely related, with the Citron, the fruit of the *Citrus medica*. [Pg 14]

As above stated the lemon tree bears fruit all the year round so that a number of crops are gathered annually. There are, however, three principal crops collected as follows: The first from July to the middle of September; the second in November; and the third in January. Frequently there are also collections in April and in May. The tree is rather delicate, not as hardy as the orange, for example. In upper Italy it even becomes necessary to cover the trees during the winter months. Lemons intended for shipment are picked before they are fully ripe and packed in barrels or boxes holding from 400 to 700. When exposed the fruit shrinks and loses in weight very rapidly, due to the evaporation of moisture from the pulpy interior. In Italy each lemon is wrapped in tissue paper to protect it against injury and to reduce the evaporation of moisture. Sometimes they are coated with collodion or covered with lead foil to reduce the loss of moisture.

The lemon is put to various uses. The yellow rind contains many minute cavities which are filled with a fixed oil and an ethereal oil to which the fruit owes its fragrant odor. In Italy the oil is obtained in a very crude way. The peel is cut into three longitudinal slices. The workman takes one of these in his right hand, in the left he grasps a small sponge; by pressing the sponge against the outer surface of the rind so that it becomes concave, the oil-bearing sacs are ruptured and the oil absorbed by the sponge. This is repeated until the sponge becomes saturated, when the juice is squeezed into a cup or other vessel. I am very much afraid that the sponge and the hands of the workman are not always clean. I have been informed that an attempt to introduce machinery for extracting the oil was forcibly resisted. It is also stated that the oil obtained by the "sponge process" is more valuable than that obtained by machinery and distillation. The bitter taste so evident in the lemon is due to *limonin* and *hesperidin*, which occur most abundantly in the rind.

The sour taste of the lemon is due to citric acid, which is found in the large cells forming the pulpy interior. Of course the sap is largely water, about 97.5 per cent., with about 2 per cent. citric acid. The amount of acid varies, however, even rising to 9 or 10 per cent. The juice is easily expressed and is put to various uses. Lemonade is largely consumed on ships, as it is said to

prevent ship scurvy. Washing face and hands with diluted lemon juice is said to remove tan and freckles. The beneficial properties of lemon juice, lemonade, in fevers is due to its cooling and refreshing effects, and also to the fact that it acts as a heart sedative, thus tending to lower the temperature. Lemon juice has been highly recommended in acute rheumatism and also to counteract the effects of certain poisons, especially opium.

The essential oil of lemon acts as a stimulant and has been used in diseases of the eye (*ophthalmia*). It also serves to give an agreeable odor to certain medicines, and is used in the manufacture of perfumery and as a flavoring agent for confectionery.

The lemon peel is used in medicine. Candied lemon peel is a confection prepared by boiling the peel in syrup and then allowing the sugar to crystallize.

The following is a description of the excellently colored plate: *A* is a flowering and fruit-bearing twig, nearly natural size; 1 is a single flower, somewhat magnified; 2, stamens and pistil; 3, ovary in longitudinal sections; 3*a*, ovary in cross section; 4, anthers; 4*a*, pollen-grains; 5, fruit, nearly natural size; 6, cross-section of fruit showing rind, large-celled pulp and seeds; 7, 8, and 9, seeds.

[Pg 15]

FROM KŒHLER'S MEDICINAL-PFLANZEN.

LEMON.

[Pg 17]

ABOUT BEES.

FRED. A. WATT.

THIS subject is an ancient and honorable one. The most ancient historical records make frequent reference to the honey-bee. A poem written 741 B. C., by Eremetus was devoted to bees. In Scripture we read of them and learn that Palestine was "a land flowing with milk and honey" and we know that wild bees are very numerous there even to the present time. In the year 50 B. C., Varro recommended that hives be made out of basket-work, wool, bark, hollow-trees, pottery, reeds, or transparent stone to enable persons to observe the bees at work. The name "Deborah" is from the Hebrew and means bee; "Melissa," from the Greek, has the same meaning.

Honey-bees were introduced into the United States from Europe, in the seventeenth century, and our wild honey-bees are offspring of escaped swarms. Like all enterprising Yankees they first settled in the eastern states and rapidly spread over the West, where they were regarded with wonder by the Indians and called the "white man's fly." They traveled, or spread, with such regularity that some observers claimed to mark the exact number of miles which they traveled westward during each year.

A great many species are almost, or entirely, worthless for domestic purposes, while those that are especially valuable are very few. The favorite at this time seems to be the Italian species, which was introduced into the United States in 1860.

At the opening of the season each colony of honey-bees contains one laying queen, several drones, and from 3,000 to 40,000 workers. The workers begin by cleaning up the hive, and the queen starts in to rear other bees at once; new comb is started, honey is brought in from the earlier varieties of flowers and the busy bee is launched into another season of sweetness and good works.

The United States Department of Agriculture, in one of its "Farmer's Bulletins," under the heading, "How to Avoid Stings," says, "First, by having gentle bees." At the time I first read this I thought they should have completed the advice by adding "and extract their stings;" but I find on investigation that the subject of gentle bees, is no light matter to the bee-keeper, and that my idea that "a bee is a bee and hence entitled to all the room he requires" does not hold good; that a bee-keeper when purchasing a colony of bees of any species not well known to him will ask if they are gentle in the same tone he would use if he were inquiring about a horse.

Bees seem to do well wherever there are flowers enough to furnish them with food, and are kept for pleasure and profit in all parts of our country. A small plot of ground is devoted to bees by the farmer, a village lot is often filled with hives, and even in our larger cities, especially in New York, Chicago, and Cincinnati, if not in the gardens or on the lawns, they may be found well established on the house-tops, as many as thirty or forty colonies being found on a single roof. They can usually find enough food in and around a city to keep themselves busy without making long excursions; in fact, it sometimes happens that they find more abundant pasturage in a city than they would in the open country, especially where there are large parks and gardens or where the linden (basswood) trees have been set out in any considerable quantities. Sweet clover also sometimes overruns a neglected garden or vacant lot and furnishes a rich field for the city-bred honey-bee.

In Egypt bees are transported on hive-boats from place to place along the Nile according to the succession of flowers. The custom also prevails in Persia, Asia Minor and Greece. In Scotland the same method is used while the heather is in bloom and in Poland bees are transferred back and forth between summer pastures and winter quarters. [Pg 18]

A few years ago a floating bee house was constructed on the Mississippi river large enough to carry two thousand colonies. It was designed to be towed up the river from Louisiana to Minnesota, keeping pace with the blossoming of the flowers and then drop back down the river to the sunny South before cold weather should set in in the fall. Honey-bee ships have also been talked of which could carry bees to the West Indies to cruise for honey during the winter.

The bee is not fastidious, but will live in any kind of clean box or barrel that may be provided for its use, hence it sometimes lives in queer places. A swarm escaping will generally make its home in a hollow tree or in a fissure of some large rock. The ancient English hives were generally made of baskets of unpeeled willow. Cork hives are in use in some parts of Europe, and earthenware hives are in use in Greece and Turkey. Glass hives are mentioned as far back as the year 1665. In 1792 movable-comb hives were invented and in the century following more than eight hundred patents were granted on hives in the United States.

Bee products form an important item of income in the United States, more than two billion pounds of honey and wax being produced in a single season. When we consider that this appalling amount of sweetness is gathered a drop here and a drop there it leads us to figures too large to be comprehended.

In considering the value of bees we must by no means think of honey as their sole product, as beeswax is an important article. After the honey has been extracted from the comb the latter is mixed with water and boiled down and run into firm yellow cakes, from which the color disappears if exposed for a certain length of time to the air. Thin slices are exposed until

thoroughly bleached, when it is again melted and run into cakes, and is then known as the white wax of commerce. Before oil lamps came into use large quantities of this white wax were used in the manufacture of candles, which made the best light then known, as they burned better than tallow candles and without the smoke or odor which made the tallow article objectionable. The advent of the oil-lamp, the gas jet, and the electric light have practically disposed of its usefulness in that direction, except in devotional exercises, although colored tapers made of white wax are now used for decorative purposes, especially during the holiday season, when numbers of them are used to light our Christmas trees. White wax is also used extensively for making ornamental objects such as models of fruits and flowers. Whole plants are sometimes reproduced and models of various vegetable and animal products are reproduced in colored wax and used for educational or museum purposes. The anatomist finds it of great value in reproducing the normal and diseased structures of the human form. No doubt the original wax works of Mrs. Jarley, made famous by Dickens in "The Old Curiosity Shop," were a collection of wax images made from the product of the honey-bee.

Metheglin is a drink made from honey, and is consumed largely in some parts of the world. It is the nectar which the ancient Scandinavian expected to sip in paradise, using skulls of his enemies as goblets.

The East Indies and the Philippine Islands seem to be under special obligations to astonish the world in everything, and in order to keep pace with their reputations have produced honey-bees of three sizes, one of which is the smallest honey-bee known, and another the largest. The smaller variety is so diminutive that one square inch of comb contains one hundred cells on each side; the entire comb, as it hangs from the twig of a small tree or bush, is only about the size of a man's hand. The workers are a little longer, but somewhat more slender than our common house-fly, and are blue-black in color, with the exception of the anterior third of the abdomen, which is bright orange. [Pg 19]

The giant East Indian honey-bee, which is probably identical with the giant of the Philippines, is the largest known species of the genus. They are about one-third larger than our common bee and build huge combs of very pure wax which are attached to overhanging ledges of rock or to the limbs of large trees. These combs are often five or six feet in length, three or four feet in width and from one and one-half to six inches in thickness. The amount of honey that they gather in the course of a season is enormous and it has been suggested that if introduced into this country they might be of immense value as they would doubtless visit mainly the plants which our honey-bees could not well gather from, such as red-clover, and thus increase the amount of clover seed as well as the quantity of honey already produced. Up to date, however, it is not proven that they will live in hives or that they can live at all in this climate; the latter being regarded as extremely doubtful by some of our best informed bee-men.

Not the least interesting thing in an apiary is the honey extractor, consisting of a large can inside of which a light metal basket is made to revolve by means of a simple gearing. The frames containing the full comb are placed in this basket, the caps being shaved off. After several rapid revolutions the comb is found to be empty and is then returned to the hives to be refilled by the bees.

The queen bee is about one-third larger than the worker and is the mother and monarch of the hive. Queens are sometimes raised by bee-keepers for sale, especially by those who have an improved strain of a certain species, or a new and desirable species of bee. When the bee-keeper gets a mail order for a queen he procures a mailing-cage, which is a small box-like cage covered with wire screen and cloth, in one end of which he places a supply of food, the other end being occupied by a ventilator. The queen and from eight to twelve workers, as royal attendants, are then placed in the cage, the wire-screen and cloth covers carefully wrapped around them, the address written, a one cent stamp affixed and her royal highness is ready for her trip across a continent, or, with additional postage, around the world.

When, from any cause, the bee-pastures become unproductive bees from different hives often declare war on their neighbors, the strong colonies singling out as enemies those that are weak or disorganized by the loss of a queen. The war is always pursued without quarter and thousands on each side perish in the fray, the victors always carrying off every drop of honey in the hive of the vanquished, leaving the unfortunate survivors of the defeated hive to perish by starvation.

In many parts of England when a member of the family dies someone must tell the bees; this is done by taking the house door-key and rapping thrice on each hive, repeating at the same time the name of the deceased and his station in the family. If this ceremony is omitted the bees will surely die. In some places the hives are draped with a strip of black cloth when a death occurs in the family and with white cloth in case of a wedding. If these ceremonies are omitted the bees are insulted and will leave. Singing a psalm in front of a hive that is not doing well will also set all things right, in some parts of England. I will not attempt to explain how the American bee-keeper rears bees without these ceremonies, but refer the reader to the various hand-books on bee-keeping which will doubtless explain it.

The bees occupy a position in the economy of nature far higher than that of mere honey-gatherers. The service they render in pollenizing the flowers is worth far more to the world than endless stores of honey. There are a number of flowers that are so adjusted that their pollen cannot of itself reach the stigma but is so disposed that it is certain to be carried away by any bee or moth that chances to visit it, while the stigma is so placed that an incoming bee is certain to reach it on first alighting on the flower and dust it with the pollen which has accumulated on the [Pg 20]

hairs on the under portion of the bee, or has clung to his legs; this, of course, causes cross-fertilization, a peculiar and wonderful provision of nature, which seems to be necessary for the preservation of fruits and flowers and for the improvement of the different kinds. Whole volumes have been written on this subject, which even now is not entirely understood, but a single case will give a little insight into the matter. The common primrose will produce even from seeds selected from the same pod, two different kinds of flowers, in about equal proportions, which are sterile of themselves. But each kind may, by means of the good offices of the bee or other honey-loving insect, fertilize the other. If no bees or other insects visit either of these flowers no seed can be produced and the life of the plant ends in a single season. Cross-fertilization is necessary to some plants and beneficial to all. Nature has so devised it and has accordingly made the flowers conspicuous to insects by painting them, in most cases, a different and brighter hue than the foliage of the plant, making the blossom, in some cases, give forth a pleasant odor, and in nearly all cases causing the flower to secrete the nectar which the insects love. Flowers which do not attract the insects by their bright colors, odor, or nectar, are generally adapted to cross-fertilization by the wind or are partly or wholly fertile in themselves.

It is a pretty well established fact that the flowers which we particularly esteem, the bright-colored, perfumed, nectar-producing varieties, owe their existence to the bees. We also owe the fruits which we love to the selection of the bee to a large extent. Some of the best varieties of strawberries are entirely sterile and must be planted in close proximity to fertilizing varieties in order to bring forth any fruit at all. Some varieties of pears also require fertilization by the bees, and cannot bear fruit if bees are excluded. Even the apple is not perfect unless fertilized by the bees, five distinct pollenizations being required to perfect a single blossom, and in places where orchards do not bear it is often found that the introduction of four or five hives of bees for each one hundred trees will cause them to bring forth fruit in abundance.

So, whether we wear bright flowers, or eat fruit or honey, or stroll through meadows sweet with clover, the handiwork of the bee follows us and impresses us with the fact that our little friend lives only to give us sustenance, sweetness, and pleasure.

BIRDS AS SHEPHERDS.

IN Venezuela there is a species of crane, called by the natives the Yak-a-Mik, which is easily tamed and trained to look after a flock of sheep or take care of the inmates of the poultry yard. When these are placed in charge of this bird it may be implicitly trusted to take them to their feeding places in the morning and bring them safely home at night, not forgetting to hunt for and collect any stragglers. The Yak-a-Mik displays all the traits of character usually associated with the faithful sheep-dog. It can be amusing, too, for, while its usual gait is slow and sedate, it can execute the most fantastic waltzes and strike all sorts of absurd attitudes. A German agriculturist, Herr von Seyffert, had one of these cranes which took charge of a herd of heifers, driving them to and from their pastures. It also kept order in the poultry yard, stopping all fighting and disorder.

[Pg 22]

PRES. BY VAUGHN'S SEED CO..

AMERICAN MISTLETOE.
½ Life-size.

[Pg 23]

THE MISTLETOE.

WILLIAM K. HIGLEY.

FROM very early times plants, animals, and even minerals have played an important part in the expression of religious ideas and in the execution of religious rites. Among the plants, sacred, and closely allied to the mystic life of a portion of the human race, there is none more interesting and rich in legend than the mistletoe. This was associated with religious observances before the time of Christ and was mentioned by our earliest historians.

There are over seventy species of this peculiar plant. Both the American variety (*Phoradendron flavescens*) and the European, or true mistletoe (*Viscum album*), belong to a family of parasites, so called because they derive their nourishment entirely or in part from some other plant instead of taking it directly from the soil. Owing to the presence of the green coloring matter (*Chlorophyll*), in the stems and leaves, the mistletoe is not entirely parasitic, but is to a certain extent self-supporting, drawing but a portion of its nourishment from the tree on which it grows.

It is found both on deciduous and on evergreen trees. In some locations in Europe it is especially abundant on the apple tree and, if in the right climate, there are few tree species which are exempt from serving as its host.

The mistletoe is an evergreen shrubby plant of slow growth, attaining a length of about four feet and its duration of life is practically that of the tree on which it grows. The leathery leaves and rugged stems are yellowish green in color and, in the axils of the leaves, are the small and insignificant flowers, which ripen about Christmas-tide into pearly white translucent berries. The seeds are probably distributed through the agency of fruit-eating birds which, after eating, wipe their beaks on the trunks and limbs of trees, leaving the seeds snugly planted in the crevices of the bark.

In Scandinavian mythology we find the mistletoe used to cause the death of one of the favorite gods of the Norsemen, Baldur, the god typifying the beautiful, the good, and the wise. In this myth other friendly gods, fearing Baldur's death, with his mother, exacted an oath from animals, plants and minerals that they would not injure him. Unfortunately, however, the mistletoe was forgotten and Loki, the god of evil, knowing this fact and jealous of Baldur's beauty, gathered a branch, and taking it to Hödur, the blind god of brute strength, directed him how to aim it. Baldur was pierced by the mistletoe and fell to the ground, dead.

But it was in "Merrie England" that the mistletoe was held most sacred, most revered. The Druids, the early priests of the Gauls and Britons, were accustomed to retreat to the oak groves for their mystic rites. The mistletoe was not often found upon the oak, but when discovered, was the occasion of special rejoicing and peculiar ceremonies, being cut with a golden hook, and white bulls were sacrificed under the favored tree. We are told by some authorities that as the oak was the symbol of God, the All-powerful, so the mistletoe became the symbol of man, receiving his life and sustenance from God. There are other interesting myths; and, in fact, the mistletoe is closely woven with many beliefs and rites of the Druids.

At Christmas-tide the mistletoe is largely used for decorative purposes, especially in England, where the custom is ancient, and also in our own land, where each holiday season finds more and more of this unique plant gracing chandelier and window, until we, too, may some day find our maids all kissed—

"Under the mistletoe bough."

THE EAGLE.

Bird of the broad and sweeping wing,
Thy home is high in heaven,
Where wide the storms their banners fling,
And the tempest clouds are driven.
—*Percival.*

THE bald eagle became the bird of our nation in the year 1873. It is at home in all parts of North America. Its nest in the top of a lofty tree is a common landmark in Maine, and on the great mountain peaks of the western states the nest is usually placed upon the rock where no man nor beast is able to climb.

The American eagle lives in America only, but an eagle living in the Old World looks very much like it. The American bird is larger than the one found in Europe. It is believed that the bird of our country sometimes visits Europe, for an eagle is seen there at times that seems to be our own bald eagle.

The birds that have beaks and claws like those of the eagle are very much like the cat family upon the ground. They are all fierce hunters and live upon weaker animals and birds. The greatest of all the cat family is the lion, the king of beasts. The greatest of the cats of the air is the eagle, and he is called the king of birds.

As the cats have claws and teeth for catching and tearing their prey so the eagles have beaks and talons which are strong and sharp. The cats come quickly upon their prey without the least noise. So do the eagles. They come down from the sky like lightning and nothing is swift enough to get away, unless it is warned of the eagle's coming.

An eagle sometimes lives to be over one hundred years old. Many years ago it was said that an eagle never dies of sickness nor of old age, but that its beak grows out of shape in its last years so that it cannot eat.

All people have admired the eagle. The Indians of America have always liked to wear the feathers of the king of birds, and in Scotland the chief was known by the feather of an eagle which he wore in his bonnet.

It often happens that a young eagle looks much larger than its father or mother. This is because the first feathers of the wings and tail are longer than the ones that grow in their place when the young eagle has once shed them. The young eagle is also darker than the old one. This is why some people have made mistakes in writing about them without knowing a young eagle from an old one.

Eagles of the same kind are not always of the same color. Some are darker than others and the markings are not alike. Some young eagles shed their downy feathers early and wear the dress of grown-up birds. Others keep some or all of their baby feathers five or six years. And there are some very old eagles still wearing some of the downy feathers of their first dresses.

Eagles kept in cages lose some of their fierce ways and change the colors of their dress. But they do not forget that they are eagles. A large cat once went under the bars of an eagle's cage to get the meat which had not been eaten by the bird. Down came the eagle, tore the cat to pieces, and ate him in a hurry.

The bald eagle is very fond of fish. I have seen him on a bright day sailing high above a lake where I was fishing. He was so slow and lazy that I did not think he was fishing too. But when he saw a fine large fish near the top of the water he came down like a flash, struck his claws into the fish, and flew away to his mate in a tree upon the land.

Sometimes the eagle gets the fish hawk to do the work for him. Waiting on the branch of some tree upon the shore he sees the fish hawk flying about over the water looking for his prey. As soon as a fish has been caught and the hawk is coming ashore to eat it, the eagle frightens the hawk so as to make him drop his fish. Then the eagle catches it again before it strikes the water.

It is because he is such a robber that some of the people of America did not like to have him [Pg 25] chosen to be the bird of our nation. They felt that we ought to have a bird that is good towards all the other birds.

A poor family once lived for a long time by robbing an eagle. The father climbed to the nest and took away the meat which the eagle brought for its young. Every day he got food for his family from the eagle. When the young birds were almost ready to fly he cut the feathers from their wings so they could not leave the nest. Then he tied them in to make sure of his own meat every day. The young ones cried harder when tied and the old ones thought they were hungry and brought them more flesh.

When the young are old enough to fly the old eagles fly above them as if to show them how easily it is done. If the young do not try to fly when the old ones think it time, they are pushed out of the nest as if to kill them. But the young wings flutter so that the bird does not fall hard, and the old bird flies under her young one to prevent any harm.

The eye of this bird is so keen that it can see a small animal much farther than the animal can see

the great bird. When out of sight in the sky the eagle can see a hare as it comes out of its hole. It comes down so fast that it sometimes catches the hare before it can get back to a safe place.

When the sky is clear the eagle flies very high, but on cloudy days he keeps nearer the ground. He likes to fly over waterfalls because fish are to be caught as they pass over the falls. At Niagara Falls eagles are often seen because animals are sometimes carried over the falls by the rushing water, and the birds can get them easily.

The eagle likes to face the sun and fly towards it as if he thought he could reach it. For a long time people wondered how he could face the sun so without being made blind. But we know now that he has a covering for his eyes that keeps them from all harm from the strong light. If you watch a chicken you may see it has two eyelids for each eye. So has the eagle. The eagle has a sort of eyebrow of feathers that may help protect his eyes from the strong light.

While the eagle is graceful in flying he is not at all so in walking. Few birds are so awkward on their feet. His great claws are made for catching his prey rather than for walking. He can tear things with them and use them in fighting, but he has not much use for them upon the ground.

When they cannot get the food that suits them best eagles will sometimes steal farm animals. Lambs, or even full-grown sheep are easily carried away. They have been known to attack children and carry them off. But they do not often do this, and they have been known to carry them a little way and then set them down again as if the load were too great or they did not wish to eat them.

A story is told of a man who lived a long time ago, and who had but one child, a little girl. He wished to adopt a poor little baby boy, but his wife did not wish to take care of the boy. He had the baby carried to the top of a tree in which was the nest of an eagle. The baby was placed in the nest so he could not fall, and the man and his wife walked under the tree. The child cried so that the lady heard him. She supposed it had been carried there by the bird. Great haste was made to get the baby down, and the lady was so pleased to think she had saved the child from being eaten by the birds that she kept the little one as her own son.

Eagles hunt in pairs. One flies about near the ground to scare the game from the bushes and trees, while the other keeps watch from above to swoop down on the first thing that comes in sight. While their young ones are in the nest the old birds are very active. They are fierce if anyone comes near the young.

Sometimes they show as much cunning in taking their prey as any of the cat family. In flying down to catch animals upon the ground they take care to fly so that their shadow will not frighten their prey. An eagle has been known to destroy an animal too large to be picked up by flying at the animal fiercely as it stood upon the edge of a steep place. The wings of the bird frightened the animal so as to drive it over the cliff to meet death upon the rocks below.

(*Continued on page 36.*)

NUTS.

1. The English walnut (*Inglandaceæ*) has a thin shell. This nut is much esteemed and is an important article of commerce. It yields by expression a bland fixed oil, which, under the names of "walnut oil" and "nut oil," is much used by painters and is a common article of food.

2. The peanut (*Arachis*) is also called ground nut and earth nut. It is cultivated in all warm regions of the globe, and its usefulness is such that it is likely to extend. It was introduced from Peru into Spain, and thence into France. It succeeds in favorable situations and yields from eighty to one hundred fold. Its cultivation is so general in the eastern parts of Africa, and even in the interior, that doubts have been therefore entertained of its American origin, of which, the most eminent botanists seem to be quite satisfied. The fruit is sometimes eaten raw, but generally boiled or roasted. The importance of the plant is chiefly owing to the fixed oil contained in it, which is used for the same purposes as olive or almond oil.

3. The Brazil nut is the fruit of the *Bertholletia excelsa*, a large tree of the order *Lecythidaceæ*, found chiefly on the Orinoco. The shell is very hard, and contains a rich, oily meat in one piece like an almond. The Portuguese early carried on an extensive trade in these nuts. They are now chiefly imported from Para, and continue to form an article of great commercial importance. When fresh, they are highly esteemed for their rich flavor; but they become rancid in a short time from the great quantity of oil they contain. This has been largely extracted for use in lamps.

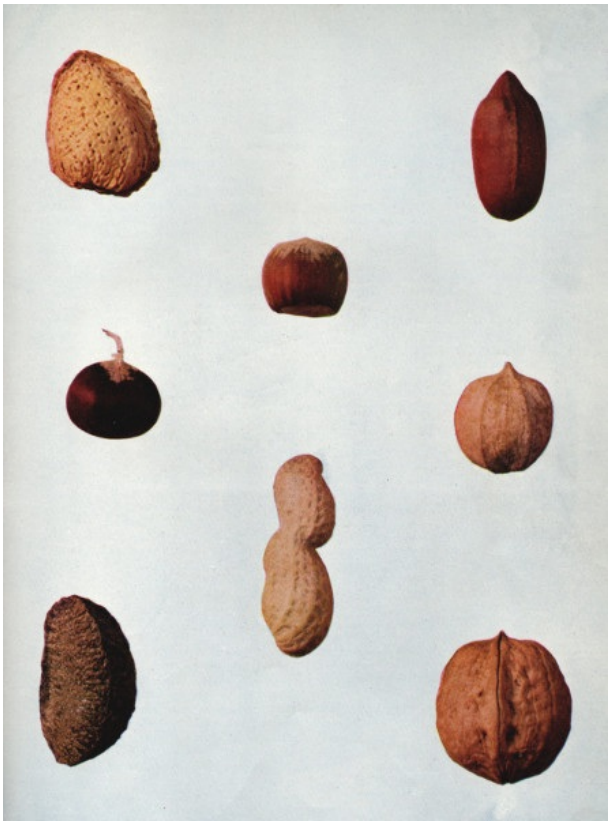
4. The hickory nut (*Carya alba*) abounds near the great lakes and in some parts of New Jersey and Pennsylvania. The nuts are in considerable demand and are sometimes exported. The shell is thin, but hard, and the kernel sweet. The oil, which was used by the Indians as an article of food, was obtained from it by pounding and boiling.

5. The filbert is the fruit of the *Corylus avellana* or hazel. The kernel has a mild, farinaceous, oily taste, agreeable to the palate. In England filberts are usually large hazel nuts. The American hazel nuts are of two other species.

6. The chestnut (*Castanea vesca*) is eaten raw, boiled, or roasted, or is ground into meal and puddings, cakes, and bread are made from it. The tree is common to Europe and America.

7. The pecan (*Carya olivalformis*), sometimes called the Illinois nut, a species of hickory nut. The shell is thin and the meat well flavored. The tree grows in North America, chiefly in the Mississippi valley, and in Texas, where it is one of the largest of forest trees.

8. The almond (*Amygdalus*) grows on a tree about twenty or thirty feet high, a native of the East and of Africa, but has now become completely wild in the whole south of Europe. It is planted for the sake of its beautiful flowers, which resemble those of the peach in form and color. The wood of the tree is hard and of a reddish color, and is used by cabinet-makers. But it is chiefly valued on account of the kernel of its fruit, well known by the name of almonds, an important article of commerce. It is mentioned in the Old Testament, and appears to have been cultivated from a very early period. It was introduced into Britain as a fruit-tree before the middle of the sixteenth century, but it is only in the most favored situations in the south of England that it ever produces good fruit. It is successfully cultivated in southern California. Almonds are either sweet or bitter. The bitter appear to be the original kind, and the sweet to be an accidental variety, perpetuated and improved by cultivation.



Almond.

Chestnut.

Brazil nut.

Life-size.

Filbert.

Peanut.

Pecan.

Hickory nut.

English walnut.

THE BIRTH OF ATHENA.

BY EMILY C. THOMPSON.

IT IS a study, interesting to some of our modern scholars, to fathom the depths of obscurity and bring up from the hidden past, from the minds of men long departed, their conceptions of the beings whom they worshiped. Still more interesting is it to surmise and conjecture the origin of these marvelous beings. Charming books have been written upon these subjects and they prove fascinating to the reader who, with vivid imagination, can follow the theories of each author and the long fantastic proofs. The gods of the Greeks, those anthropomorphic beings, throbbing with life, radiant with beauty, the ideal of all that is fair and lovely, and yet the prey of human passions and desires, are a never-ending source of delight to classical students.

All theories start from the supposition that the gods had their origin either in physical or mental phenomena. Many try to trace out the effect which the world of nature with its wonders, its beauties, and its fearful realities, has had upon the savage and primitive mind, and how from these impressions arose the main gods of the Greek religion. Of course there are scholars on the other side who will not admit that there is any physical aspect of any of the gods. So the conflict rages, exciting, even absorbing, but inconclusive. The method of proof must depend largely upon the actual remains of that civilization which are still left for us in the literature and art of that people. The Greeks had an established theogony very early, as we know by the "Theogony" of Hesiod, which still remains. In this the parents of the gods were traced far back, to Gaia, the earth, and Uranus, the sky, who themselves were sprung from Chaos. A minute relationship was figured out between all their deities which is to us almost too perplexing to follow. Many names in this theogony are names taken from nature, as those above, and so the scholars get a basis for their investigations.

Athena was one of the principal goddesses of this race, the virgin goddess of wisdom and of the arts of life, especially honored at Athens, the seat of ancient culture. Could any goddess seem farther removed from anything physical or material?—and yet we find many theories from competent, earnest scholars, brought forward to prove that such a relationship did exist. The birth of this goddess as recorded by the ancient writers was peculiar. At a blow given by Hephæstus (Vulcan) or Prometheus, she sprang from the head of Zeus, the great god of Olympus, clad in her armor, full-grown, and perfect.

A few quotations will tell us the story and show us all upon which the scholars have to base their theories about the origin of the goddess and her nature.

Homer presents Athena to us as the daughter of Zeus, and of Zeus alone, but he does not tell anything about her birth. She seems to be the spoilt darling of her father, or as one German writer calls her, *sein anderes Ich*. She wears the ægis of her father and sometimes all his armor, as she takes an active part in the battles, aiding her beloved Achæans.

Hesiod, Theogony, 886-900; 924-926.

"Zeus, the king of the gods, made Metis first his bride—Metis, most knowing of gods and of mortal men. But when she was about to bear the glancing-eyed goddess Athena, then deceiving her mind by craft, by winning words, he swallowed her, by the shrewdness of Gaia and starry Uranus, for thus they advised him, that no other of the ever-living gods might gain kingly honor in place of Zeus. For from her it was decreed that there should spring clever children; first the glancing-eyed maiden, Tritogenia (Athena), having equal strength with her father and wise counsel; but that then she would bear a son, king of gods and men, with overbearing heart. But first Zeus swallowed her, since the goddess purposed both good and evil for him.... So he himself bore from his head the glancing-eyed Athena, terrible, strife-stirring, leader of the host, the unwearied, revered one, whom the din of battle, wars, and combat delights." [Pg 30]

Pindar, Olympian VII, 33-38.

"Then the golden-haired one (Apollo) spoke from the fragrant shrine of the temple, spoke of the voyage from the Lernæan shores straight to the sea-girt island where the king of the gods, the great one, moistened the city with golden snowflakes, when by the arts of Hephæstus, by his brazen ax, Athena springing down the crest of her father's head, uttered the war cry with a mighty shout, and Heaven and Mother Earth shuddered before her."

Homeric Hymn to Athena XXVIII.

"Of Pallas Athena, honored goddess, I begin to sing, with glancing eyes, of many counsels and kindly heart, revered maiden, savior of cities, valiant, Tritogenia, whom Zeus himself bore from his sacred head, clad in her arms of war, golden, all-radiant. Wonder held all the immortals as they looked upon her. She quickly sprang before ægis-bearing Zeus from his immortal head shaking her sharp spear. And great Olympus trembled terribly beneath the weight of the glancing-eyed one, and the earth about resounded fearfully, and the sea was moved, agitated with its purple waves, and the salt water was poured forth on a sudden. The glorious son of Hyperion (the sun) stopped his swift-footed steeds for a long time until the maiden Pallas Athena took her arms from her immortal shoulders and all-wise Zeus rejoiced.

"So hail to thee, daughter of ægis-bearing Zeus! But of thee and of another song I shall be mindful."

Lucian, Dialogi Deorum VIII.

In Lucian's "Dialogues of the Gods" we find the following scene which gives an amusing account of the story in the words of Hephæstus and Zeus.

Hephæstus.—"What must I do, O Zeus? For I have come with my ax, the sharpest one, if it should be necessary to cleave stones at one blow."

Zeus.—"That is good, O Hephæstus, but bring it down and cleave my head in twain."

Heph.—"Are you trying me or are you insane? Tell me truly what you wish of me."

Zeus.—"This very thing, to cleave my head. If you disobey, not now for the first time will you make trial of my anger. You must strike with your whole heart and not delay for I am tortured by the pains which confuse my brain."

Heph.—"See to it, O Zeus, lest we do some harm, for the ax is sharp and not without bloodshed."

Zeus.—"Only strike quickly, Hephæstus, for I know the consequences."

Heph.—"I am unwilling, but still I shall strike, for what must I do when you bid? What is this? A maiden clad in armor! A great evil, O Zeus, did you have in your head! Naturally were you quick to anger, keeping such a maiden beneath the covering of your brain and armed too. I suppose it has escaped our notice that you had a camp and not a head. She leaps and dances, shakes her shield, brandishes her spear, and is in an ecstasy. And the greatest marvel, she is fair and vigorous—already in this short time. Quick-glancing eyes has she, and a helmet, too, adorns her. Therefore, oh Zeus, as my wages, promise her to me."

Zeus.—"You ask what is impossible, Hephæstus, for a maiden always it is her wish to remain. I, as far as I am concerned, do not gainsay it."

Heph.—"I wanted this. I'll manage it and I'll snatch her away."

Zeus.—"If it is easy for you, do it. Still I know that you ask what is impossible."

A certain Philostratus gives descriptions of paintings which he pretended belonged to a gallery in Naples, and this is one of them: "The Birth of Athena."

"Those astonished ones are the gods and goddesses to whom the order has been given that even the nymphs are not to be absent from heaven, but are to be present with the rivers from which they are sprung. They shudder at Athena, but just now sprung in her arms from the head of Zeus, by the arts of Hephæstus, as the ax shows. No one could imagine the material of her panoply, for as many as are the colors of the rainbow as it changes into different lights, so many colors flash from her arms. And Hephæstus seems in doubt by what gift he should win the favor of the goddess for his bait is spent since her arms have grown with her. [Pg 31]

Zeus gasps with pleasure, as those enduring great pain for great gain, and inquires for his child, proud that he bore her, and Hera is not angry, but rejoices as if she had borne the maiden herself. Now two peoples sacrifice to Athena on two citadels, the Athenians and the Rhodians, land and sea; of the one indeed the sacrifices are without fire and incomplete. Among the Athenians fire is painted and the savor of sacrifices and smoke, as if fragrant and ascending with the savor; therefore, as to the wiser and those sacrificing well, the goddess comes to them. It is said that gold was poured down from heaven for the Rhodians and filled their houses and streets since Zeus poured out a cloud upon them because they, too, revered Athena; and the god Wealth stood upon their acropolis, winged, as if from the clouds and golden from the material in which he appears, and he is painted as having eyes, for from foresight he came to them."

Now that practically all the evidence has been brought it is time to investigate the theories propounded by these modern scholars and the various interpretations which they put upon this strange birth of a deity.

Preller looks upon Athena as the goddess of the clear sky. In the cloudy sky, in the midst of the storm and lightning the clear bright heaven appeared, and this was the birth of Athena. The sky is of the greatest beauty in Greece, especially in Attica, so Athena was most honored in this land.

To another German scholar, Welcker, she is the æther and also the spirit, presenting both sides of the nature of her father, being æther, the daughter of Zeus dwelling in the æther and spirit, the daughter of Zeus the most high spirit. He lays a great deal of stress upon etymologies in his method of proof, deriving the name Athena from æther, but as every author has a different derivation for this name equally plausible, it is impossible to have full confidence in this gentleman's theory.

Ploix regards Athena as the twilight, and Max Müller brings forward his inevitable "Dawn" as the true solution of the question, but the view which is presented in Roscher's Lexicon is perhaps the most sensible of all on this side. Originally Athena was the storm-cloud, and her birth from the head of Zeus shows this, Roscher maintains. This interpretation is evident all through the myth. The clouds appear in different forms, sometimes as the head of Zeus the god of the weather, at other times as the ægis. The lightning is the bright hatchet or glittering lance with which the blow is dealt. The thunder is the terrible war cry. That she was born in the west adds to this evidence, as storms came to the Greeks from that direction.

Farnell contends valiantly in support of his theory that Athena represents no physical force in

nature, but wisdom. In antiquity he acknowledges that some philosophers did regard Athena in the other light. Aristotle looked upon her as the moon. The stoic Diogenes Babylonius gave a physical explanation of her birth. He recalls also a comment of a scholiast to Pindar, which tells that Aristocles said that the goddess was concealed in a cloud, and that Zeus, striking the cloud, made the goddess appear. He remarks that philosophers then, in their vagaries, were no better than modern scholars, but that the conceptions which the Greek people and poets had are important for us in reaching a true conclusion; so he endeavors to prove that neither in the accounts of the poets nor in the minds of the Greeks was there any physical conception of the goddess.

In the hymn quoted above he reminds us that there is no thunder which could not be left out if this were the description of a storm. He says also that there is nothing physical in the picture which Pindar gives us, unless the terrible cry of a deity must be taken to mean thunder. Lucian tells of no storm, and Philostratus, who is so fond of finding remote allusions does not seem to find any indication of a clash of the elements. The only physical feature in his description is the comparison of the panoply of Athena to a rainbow. So Farnell says: "It may be admitted, then, that these poetical descriptions do not consciously express the physical fact. To make them serve the other theories we must regard their highly wrought phrases as mere survivals of an ancient poetical symbolic diction which did more clearly express this." If this were true, would not the earlier accounts preserve this diction for us? But they do not, for this symbolic language is not found in either Homer or Hesiod. He says: "Is it not more natural to say that as imagination dwelt upon her birth the poets tended to embellish it with the richest phraseology, to represent it as a great cosmic incident in which the powers of heaven and earth were concerned?"

[Pg 32]

His opponents seem to base all their interpretations upon the later accounts, beginning with the Homeric hymn, for this story which Hesiod gives is in the way as there is no phenomenon in the world of nature corresponding to the swallowing of Metis. Metis is Thought or Counsel and is a personification of this abstract idea as Hesiod shows by calling her the most knowing of gods and men. Preller objects to this, and affirms that this primitive language does not deal with abstractions, and that the adjective thus applied to her by Hesiod simply connects her with the water, as there is a sea nymph of that name. But in all the myths which mention Metis, she appears as Thought or Counsel, and it is absurd in a language which personifies grace, righteous indignation, and law not to allow Metis (Thought) to be a similar personification.

Of course the worship of Athena had been long in vogue before a story of her birth arose. So Farnell reasons out the origin of the story thus: In her worship Athena appeared to have abundant thought and counsel, therefore she naturally became the daughter of Thought or Counsel, the daughter of Metis; she had all the powers of Zeus, therefore she became the daughter of Zeus, and as she had no feminine weakness and inclined to father more than mother, she could not have been born in the ordinary way, and this might have been so if Zeus had followed a fashion common in myth and had swallowed her mother, Metis. The prophecy given in Hesiod as the reason for the swallowing probably arose after the story, as the fulfillment of the prophecy could have been hindered in easier ways, and it is likely that this reason was borrowed from other myths, as, for example, the Cronos story.

The above explanation, Farnell says, is, of course, only a hypothesis, but it has the advantage over the others of being suggested by the most ancient form of the legend and the most ancient ideas concerning the goddess. He adds that the appearance of Prometheus and Hephæstus in later accounts would only strengthen his interpretation, the association of these divine artists with the goddess of wisdom and of the arts of life.

This was a favorite subject with the artists from the earliest times as old vase paintings bear witness. But the famous representation was that in the east pediment of the Parthenon, the work of Phidias. Only fragments of this remain to-day. The central group is entirely lost except for the torso of one god, supposed by some to be Hephæstus, but more probably it is that of Prometheus. So the fragments are of the side groups and not so helpful in recalling the original, but still conjectures and reproductions have been innumerable.

In Madrid a Roman puteal has been found which is believed to present the central group of the east pediment. Upon this Zeus is seated, before him Athena flees away, Victory flies after her to place a crown upon her head and behind Zeus Prometheus with the ax in his hand draws back in fright and turns away. This group of Phidias was, of course, the culmination of this story in art. The later representations are few and supposed to be merely copies of this.

[Pg 34]

FROM COL. CHI. ACAD. SCIENCES.

WHIPPOORWILL.
¾ Life-size.

THE WHIPPOORWILL.

WHAT farm boy has not heard this birdless voice echoing from the ghostly shades of the thicket close at hand, or scarcely audible in the distance? Perhaps you have heard it as you have passed between the wood and the hill over there, coming clear from the wood but reëchoing from the hill only the shrill last syllable. Farther away on the distant hill-top you may have taken this last syllable for the piping of the salamander. The "whippoorwill" song belongs with the early May moonlit balmy nights, before the blossoms have lost their best perfume and before farm work has become a mere drudgery.

It vividly recalls the merry May-basketing frolics, apparently so necessary to existence on the farm; the fresh green fields and woodland blossoms; the planting season with all its hidden promises. There is, in the warble of the bluebird, glad promise of returning spring; and in the animated whistle of the phœbe reiteration of the earlier promise; but the whippoorwill tells of that delightful season realized. His is not a complaint groaned forth, but a glad announcement of joy fully come.

My early home nestled in one of those gems of woodland that dot the rolling Iowa prairies. One of my earliest memories of this old home is the twilight choruses of the whippoorwills in the door-yard. They often ventured upon the door-step and sang for minutes at a time, apparently oblivious of the members of the family seated just inside the open door. On more than one occasion more than one bird occupied the door-step at the same time, all the while apparently trying to drown each others' voices in a continuous flow of song. At such times the delightful mellowness which one hears, with the birds in the distance, gives place to an almost painful, penetrating shrillness. The more deliberately uttered song is invariably preceded by a strongly guttural sound not unlike that produced by striking an inflated rubber bag. The near-by song, to my ear, sounds like "*qui ko wee*," the first syllable with a strong "q" sound. I have never heard them sing later than 11 o'clock in the evening nor earlier than 3 in the morning.

It is well-nigh impossible to creep upon a singing bird in the woods, even if it could be seen in the dim light, but it was not unusual, at my old home, for the birds to playfully fly round and round anyone who might be standing out in the yard at twilight. The birds often came so close that the wings seemed to brush the face. The flight is so utterly noiseless that the object of their sport is aware of the presence before he can fully realize what it is.

The whippoorwill inhabits the eastern portion of the United States, west to eastern North and South Dakota and Nebraska, western Kansas, Indian Territory and Texas; north to southern Canada, into Nova Scotia and Manitoba; and south in winter into eastern Mexico and Guatemala. It breeds in the northern and central parts of its range, and rarely to Florida.

The nest is made late in May or early in June, in the Northern states. The eggs are two in number, light gray or white, with brown and lilac markings often arranged in scratchings and pencilings besides the spots and blotches. There is usually scarcely more of a nest than the leaves lying on the ground; rarely nothing but the bare ground.

THE EAGLE.

(*Continued from page 25.*)

Eagles are sometimes caught by placing a large cage on edge so it will fall when a string is pulled. A live hen and her chickens are tied to the cage so they may run under when the eagle comes at them. As they run into the cage to escape the eagle, he follows them, the string is pulled, and the eagle finds himself alone in the trap, for the hen and her chickens easily get out between the bars which are too close together to allow him to do the same.

An eagle once attacked a weasel. This little animal is very fierce, and will not give up its life easily. Finding itself in the grasp of the bird, the weasel turned and fastened its teeth in the throat of the eagle. It was lucky for the eagle that the weasel did not cut his throat, but the little animal never let go. Its teeth were locked into the flesh of the eagle so they could not be torn open. Years afterwards the eagle was shot, and it had on its neck a queer locket, the skull of the weasel hanging there by the teeth. Sometimes the weasel cuts a vital part in the bird that picks it up, and then the weasel enjoys the life-blood of his enemy.

We have a gold coin that is named after the eagle. It is worth ten dollars. In fact it is ten dollars in gold. The first one was made in 1792. Half-eagles, quarter-eagles, and double-eagles have also been made of gold at our nation's mints.

In some countries besides America it has been the national bird. When the army of Rome first tried to land in England the men feared the fierce English soldiers. One soldier had an Eagle with him in the boat. He jumped into the sea with his eagle and called to his friends to follow him. They soon put the enemy to flight, and the eagle was praised for helping them win.

The eagle is fond of capturing such birds as the swan. When he finds a swan flying so high that it cannot get to the water and dive out of his reach the eagle flies against the swan from below with such force that the breath is knocked out of the swan in an instant. As the swan falls lifeless to the ground the eagle invites his mate to meet him at the spot and they have a great feast.

The eagle flies swifter than a railway train, but one was once caught by a train before it could rise and get out of the way. The "cannon-ball" train on the Georgia Railway was late. In making up time it swung round a curve in a cut at full speed. A bald eagle was seen on the track by the fireman, who was looking out of the window. The pilot of the engine was upon the bird before he could rise. It struck him, tumbled him upon the frame, and fastened one of his claws into a wooden beam.

Before the eagle had time to get back his senses the fireman climbed along the foot-rail to the pilot. He caught the great bird, and a fierce struggle followed. The bird fought for freedom and the fireman fought for a prize.

The train was going at the rate of forty-five miles an hour. It was hard for the man to keep himself on the engine with one hand on the rail and the other holding the eagle, which tore at him wildly as the engine swung to and fro upon the rails.

The man's clothing was torn to shreds and his hands were bleeding. But he worked his way back to the cab where the engineer assisted him in tying the eagle so he could not get away. But the tying was not easy for two men, for the bird made good use of his great beak and claws.

When spread out on the car floor he measured seven feet from tip to tip of his wings. He was not injured, and is now kept as a splendid prisoner, the king of American birds.

MIGRATORY BIRDS.

IN the New World the birds of the temperate zone are rather perplexing in their migratory habits. Many of those which go north to Canada and Alaska in the summer pass the winter in Mexico, Panama, and even South Columbia; while others, as well as a number of migrants from the United States, go over to the West Indies. One of the most wonderful instances of migration is that of the tiny flame-breasted humming-bird (*Selasphorus rufus*), which breeds on the west coast of America as far north as Alaska and Bering Island, and winters in Lower California and Mexico. Thus, with unerring instinct, this diminutive bird, scarcely two inches long, flies twice a year the astounding distance of over 3,000 miles. The birds which belong to the second class—those which breed in the Arctic regions—comprise the swans, many of the waders, and a considerable number of ducks and geese. In Europe these birds spend the winter in all the countries from England south to the Mediterranean and Black seas, some even going as far south as the upper reaches of the Nile. In Asia most of the waders, such as snipe, woodcock, sandpipers, and plovers, as well as the ducks and the geese, spend the winter in India and South China. In America the Arctic birds migrate to the Southern United States and Mexico.

The partial migrants, which form the third class, are rather more puzzling in their movements, for among them we find birds whose motives for wandering are very diverse. Some are unwilling slaves—*i. e.*, they get mixed up in the big flights of true migratory birds, and are irresistibly hurried along with them; such are the rooks, starlings, robins, etc., which are so frequently seen in Heligoland in the midst of a flock of swallows, warblers, and other genuine migrants. Another lot of these partial migrants are those which, perhaps, most justly deserve this name; viz., such birds as larks, pipits, titmice, etc., which, although resident with us all the year round, at times greatly diminish in numbers, owing to more than half the individuals changing their abode. For instance, those which breed in Scotland and England wander in the winter over to France, but, unlike the true migrant, always leave some of their number behind.—*Walter Rothschild, The Nineteenth Century.*

HOW BIRDS CARRY SEEDS.

DR. HOWARD, the new secretary of the American Association for the Advancement of Science, writing of the manner in which seeds are carried to a great distance by birds, recited an experiment of Darwin, which had a curious result. Adhering to the leg of a wounded partridge, Darwin found a ball of earth weighing six and a half ounces. From the seeds contained in this ball he raised thirty-two plants belonging to five distinct species.

THE SHIP OF THE DESERT.

THE pack camel travels very slowly, and until you are sufficiently reconciled to the motion to be able to doze on its back, you are constantly tempted to get off and walk. If you want speed, you must buy a racing camel. This seems to belong to a different creation. It is much taller, more alert and more intelligent. It can accomplish 150 miles in sixteen hours without undue effort, and, in the matter of price, compares with the pack camel as the thoroughbred does with the cab horse.

THE SNAPPING-TURTLE.

BY reason of the ferocity of disposition of this curious animal, the snapping-turtle (*Chelydra serpentina*) is rather formidable, not only to the smaller creatures which inhabit the same localities, but also to man, its bite causing very severe wounds. It is found in America from Canada to Ecuador, and there are few localities where it is not met with frequently. Swimmers in small lakes are sometimes attacked by it, the habits of the animal both in the water and on land being the same. It is bold as well as fierce, often suffering itself to be lifted from the ground by the object which it has grasped rather than to let go its hold. If attacked, the reptile's long reach and strong jaws enable it to defeat any ordinary foe. The elongated tail of the snapping-turtle has given rise to the popular name, alligator turtle and, being appended to the small, comparatively thin shell, giving an elongated appearance to the body, the specific name *serpentina* resulted.

When the snapper elevates itself for the attack, with half-open mouth and sullen eyes, there is said to be something fiery and defiant in its attitude, though it is so slow and awkward in recovering itself after missing its point of attack that it presents a most ludicrous appearance. These turtles are remarkably strong. The elder Agassiz states that he observed one bite off a piece of plank more than an inch thick. They also attain considerable size, being the largest inland representative of the order, specimens not infrequently exceeding three feet in length. It is carnivorous in its habits, and is very destructive of fish, small quadrupeds, birds, and reptiles. Many have been the water-fowl which have ventured too close to their voracious enemy. Its appetite is said to be so great that it will even catch young alligators, and devour them in spite of their teeth and struggles.

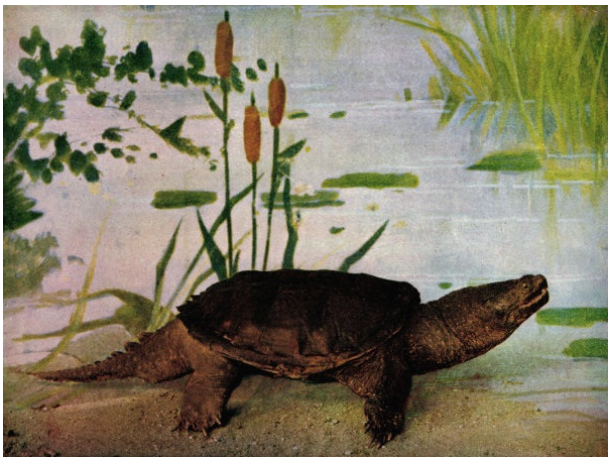
The flesh of the snapping-turtle is delicate, tender, and of rich flavor. Every fisherman knows that it will take almost any kind of bait, provided it be of animal substance. It, however, prefers fish, and cannot resist a hook so baited.

In the northern United States, from the tenth to the twentieth of June, it has been observed, the female, at early morning, leaves the water and crawls to a sandbank, digs a small cavity with its hind leg, into which the small, round eggs are deposited to the number of twenty-five or thirty, when the sand is drawn over them, the surface smoothed down, and the animal is soon back in the water, the entire operation not lasting over twenty minutes. This method is different from that of our other land turtles. Nothing but sand will suit the purpose of the snapping-turtle. In order to find a suitable spot for the burial of her eggs, the female is often forced to traverse a considerable distance. The sand must be quite dry and exposed to the full rays of the sun. The little ones are hatched in July. The young run by instinct into the water.

Remarkable stories are told of the longevity of the turtle and of its tenacity of life. That they live to near a century is well authenticated. After the head is severed from the body the head will open and shut the mouth and roll the eyes. In one case a stick was held between the open jaws, which closed upon it with violence, and kept hold of it. Meanwhile the headless body was crawling on the ground.

An allied form (*Macrochelys lacertina*) inhabits the tributaries of the Mexican Gulf, extending northward in the Mississippi as far as Missouri.

[Pg 39]



FROM COL. F. M. WOODRUFF.

SNAPPING TURTLE.
¼ Life-size.

THE STORY OF LITTLE BILLEE.

CAROLINE CROWNINSHIELD BASCOM.

IN THE March number of the *Cosmopolitan* of 1894, I read a most interesting article about a tame humming-bird. I know a number of people who enjoyed it as much as I, so I feel sure all lovers of pets, especially of birds, will be interested in my story of "Little Billee." I have always been passionately fond of animals and would like to make pets of them all. I have cared the least for birds, (except out of doors) and have known very little about them.

I have been ill many months, and my family and friends have done all they could to make the days pass as quickly as possible for me. Early in June my mother found a little brown bird which could not have been more than two weeks old. Thinking it might amuse me she brought him up stairs done up in her handkerchief, and I took him inside the bed. After an hour he seemed very happy and not at all afraid. I looked him over carefully, but found him uninjured. I took him to the open window expecting to see him try to fly away, but he did not seem to have the slightest intention of doing so. From that day to this he has been perfectly devoted to me and my constant companion. At this minute he is sitting on the back of my neck dressing his feathers.

The first day I could not get him to eat anything until night, when he drank milk from an after-dinner coffee spoon. After that he took little pieces of bread soaked in milk from my tongue or lip. I fed him in that way for several days, then he would take it out of my fingers. He lived on bread and milk for two weeks. Now he eats almost everything that I do. All kinds of vegetables, mushrooms, and ice cream. He likes to sit on my hand or shoulder and take them from my fork.

I have some kind of nourishment every two hours and Little Billee knows very well when my maid comes into my room with a salver that there is something on it to eat or drink, and he is wild until he gets on my hand or shoulder. He drinks milk from my tumblers and will not drink water out of anything but my medicine glass. When Little Billee sees me sit down in the morning with an orange on a plate, he flies upon his cage, then over into my lap, and sits on the first finger of my left hand and eats the orange from my spoon. At first he could not crack his own seeds and as he was very fond of them I used to do it for him. Now he can crack them himself, but he prefers eating them outside his cage, and his hemp seed he always brings over and eats on the rug in front of my bed.

Little Billee is very fond of little orange blossom biscuits. I keep some in a tin box under a table by the side of my bed. For several days every time I would reach out of bed and tap on the box Little Billee would come running for a piece. One day I was visiting with a friend and we forgot all about the bird. Soon we heard rap, tap, tap, pop, pop, pop, and there was Little Billee standing by the box waiting for a piece. Since then he comes many times a day. If I send him away with a small piece he returns directly for a large one.

I had quite a time teaching him to stay in his cage. The first day I put him in I was afraid he would die of fright. I left the cage on the floor for two days before he ventured in. After he had been going in and out for some time, I closed the door, but he was frightened quite as much as at first, and he would not go near the cage the rest of the day. Finally I tried taking the cage on my lap and shutting him in; he did not seem afraid then and now he does not mind being shut up in the morning when I am in my dressing-room, but he much prefers going in and out at his own sweet will. If I leave him shut up in his cage and go back to bed, he is frantic until he is let out and gets in the bed with me. For the first two weeks he was not happy if he was not on me somewhere. He would stay in bed with me for hours at a time, but now he plays on the floor, with a little piece of paper, cotton, or ribbon, and eats his seeds and biscuit. [Pg 42]

I dress my hair high and it is Little Billee's special delight to sit on the top of my twist while I walk about my room. During the first few weeks if I put him on the floor when he had been in bed with me, he would hop back and forth on the rug in front of my bed, and beg to be taken, or he would fly straight up. I would put down my hand, he would hop upon my finger and in a second be back inside the bed. If I was sitting in a chair and put him down on the floor, he would climb right up from my feet to my neck, put his little bill in my mouth and chirp with glee. One day he was on the floor and did not see me go back to bed, but saw my wrapper over a chair (which stood about a yard from my bed). He supposed I was inside of it, but when he reached the top and found no mouth to put his bill into, he gave several very mournful peeps, but as soon as I spoke to him he chirped and it did not take him long to fly over to me. The next day when I put him down on the floor I was anxious to see what he would do. After teasing for some time for me to take him, he went to a chair, climbed up on the wrapper until he reached the top, then flew over to me. Ever after he came that way when I refused to take him.

One day I left Little Billee on the rug in front of the bed and went into my dressing room. While I was gone my mother came in and sat down. He was much frightened. Every time she spoke to him he ran under the bed, stuck his little head out from under the valance and peeped for me to come to him. When I spoke he answered, but was too much afraid to pass mother to come to me. When I came out he ran quickly to me and flew onto the back of a very low chair. I bent down and he flew up on my shoulder, chirping as loud as he could. No little child could have shown more joy in getting back to its mother. I do not suppose he remembers any other mother, and thinks all little birds have just such good mothers as I.

I have a magnificent big tiger cat named Taffy, so I thought Little Billee would be a very good

name for my wee bird. It seems a very appropriate name too, as he spends a great deal of his time dressing himself and manicuring his nails. When he struts about with his head held high you can plainly see the long coat, high collar, high hat, and umbrella and can easily imagine the original Little Billee is before you. But I fear Taffy and my Little Billee will never go walking arm and arm together. Taffy has already caught Little Billee twice, but I have rescued him from the jaws of death before any harm was done. I am trying my best to get them to live contentedly together. I do not allow Little Billee to go out into the hall for fear he will fly down stairs and be caught by Taffy before anyone can reach him. Before the door into the hall is a small rug and he thinks flying over that a great feat, but when I say, "Little Billee, come right home," he returns instantly.

He goes to bed at eight o'clock in a little basket which I put on the top of some hanging shelves so there will be no danger from Taffy in the dark. Taffy sleeps on my bed every night, and very often on the outside when Little Billee is inside, and it seems like the lion and the lamb lying down together. Little Billee will usually be contented in his basket until 7 o'clock in the morning, then I take him into the bed with me where he lies quietly on my arm, neck, or palm until I get up at 9 o'clock. He never makes a peep unless I speak to him, then he chirps away like a happy child. On fine evenings I sat before an open window from 7 o'clock until 8 with Little Billee on my finger listening to the birds. When he became sleepy he tucked his little head under his wing, in a few minutes crawled into the palm of my hand and went sound asleep, ready for his basket.

When the hot wave came I went down-stairs at 7 o'clock, shutting him up in his cage.

The second night I had hard work to catch him. He ran into the hall and would not come when I called to him. The third night, when he saw me making preparations to dress, he acted like mad. He hopped all around me, put out his tiny wings, and tried to fly onto me, opened his bill, but not [Pg 43] a sound came out. As I stood in front of my dressing table he flew to the top of his cage (which stood on the floor) to the back of a chair (which was near me), then up to my shoulder, chirping away so merrily that I knew he was saying: "Please take me with you." Of course, after that it is needless to say I took him down-stairs, and he has gone down every night since, where he remains until 8 o'clock, then is put into his basket, and I hear no more from him until morning.

On pleasant mornings I sit on the piazza and Little Billee sits on my hand or plays in my lap. When I walk on the sidewalk Little Billee goes, too, and never offers to fly away, and if the wind blows he holds on tight. Sometimes he sings and always seems interested in all that is going on about him.

Twice Little Billee has flown out of my window from fright. Once he was on my shoulder when a very small girl with a very large hat came up to him and away he flew. The next time a large bunch of ferns was brought to me. I thought he would like it and think it was a nice little tree, but I am all the tree he seems to care for. He was so frightened he flew onto a chair, and as I held up a fern out of the window he went. Both times when my maid went to look for him she could not find him until she peeped, then he answered, and she found him sitting in the grass waiting to be picked up, and he was delighted to get back to me.

Little Billee has never gone to any one except my physician, and that was when I had had him about a week. He went to him, hopped all over his shoulder, picked at his collar and tie and was very friendly. Now he will not go to even him, and I feel sure I am Trilby and his only love. Perhaps the children who read this will think Little Billee is a little angel bird and too good to live, but I will say right here he is too bad to die. Like all bright children sometimes he is very naughty. For instance, when I want to lie quietly on my bed in the day time and Little Billee does not, he will play for some time running up on the top of my pillow, then down again, hop on my arm, then under the sheet until he finds my hand; back he goes and does the same thing over again. When he gets tired of that he will sit on my chin and be very loving, kiss me in the mouth, and chirp away. When he finds I am not going to open my eyes or speak to him he will peck and bite my eyes, nose, ears, cheeks, and lips, and I assure you they are not love bites either. Then again, when he wants to sit on my shoulder and I prefer he should sit on my hand, he will fly up every time I take him down, and bite hard at my hand, and for such a little bird he has a very big bite and a very fierce look.

He loves to visit my mother in her room, and is very happy walking all over her and on her head, but she has never yet been able to touch him. He seems to have eyes all over his head, for, no matter how careful she is, he always sees the finger. He thoroughly enjoys my squeezing him in my hand, and kissing him over and over again.

No doubt long ere this my readers have been wondering what kind of a bird Little Billee is, but that is a question which has not yet been answered. But I love Little Billee so dearly that it makes little difference to me what his nationality is or whether his ancestors came over in the Mayflower, fought in the American revolution, or whether, like Topsy, he "just growed." It was amusing to see Little Billee the first time he heard the piano. One morning two friends came to see me, and while one of them played I lay on the sofa with Little Billee cuddled up in my neck. At first he was very much afraid and did not know what to make of the music. Soon he became charmed (as everyone does who hears exquisite playing) and craned his little neck way out, opened his bill, as if he were drinking in the sound, then reached around, kissed me in the mouth, snuggled down again, for a few minutes, and repeated it as long as she played.

One morning I saw Little Billee lying on the floor before an open window with his neck stretched out and bill wide opened. I thought he was dying, picked him up, but found him as lively as ever. [Pg 44]

When he did the same thing over again I understood he was taking a sun bath, and now he takes one every morning. One morning it was quite cold when we came in from our walk, and I sat down in front of the fire with Little Billee on my knee. It was amusing to see him put his head on one side, open his bill and drink in the warm air. For six weeks he strongly objected to taking a water bath, and I really suppose he was too young and knew best. I left a little dish for several days on the floor by the side of his cage, but he was very careful not to go near it. One morning everything was very quiet, I on my bed and Little Billee playing about the room. Soon he went to the dish, looked in all four corners, came back to the first one, put his bill in just a little way, then went the rounds; did it all over again, putting his bill in a little further, and shaking off the water. After debating a long time he got on the edge of the dish, put his head in until it was all wet, then screwed up all his courage and in he went. Such a droll little figure as he cut, standing there with his body and head held as high as he could get them, his wings out just a little, not knowing what to do next. All I could think of was a very timid child going in wading for the first time, with long thin legs, very short frock, and arms akimbo. His fear soon left him, and he was bathing like an old stager. When he finished he got out, gave himself two or three good shakes, then came over to the bed, and asked me to take him. I did him up in my handkerchief, but that did not suit him at all. I could not do anything with him, until I let him get on my bare neck, and covered him with the trimming of my robe *de nuit*. He was soaking wet and shivering like a person having a hard chill. He kept very still until his feathers were dry enough to be dressed. Such shaking, dressing of feathers, and prinking I never saw. When his toilet was made to suit him he nestled down under my chin, and we both slept for an hour. Every day we go through the same performance after the bath. One day I wanted to do something in my dressing-room, so thought Little Billee could take his bath and dry himself. Soon I began to hear very mournful peeps, and I came out to find Little Billee, soaking wet, standing in front of my bed, thinking I was there and teasing for me to take him. Of course I could not resist such pleading, so to bed we went. I know I am completely spoiling him, but he is such a dear no one could help it.

Little Billee has taken a great interest in this tale, and when I write is always on my shoulder, arm or hand. His favorite place to sit is on my left hand between my first finger and thumb, as they hold my portfolio on my lap, and peck at my paper and pen. One day he took the pen full of ink into his bill then threw the ink all over my paper. Little Billee has great fun taking the paper off from the bottom of his cage, and carrying it all about the room, and will take it out as fast as I put it in. The other day he went into his cage, took the furthest corner of the paper in his bill, backed out bringing the paper over his head until it was all on the floor, then went over to the opposite corner, took that in his bill, backed off the paper until he came to the end, then went around in a circle like the wind, for perhaps a dozen times, with the paper perfectly straight out just like a sail. After a few moments I put the paper back, he took it right out in the same way and did it all over again.

A number of weeks have passed since I began Little Billee's biography. He grows more wonderful every day, and his devotion to me is simply marvelous. Every day he does some new cunning thing and seems to understand everything I say to him.

The other day he would not come to me when I put down my hand, but ran across the room. After trying for some time to make him mind, I got up and said, "Billee, I am going away and leave you," and started out into the hall. He came chasing after me, and now will always do it when I tell him I am going to leave him. If I go out of my room and tell him he *cannot* go, he will sit on a chair by an open window or play about on the floor for an hour at a time, and never think of flying out of the window or going out of the door.

(*Continued on page 48.*)

FROM COL. CHI. ACAD. SCIENCES.

SAND-HILL CRANE.
⅙ Life-size.

THE SAND-HILL CRANE.

THE sandhill crane is so often confused, in the popular mind, with the great blue heron, that it may not be amiss to suggest the real differences between them. We should first remember that the crane is not found east of Illinois, except casually or accidentally, but is numerous from Illinois westward to the western border of the plains during the migrations. It ranges as far north as Manitoba. The great blue heron is pretty evenly distributed over the whole of North America. The cranes usually, if not always, migrate in greater or lesser flocks, alternately circling upward to considerable heights and sailing straight away, with both soaring and flapping motion, and with prodigious croakings. The herons migrate singly or in pairs, with long, steady sweep of the wings, and make no outcry. Close at hand the two species would hardly be confused by an ordinarily careful observer, but these large birds are rarely seen close at hand.

The feeding habits of the two birds are very similar, and to this superficial similarity is largely due the confusion, I suspect. Both wade into the water searching for some hapless frog or toad, often standing motionless for minutes at a time until the victim comes within range of the sharply-pointed beak, when a lightning-like movement of the head sends the beak completely through the creature, killing and capturing it with one stroke. The long legs and neck are admirably adapted to this kind of fishing.

Colonel N. S. Goss describes the courting antics of these ungainly birds as extremely ludicrous at times. A veritable Indian war dance, in fact, in which the females join heartily, and like the war dance, stopping only when the last participant falls down with exhaustion. It seems to be a sort of promiscuous wedding ceremony for the whole company.

The crane nests on the dry, flat prairie, usually scraping together some wisps of dry grass, but often with not even this poor excuse for a nest. Here two to four drab-brown colored, rough-shelled eggs are laid and the young reared.

Size seems to be the only criterion which determines what the crane may eat. Perhaps it might better be said, what he will swallow. He seems to relish stones, pocket-knives, steel nails and the like fully as well as the choicest bit of frog or toad. Like many other birds, however, he regurgitates the indigestible matter, and so takes no harm from this promiscuous diet. Many of us may have reason to envy him this capacity.

Dr. P. L. Hatch, in his "Birds of Minnesota," gives an interesting description of the fighting qualities of a pet crane which he offered to pit against any and all canines, one at a time. One valiant mastiff, which essayed to do battle with his craneship, entered the ring with all the confidence of an unbroken record of victories, but a moment later he "stayed not on the order of his going," carrying with him the exact pattern of the crane's beak. No other canines ever volunteered for a similar service.

THE STORY OF LITTLE BILLEE.

(*Continued from Page 44.*)

I have succeeded far beyond my expectations with Taffy and Little Billee. It hurt me very much to be obliged to punish Taffy when he would spring at Little Billee, as Taffy and I had been devoted to each other for two years; still I did not want him to kill my baby bird. One day Little Billee was sitting on my knee dressing his feathers and going through all sorts of antics, while Taffy sat a few feet away gazing at him with longing eyes. I called to my maid to bring Taffy and hold him on her lap, and then let Little Billee peck and bite his paws, ears, and nose, and a more astonished cat I never saw. After we let Taffy go he was found sitting on the cellar stairs in a most dejected way rubbing his nose with his paw. For several days we did the same thing until Taffy was afraid at sight of Little Billee. One morning Taffy came to bed with me, and lay on my arm while Little Billee sat on my shoulder. Soon Taffy put his chin on my chin, and Little Billee came and sat close to my cheek. Finally Taffy became so sleepy he turned over, went fast asleep, and Little Billee hopped down on his back, and we lay that way for some time. Since then almost every day Taffy will lie on my lap, and Little Billee will sit on his head, back, or on my knee and dress his feathers. One day Little Billee had the impertinence, while I had them both on my lap, to reach out and peck Taffy in the eye. That was a little more than Taffy could endure, and he reached out his paw and struck at him. For over a week I could not get Little Billee to go near him, but now they are very good friends.

Little Billee enjoys going down into the parlors to see visitors, but he gives them to understand, the first thing, they may look but they must not touch. He will entertain them by hopping all over me, kissing me in the mouth and chirping at the top of his voice. When it begins to get dark Little Billee does not want to be off from me a minute. If I have him down stairs and put him on the floor he will hop and fly after me from room to room. The other day I left him in the front parlor on a plant jar and went into the dining-room and was gone some little time. When I came back there was no Little Billee to be found. I called him by name and peeped to him, but I could not get an answer. As I went upstairs I called, "Where is my Little Billee?" And he said, chirp, chirp, chirp; and I found him in my room eating his seeds and as happy as possible.

Since then every day when he gets tired of the parlors he goes upstairs, for he seems to think my room is his home. One day I watched him to see how he went. He hopped from step to step. When he reached the top he flew into my room and lighted on the top of his cage.

Little Billee is certainly not color-blind, for he notices every little change in my dress no matter how slight it is. He had seen me for weeks in only my robe *de nuit*, and wrapper. It was pitiable to see him the first time he saw me gowned in a white skirt and blue waist. I had to lie down when I had finished dressing and Little Billee came over to the bed as usual and asked me to take him. I put down my hand, he hopped on my finger, but when he looked up and saw the blue sleeve away he went as if he had been shot out of a cannon. He tried several times but his courage always failed. At last he gave up and went and sat in a chair across the room, and it was two days before he really liked the change. Next I tried a pink waist with the white skirt, but that seemed even worse to him, which seemed very strange, as he had seen me for days in a pink and white wrapper.

My numerous friends will vouch for the veracity of the story, as they all think Little Billee is the most wonderful bird they have ever seen. I only hope my little sketch, told just as the things have come to me, will give similar pleasure to other invalids.

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.
- Chapters on The Eagle and The Story of Little Billee were interrupted by other chapters. Incomplete paragraphs were rejoined but the insertions were retained.
- The Gorilla illustration was moved from page 3 to page 2.
- The Contents table was added by the transcriber.

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